S Afr J Sports Med 2024;36:1-138. DOI: 10.17159/2078-516X/2024/v36i1a20497

Table of Contents

FREE COMMUNICATION ABSTRACTS

INDEX	NAME	ABSTRACT TITLE
349	Mrs Rowena Visagie	Awareness and knowledge of the female athlete triad and Relative Energy Deficiency in sport (REDs) among multi-specialty healthcare professionals
222	Ms Christina Sefotha	Perceived knowledge of female athletes on the influence and effects of the menstrual cycle on musculoskeletal injuries
33	Dr Dimakatso Ramagole	Lower limb clinical osteoarthritis and its association with joint pain and function, and severe injuries and surgeries, in female professional football players
275	Dr Lucy Chesson	Injury risk factors and their priority for mitigation in women's netball: A systematic review and Delphi study
189	Dr Marelise Badenhorst	Exploring the influence of 'Recognise and Remove' on management decisions and player disclosure
142	Dr James Brown	Concussion rates in the top-tier elite rugby union competitions across the world from 2019 to 2024
104	Dr Roisin Cahalan	Comparison of match injuries in male adult amateur community rugby union and schoolboy rugby union in Ireland
352	Dr Danielle Salmon	Getting them through the door: Factors that increase the likelihood of a community rugby player attending a medical diagnosis and clearance assessment.
175	Dr Nessan Costello	Total energy expenditure and dietary intake of senior male soccer players during pre-season: A doubly labelled water study
124	Dr Adele Broodryk	Effects of a sleep hygiene period on the internal and external, inter- and intra-match demands of male university-level soccer players during a tournament
40	Dr Lervasen Pillay	Don't forget to mind the mind: a 12-month prospective cohort study on mental health symptoms in active professional male footballers
193	Dr Mduduzi Rhini	Physical demands comparison of different formats of small-sided games in a South African Premier Soccer League team
283	Dr Siphesihle Nqweniso	A combined physical activity and multi-micronutrient supplementation intervention in South African primary schools: Effects on physical activity, fitness, and cardiovascular disease risk factors
346	Prof Sarah Moss	Association between physical activity and cardiorespiratory fitness of adult women from a low-resourced community: B-Healthy study
230	Dr Siyabonga Kunene	Barriers, facilitators of sports participation and needs of athletes living with disabilities in South Africa
22	Ms Nabilah Ebrahim	The determinants of falls among the elderly living in long-term care facilities in the City of Cape Town

293	Dr Cameron Owen	Which rugby league tackle drills have the highest probability for head acceleration events (HAEs)? A case study approach for sports quantifying HAEs during training activities
113	Mr Johan Le Roux	Pain, impairment, medication use and health-related quality of life of retired professional rugby players
243	Mr David Kopping	Injury mitigation among South African tennis players through virtual reality: A randomized controlled study
316	Ms Lara Paul	Injury events and mechanisms across age groups in South African female rugby union players
172	Dr Solomon Mthombeni	A conceptual model of international sporting success for South Africa
279	Prof Philippe Noirez	Air quality and kinetics of venous blood gas parameters during a 156km ultra marathon
139	Dr Celeste van Loggerenberg	Sports-related injuries and illnesses amongst adolescent athletes in an urban setting presenting to a sports medicine practice: a one-year prospective study
245	Dr Marcel Jooste	Which bugs are biting our athletes? Data from 210 athletes with pathogen-specific acute respiratory infections presenting at a sport and exercise medicine clinic
130	Mr Loyiso Maqina	Comparison of sudden cardiac arrests/deaths in South African & European professional football leagues: risks, incidence, and preventive measure: A systematic review
281	Mr Clinton Swanepoel	Preliminary perspectives of elite coaches on optimal training strategies for 5000m track athletes in South Africa
171	Mr Gregory Gordon	Determining a new method of analyzing sprint and change of direction abilities in trained athletes
153	Mrs Franso-Mari Olivier	The association between the growth spurt status of adolescent male cricket players and risk of injury during a cricket season

349: AWARENESS AND KNOWLEDGE OF THE FEMALE ATHLETE TRIAD AND RELATIVE ENERGY DEFICIENCY IN SPORT (REDS) AMONG MULTI-SPECIALTY HEALTHCARE PROFESSIONALS

Rowena Visagie[1], Maritz Laubscher[2], Caroline D'Alton[3], Nicky Keay[4]
Orthopaedic Research Unit, Division of Orthopaedic Surgery, University of Cape Town, Groote Schuur Hospital[1], Orthopaedic Research Unit, Division of Orthopaedic Surgery, University of Cape Town, Groote Schuur Hospital[2], HPALS, Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town[3], Department of Medicine, University College, London, UK[4]
rowenacurr@gmail.com

Background: The female athlete triad (Triad) and Relative Energy Deficiency in Sport (REDs) are serious conditions with harmful health and athletic performance consequences, including, but not limited to,

menstrual dysfunction and bone stress injuries. Athletes may present with the associated symptoms to various healthcare professionals. The aim of this study was to investigate the knowledge and awareness of the Triad and REDs among multi-specialty healthcare professionals.
Methodology: An online expert-reviewed questionnaire was developed and distributed to healthcare professionals to assess awareness and knowledge. The participants included radiologists, orthopaedic surgeons, sports physicians, general practitioners, dietitians, physiotherapists, biokineticists, endocrinologists, and gynaecologists. Fishers exact or chi-squared tests were used for between group comparisons. Statistical significance was accepted when $p<0.05$.
Results: Of the 162 survey participants, 51% were aware of the Triad and 40% were familiar with the term REDs. Forty-five percent were unaware of either condition. Levels of awareness were significantly higher among allied health practitioners vs medical doctors (85 vs 41% for the Triad, and 81 vs 27% for REDs). Of those aware of the Triad, 46% were able to identify all 3 components. Among those familiar with REDs, 69% were able to recognise that low energy availability is the main underlying cause. Overall, 6%, 8% and 44% reported feeling very comfortable diagnosing, treating, and referring those with REDs respectively. Only 14% reported comfort diagnosing disordered eating and eating disorders. Twenty-three percent were aware that menstrual dysfunction is not a normal consequence of heavy athletic training and 41% of practitioners were aware that contraception is not recommended treatment. Overall, 45% were able to identify the appropriate score currently used to assess BMD in athletes (Z-score: DEXA comparison for age and gender equivalent), however only 18% were aware that a low BMD in female athletes <40 years old in weight-bearing sports is currently defined as Z-score < -1.
Conclusion: This research shows inadequate awareness and knowledge of the Triad and REDs among the participating healthcare professionals, as well as low rates of comfort in diagnosing, treating, and referring those with REDs. Therefore, education strategies to address these gaps is warranted.

222: PERCEIVED KNOWLEDGE OF FEMALE ATHLETES ON THE INFLUENCE AND EFFECTS OF THE MENSTRUAL CYCLE ON MUSCULOSKELETAL INJURIES

Christina Sefotha[1], Caitlin Beckett[2], Simoné Ferreira[3], Lynn Smith[4]
Department of Sport and Movement Studies, University of Johannesburg[1], Department of Sport and Movement Studies, University of Johannesburg[2], Department of Sport and Movement Studies, University of Johannesburg[3], Department of Sport and Movement Studies, University of Johannesburg[4]
christinas@uj.ac.za

Background: The menstrual cycle (MC) has been theorized as a significant factor that contributes to musculoskeletal injuries amongst female athletes. However, the literature showing its effects are limited. Additionally, very little is known about the knowledge of the MC and its effects on the body and injury occurrence amongst competitive female athletes. The aim of the study was to investigate the knowledge levels on the effects of the MC and hormonal contraceptives amongst female athletes.
Methodology: An online questionnaire was utilized. The questionnaire was distributed by the researchers, sports coaches and managers of the respective sports teams to university athletes older than 18 years competing at different competitive levels from different sporting codes. A quantitative, descriptive research design was utilized. The data was analysed quantitatively using the Statistical Package for the Social Sciences (SPSS, version 28).
Results: A total of 76 participants were recruited in this study with a mean age of 21,12±2,033. Out of the 76 respondents, 50% had no knowledge and only 2,6% had very high knowledge of the MC and its

effects on musculoskeletal injuries. Majority of the respondents had “low knowledge” (n=32) on the effects of hormonal contraceptives on the body and only 5 participants had “very high knowledge”.
Conclusion: Majority of the female athletes’ knowledge ranged from no to low knowledge of the MC and its effects on the body and musculoskeletal injuries. Additionally, the knowledge levels on the effects of hormonal contraceptives on the body were predominantly low. This highlights the importance of expanding the knowledge of female athletes and stakeholders within the sports community on the effects of the MC on injury occurrence. This will challenge sports coaches and Biokineticists to find ways to factor in the MC with regards to training and rehabilitation and finding methods to reduce the injury occurrence. This study brings light to the gaps in relation to the lack of studies explaining the pathophysiological reasons behind female orientated sports-related musculoskeletal injuries showing that there is still limited focus on literature focused on understanding the functionality of the female body.

33: LOWER LIMB CLINICAL OSTEOARTHRITIS AND ITS ASSOCIATION WITH JOINT PAIN AND FUNCTION, AND SEVERE INJURIES AND SURGERIES, IN FEMALE PROFESSIONAL FOOTBALL PLAYERS

Dimakatso Ramagole,[1,2] Dina C Janse van Rensburg,[2,] Pippa Bennett,[3] Charlotte Cowie,[4] Mario Maas,[5,6,7] Ritan Mehta,[4] Gopika Ramkilawon,[8] Jussi Rantanen, [9] Jari Salo,[10] Babette Pluim,[1,2] Gino Kerkhoffs,[1,6,7,11] Vincent Gouttebarge[1,2,7,11,12]

Amsterdam UMC location University of Amsterdam, Department of Orthopedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, the Netherlands[1], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[2] , UKSI Performance Centre, Loughborough University, Loughborough, UK Sports Institute[3], The Football Association (England), National Football Centre, St George’s Park, Needwood, DE13 4PD, UK[4], Amsterdam UMC location University of Amsterdam, Department of Musculoskeletal Radiology, Meibergdreef 9, Amsterdam, The Netherlands[5], Academic Center for Evidence-based Sports Medicine (ACES), Amsterdam, the Netherlands[6], Amsterdam Movement Sciences, Aging & Vitality, Musculoskeletal Health, Sports, Amsterdam, The Netherlands[7], Department of Statistics, Faculty of Natural and Agricultural Sciences, University of Pretoria[8], Orthopaedics and Sports Clinic, Mehilainen NEO Hospital, Turku, Finland[9], Sports Hospital Mehilainen, Helsinki, Finland[10], Amsterdam Collaboration on Health & Safety in Sports (ACHSS), IOC Research Center of Excellence, Amsterdam, the Netherlands[11], International Federation of Professional Football Players (FIFPRO), Hoofddorp, the Netherlands[12]
maki.ramagole@up.ac.za

Background: Early diagnosis of clinical osteoarthritis in athletes can help mitigate against long term debilitating osteoarthritis of the lower limbs. There is limited research on female professional football players. The objectives of this study were to determine: 1) The prevalence of clinical osteoarthritis (OA) of the hips, knees and ankles; 2) its association with pain and function; and 3) its association with severe injuries and surgeries in female professional football players.
Methodology: A cross-sectional observational study of active female professional footballers recruited by the International Federation of Professional Footballers (FIFPRO). Participants completed the online validated questionnaire related to joint pain and function, severe injuries and surgeries. They had a physical evaluation by their physician for clinical hip, knee and ankle OA.

Results: Seventy-four (74) participants were enrolled. Clinical hip, knee, and ankle OA prevalence were 2.7%, 5.4% and 8.1%, respectively. Clinical hip OA had a weak association with pain (p= 0.6154), a weak to moderate association with function (p= 0.3785), and no significant association with severe injuries (p = 0.2299). Clinical knee OA had no significant association with pain (p = 0.5556) or function (p = 0.7379). There was a significant association with severe injuries (p = 0.0238) and a moderate association with surgeries (p = 0.0577). Clinical ankle OA had a significant association with pain (p = 0.028), a moderate association with function (p = 0.0776), a weak to moderate association with severe injuries (p = 0.1682), and no association with surgeries (p =1). The odds of developing OA after one or more surgeries were 9 and 1.3 times higher in the knee and ankle, respectively.
Conclusion: Clinical OA prevalence was low in active professional female football players. This may be attributed to age (mean age 25 years) and BMI (mean 22.1). Pain was present and function was impaired. Participants were more prone to clinical OA after severe injuries and surgeries in the knee, but ankle surgeries seemed to offer protection. Injury prevention strategies, treatment and rehabilitation after severe injuries and surgeries are important to mitigate against OA. Further research is recommended in female professional football players.

275: INJURY RISK FACTORS AND THEIR PRIORITY FOR MITIGATION IN WOMEN'S NETBALL: A SYSTEMATIC REVIEW AND DELPHI STUDY

Lucy Chesson[1], Sarah Whitehead[2], Lois Mackay[3], Ben Jones[4], Omar Heyward[5], Aaron Fox[6], Sean Scantlebury[7], Dina C Janse Van Rensburg[8, 9, 10, 11]
Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[1], Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom; Leeds Rhinos Netball, Leeds, United Kingdom[2], Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom; England Netball, Loughborough, United Kingdom[3], Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom; England Performance Unit, Rugby Football League, Manchester, United Kingdom; Premiership Rugby, London, United Kingdom; Division of Physiological Sciences and Health through Physical Activity, Lifestyle and Sport Research Centre, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; School of Behavioural and Health Sciences, Faculty of Health Sciences, Australian Catholic University, Brisbane, QLD, Australia[4], Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom; Premiership Rugby, London, United Kingdom; Rugby Football Union, Twickenham, London, United Kingdom[5], Centre for Sport Research, Institute for Physical Activity and Nutrition, Deakin University, Geelong, Australia[6], Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom; England Performance Unit, Rugby Football League, Manchester, United Kingdom[7], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa; Medical Advisory Panel, World Netball, Manchester, United Kingdom[8, 9, 10, 11]
l.j.chesson@leedsbeckett.ac.uk

Background: Given the high injury rate of netball, injury prevention is a focus within the sport and for governing bodies. To support the development of appropriate injury mitigation strategies further consideration of the risk factors for injury is needed. Therefore, this study aimed to establish consensus on injury risk factors (RFs) in women's netball via a combined systematic review and Delphi method approach.

Methodology: A systematic search of databases (PubMed, Scopus, MEDLINE, SPORTDiscus, CINAHL) was conducted from inception until June 2023. Twenty-four risk factors (RFs) were extracted from 17 studies and combined with a three-round Delphi approach to achieve consensus. In round-one, experts listed perceived RFs for injury in netball which were combined with the RFs identified via the systematic review. In rounds-two and round-three, experts rated their level of agreement with each risk factor on a 5-point Likert scale (1-strongly disagree to 5-strongly agree). Consensus was defined as >80% agreement (with <10% in disagreement). In round-three, experts also rated the priority for mitigating the risk factor (1-very low to 5-very high).
Results: Nineteen experts participated in round-one and round-two, and sixteen participated in round-three (response rate 84%). One-hundred and nine RFs for injury were identified by the systematic review and experts combined. Sixty-one RFs reached consensus, categorised into five groups: 'individual characteristics' (n = 22), 'lifestyle' (n = 11), 'training and competition' (n = 14), 'sport science and medical provision' (n = 6) and 'facilities and equipment' (n = 8). 'Poor landing technique/ mechanics' had a median (interquartile range) mitigation priority rating of 5(1), while all others had median ratings of 3-4.5.
Conclusion: This study identifies a range of RFs for injury, provides focus areas for injury prevention and highlights the importance of a multi-disciplinary approach to injury mitigation in netball. Future research is needed to investigate the priority and feasibility of the mitigation of the risk factors in specific environments to support tailored injury prevention strategies.

189: EXPLORING THE INFLUENCE OF 'RECOGNISE AND REMOVE' ON MANAGEMENT DECISIONS AND PLAYER DISCLOSURE

Marelise Badenhorst[1], Danielle Salmon[2], Janelle Romanchuk[3], Simon Walters[4]
Sports Performance Research Institute New Zealand, School of Sport and Recreation, Auckland University of Technology, New Zealand[1], New Zealand Rugby, Wellington, New Zealand; World Rugby, Dublin, Ireland[2], New Zealand Rugby, Wellington, New Zealand[3], Sports Performance Research Institute New Zealand, School of Sport and Recreation, Auckland University of Technology, New Zealand[4]
marelise.badenhorst@aut.ac.nz

Background: Participation in rugby union is associated with a high risk of concussion. As medical professionals are not always available in the community game, World Rugby's 'Recognise and Remove' process aims to ensure players' safety at the community level by removing players from the field if there is any suspicion that a concussion may have occurred, and entering them into a 21/23-day standdown for both suspected and diagnosed concussions. However, the utilisation of this procedure is not without complexity. Understanding community perceptions around the challenges of recognising concussions and removing players from play, may assist in facilitating player safety in the future.
Methodology: A pragmatic, qualitative descriptive approach was adopted. Semi-structured interviews were conducted with 62 school and club-level community rugby stakeholders (including players, parents, coaches, general practitioners, school contacts, and provincial union representatives) from across New Zealand (NZ). Reflexive thematic analysis was used to analyse the data.
Results: Three overarching themes were developed from the data. i) "If in doubt sit them out, or are we now over-aware?" described contrasting perspectives between participants who believe that if there is any suspicion of concussion a player should be removed, and participants who are concerned that 'every knock' is now, unnecessarily, considered a concussion. ii) "Uncertainty and making decisions under pressure" describes the difficulty experienced by players if they are unsure if they are concussed, or the

decision-making pressure experienced by team leads/physiotherapists if the concussion is not obvious. iii) "Actions have consequences" describes the influence of the mandatory stand-down period in participants' decision-making and the potential of future player non-disclosure.
Conclusion: An approach of 'if in doubt, sit them out' has been widely recommended by rugby unions. However, over time, implementing this strategy has caused dissatisfaction for some stakeholders and a subsequent desire 'to be more certain' before a player is removed due to the automatic 21/23-day standdown. Although hypervigilance may be perceived by many as detrimental to the game, to ensure player safety above all else, strategies to collaborate with the wider rugby community are necessary.

142: CONCUSSION RATES IN THE TOP-TIER ELITE RUGBY UNION COMPETITIONS ACROSS THE WORLD FROM 2019 TO 2024

James Brown[1], Ross Tucker[2], Eanna Falvey[3], Ed Lodge[4], Lindsay Starling[5], Ben Hester[6], Martin Raftery[7]
Leeds Beckett University[1], Stellenbosch University[2], World Rugby[3], World Rugby[4], World Rugby[5], World Rugby[6], World Rugby[7]
jamesbrown06@gmail.com

Background: Historically, concussion rates in professional rugby union ('rugby') have been informed by one large men's club competition and Rugby World Cup. A 2021 meta-analysis of men's elite rugby, which was also largely influenced by these data, published a concussion rate of 12 per 1000 match-hours (95% confidence intervals - 95% CI: 9-15). The aim of this study was to describe concussion rates from globally-representative elite men's and women's club competitions, over a period from 2019 to 2024 and with at least two full seasons to compare.
Methodology: The numbers of concussions and criteria 1 (clear and obvious concussions, C1) removals were obtained from World Rugby's SCRM database, used by every team as part of the sport's HIA (head injury assessment) protocol and player welfare standards. Concussion and C1 incidence were calculated as a rate, per 1000 hours of match play, given the known number of fixtures in each competition. Six tournaments were analysed: men's Champions Cup, men's Rugby World Cup, men's RFU Premiership, men's Super Rugby, men's United Rugby Championship and women's RFU Premiership.
Results: The lowest concussion rate over this period was the men's Rugby World Cup in 2023 with a rate of 9.3 per 1000 hours (95%CI: 5.9 – 14.9). The highest recorded concussion rate was from the Champions Cup in 2021 with a rate of 25.6 per 1000 match hours (95% CI:16.7 – 29.3). Despite fluctuations, individual tournament concussion rates have not changed significantly over time. By contrast, two of the six competitions (men's and women's RFU Premiership) have significantly lower C1 rates in the most recent season, with an additional two competitions (men's Champions Cup and men's Super Rugby) showing downward trends.
Conclusion: The concussion rates of all six competition rates in the present study, including the women's RFU Premiership, fall within the latest meta-analysis for men's elite rugby 95% confidence intervals (9-15 events per 1000 match hours). The rates of the latest men's Rugby World Cup (2023) were the lowest. C1 rates have reduced in the latest season in two of the competitions, but these injuries are typically small in absolute number. Future research should explore the reasons underpinning inter-competition rate differences.

104: COMPARISON OF MATCH INJURIES IN MALE ADULT AMATEUR COMMUNITY RUGBY UNION AND SCHOOLBOY RUGBY UNION IN IRELAND

Roisin Cahalan[1], Tom C. Comyns[2], Lauren Guilfoyle[3], Patrick Dolan[4], Kilian Bibby[5], Giles Warrington[6], Kieran O'Sullivan[7], Liam G Glynn[8], Mark Lyons[9], Helen Purtill[10], Ian C. Kenny[11]
School of Allied Health, University of Limerick, Limerick, Ireland[1], Sport and Human Performance Research Centre, University of Limerick, Ireland[2], Sport and Human Performance Research Centre, University of Limerick, Ireland[3], Sport and Human Performance Research Centre, University of Limerick, Ireland[4], Sport and Human Performance Research Centre, University of Limerick, Ireland[5], Sport and Human Performance Research Centre, University of Limerick, Ireland[6], School of Allied Health, University of Limerick, Limerick, Ireland[7], School of Medicine, University of Limerick, Ireland[8], Sport and Human Performance Research Centre, University of Limerick, Ireland[9], Department of Mathematics and Statistics, University of Limerick, Ireland[10], Sport and Human Performance Research Centre, University of Limerick, Ireland[11]
roisin.cahalan@ul.ie

Background: Injury surveillance in male adult amateur and schoolboy Rugby Union may provide important comparative data to facilitate optimal strategies to support player welfare. This study aimed to compare the diagnoses, nature, location, and mechanism of match-play injuries in these two cohorts.
Methodology: Analysis was conducted over one season (September-May 2022/23) on 878 male adult amateur players from 22 men's clubs, and 481 schoolboy players (16-18 years old) from 14 teams. Each team registered their players on an online portal (IRISweb) and designated an injury recorder to report injuries. A 24-hour time-loss injury definition was used. Measures included injury diagnoses, nature, body location and mechanism. Data from 496 (9895 exposure hours) and 191 (3352 exposure hours) matches were analysed from adult and schoolboy teams respectively.
Results: For male adult amateur players, the overall match time-loss injury incidence was 43.3/1,000 player hours. The most common injury diagnoses were concussion, followed by ankle sprains, accounting for 20% and 11% of all time-loss match injuries respectively. The most common injury locations were the head (23%), shoulder (14%), and ankle (12%), while the tackle event accounted for 64% of all match-play injuries. Forwards (positions 1-8) sustained more injuries (60%) than backs (40%). The blindside flanker (no. 6), second row (no. 4) and the hooker (no. 2) were most affected, incurring 10%, 9% and 9% of injuries respectively. For schoolboy players, match time-loss incidence was 38.5/1,000 hours. Concussions (19%), ankle sprains (9%) and shoulder dislocations/subluxations (7%) were the most common diagnoses. The head (21%) was the most common injury location followed by the shoulder (16%), ankle and knee (both 10%). Tackles accounted for most injuries (67%), with backs more prone to injury (55%). Openside flankers (no. 7) and scrum halves (no. 9) reported the most match-play injuries at 12% respectively.
Conclusion: Similarities between adult and schoolboy players' injury profile include diagnoses, mechanism and injury location. Injury incidence is lower for schoolboys, possibly reflecting mature physicality in the adult game. Rates of concussion and head injury are most common in both cohorts, reflecting the importance of continued focus on this facet of Rugby.
Supported by the Irish Rugby Football Union (IRFU).

352: GETTING THEM THROUGH THE DOOR: FACTORS THAT INCREASE THE LIKELIHOOD OF A COMMUNITY RUGBY PLAYER ATTENDING A MEDICAL DIAGNOSIS AND CLEARANCE ASSESSMENT

Danielle Salmon[1], Jody McGowan[2], Marelise Badenhorst[3], James Brown[4], Gisela Sole[5], John Sullivan[6],

Johna Register-Mihalik[7], Simon Walters[8], Zachary Yukio Kerr[9], Chris Whatman[10], Sierra Keung[11]
World Rugby[1], Sports Performance Research Institute New Zealand, School of Sport and Recreation, Auckland University of Technology, 90 Akoranga Drive, Auckland 0627, New Zealand[2], Sports Performance Research Institute New Zealand, School of Sport and Recreation, Auckland University of Technology, 90 Akoranga Drive, Auckland 0627, New Zealand[3], Carnegie Applied Rugby Research (CARR) centre, Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom; Institute of Sport and Exercise Medicine (ISEM), Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University; Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, the University of Cape Town and the Sports Science Institute of South Africa, Cape Town, South Africa[4], Centre of Health, Activity, and Rehabilitation Research, School of Physiotherapy, University of Otago, 325 Great King Street, Dunedin, 9054, New Zealand[5], Injury Prevention and Player Welfare, New Zealand Rugby, 100 Molesworth Street, Wellington 6140, New Zealand[6], Injury Prevention Research Center, University of North Carolina at Chapel Hill, Chapel Hill, USA[7], Sports Performance Research Institute New Zealand, School of Sport and Recreation, Auckland University of Technology, 90 Akoranga Drive, Auckland 0627, New Zealand[8], Injury Prevention Research Center, University of North Carolina at Chapel Hill, Chapel Hill, USA[9], Sports Performance Research Institute New Zealand, School of Sport and Recreation, Auckland University of Technology, 90 Akoranga Drive, Auckland 0627, New Zealand[10], Sports Performance Research Institute New Zealand, School of Sport and Recreation, Auckland University of Technology, 90 Akoranga Drive, Auckland 0627, New Zealand[11]
danielle.salmon@worldrugby.org

Background: Concussions are a global concern, in New Zealand (NZ) an estimated 10 per 1000 rugby players seek medical care for concussions at an average cost of NZ$1700 per claim. In response, NZ Rugby (NZR) developed a community concussion initiative to operationalize best practice guidelines for managing concussions.
Methodology: This study aimed to describe demographic and/or contextual factors associated with players attending a medical diagnosis, clearance assessment and adherence to the recommended standdown period as part of NZR's concussion management pathway (CMP). Over the course of the 2020 and 2021 seasons, 4724 community rugby players from 59 clubs/schools in NZ participated in the study. The following factors were examined relative to compliance to each stage of the CMP: players' age, sex, ethnicity, presence of a team physiotherapist and completion of a pre-season baseline test.. Multivariate logistic regression models explored associations between independent variables and CMP compliance steps.
Results: Over the two seasons, 383 suspected concussions were reported, with an average incidence rate of 16.4 suspected concussions per 1000 player match hours. Age, ethnicity, and sex did not influence compliance to the CMP steps. 62% of players attended a medical diagnosis assessment following their suspected concussion. The odds of a player attending a diagnosis assessment were increased by having a team physiotherapist (OR 3.12; $p<0.001$). The odds of a player obtaining medical clearance were significantly improved if their team had a physiotherapist (OR 2.02; $p=0.02$) and a pre-season baseline test (OR 2.48; $p<0.001$). The odds of a player adhering to the appropriate stand-down were significantly improved by having a baseline test (OR 2.94; $p<0.001$). Having a team physiotherapist and completing a pre-season baseline test were associated with improved compliance to the CMP.
Conclusion: These contextual factors should be promoted by relevant governing bodies to improve player welfare following a rugby-related concussion in the community game.

175: TOTAL ENERGY EXPENDITURE AND DIETARY INTAKE OF SENIOR MALE SOCCER PLAYERS DURING PRE-SEASON: A DOUBLY LABELLED WATER STUDY

Dr Nessan Costello[1], Mr Andrew Jenkinson[2], Professor Ben Jones[3], Dr Lucy Chesson[4], Mrs Lara Wilson[5], Mr Rob Price[6], Dr Catherine Hambly[7], Professor John Speakman[8, 9, 10, 11]
Leeds Beckett University[1], Leeds Beckett University[2], Leeds Beckett University[3], Leeds Beckett University[4], Leeds Beckett University[5], Leeds United Football Club[6], Aberdeen University[7], Aberdeen University[8, 9, 10, 11]
n.costello@leedsbeckett.ac.uk

Background: Senior male professional soccer players require adequate energy availability (EA) for pre-season training and match-play to support their health and performance. Despite the higher demands of pre-season compared to in-season, no study has yet established the energy requirements of pre-season using criterion methods or evaluated the dietary energy and macronutrient intakes of professional male players during pre-season rest, training, and match days. This lack of data makes it difficult to set appropriate energy intake guidelines. Therefore, this study aims to quantify the total energy expenditure (TEE) of senior male players during a pre-season micro cycle and assess their dietary energy and macronutrient intakes across days.
Methodology: Six senior male soccer players were studied during two consecutive 7-d micro cycles, including training only (pre-season) and training including match-play (one-match micro cycle). Total energy expenditure and dietary intake was assessed for 14-d using doubly labelled water and a version of the remote food photographic method. Energy availability (EA) was calculated.
Results: Mean 14-d TEE was 13.17 ± 1.19 MJ·d-1. Resting metabolic rate was 8.08 ± 0.85 MJ·d-1. Physical activity level was 1.64 ± 0.17 AU. Energy, carbohydrate, protein, and fat intake was 10.95 ± 1.52 MJ·d-1, 2.8 ± 0.6 g·kg-1·BM, 2.2 ± 0.4 g·kg-1·BM, and 1.5 ± 0.4 g·kg-1·BM, respectively. Mean EA was 0.10 ± 0.03 MJ·kg-1·FFM. Total energy expenditure was not significantly different between a pre-season training and one-match micro cycle (+1.89 ± 1.98 MJ·d-1; ES = 0.95 ± 1.08; P = 0.100). There were no significant differences in energy or macronutrient intake across weekly micro cycles (P>0.068) or days (single training, double training, match, or rest; P>0.144).
Conclusion: The addition of match-play did not change TEE during a pre-season micro cycle. Players did not periodise dietary energy or carbohydrate intake across days of distinct intensity differences (single training vs. double training vs. match vs. rest). Players had sub-optimal EA, failing to achieve dietary recommendations at key time points before and after pre-season training or match-play. Overall, these findings can support nutrition practitioners when coaching senior male players during the pre-season mesocycle.

124: EFFECTS OF A SLEEP HYGIENE PERIOD ON THE INTERNAL AND EXTERNAL, INTER- AND INTRA-MATCH DEMANDS OF MALE UNIVERSITY-LEVEL SOCCER PLAYERS DURING A TOURNAMENT

Adele Broodryk[1], Michael Prevoo[2], Mark Kramer[3]
Physical Activity, Sport and Recreation Research Focus Area, PHASREC, North-West University, South Africa[1], Physical Activity, Sport and Recreation Research Focus Area, PHASREC, North-West University, South Africa[2], Physical Activity, Sport and Recreation Research Focus Area, PHASREC, North-West

University, South Africa[3]
adele.broodryk@nwu.ac.za

Background: Soccer is a physiologically and psychologically demanding sport, requiring players to optimise their sleep to effectively enhance their recovery and ensure optimal performance during a match. Unfortunately, numerous factors limit the amount of sleep players obtain at night, posing a risk not just for poor performance, but also to sustain injuries. Over the years, researchers have investigated the effects of implementing various sleep hygiene principles to improve performance, though limited to no studies have investigated the effects thereof on real-life competitive events. Therefore, the aim of this study was to determine the effect of a sleep hygiene intervention period (SHP) on the internal and external match demands during an 8-match tournament.
Methodology: Sixteen male university-level soccer players' (average age: 22.2±3 y; stature: 167.6±6.4 cm; mass: 62±6.6 kg) from a tertiary institution took part in this study. Their sleep patterns, movement patterns (Catapult GPS units) heart rate, and rate of perceived exertion (RPE) were compared over a testing period spanning over eight weeks (two weeks of no-sleep intervention [no-SHP], four weeks of SHP, two weeks of no-SHP). During this period, a competitive match was completed on a weekly basis, totalling eight matches. During the SHP, participants were required to complete at least 10 of a possible 16 sleep hygiene recommendations and tabulate which were adhered to daily.
Results: A significant shorter sleep latency (19 minutes, $p < 0.001$) and longer sleep duration (8 hours, $p = 0.002$) were reported. The SHP had a significant (p 0.6) impact on various external loads over the complete duration of the match compared to the no-SHP condition. Comparing the match halves of the no-SHP and SHP, significant differences were found for total distance ($p < 0.001$), distances completed whilst jogging ($p < 0.001$), running ($p < 0.001$) and sprinting ($p = 0.03$), as well as distances covered in the medium ($p = 0.05$) and high-velocity ($p < 0.001$) zones, and low ($p < 0.001$) and medium ($p < 0.001$) decelerative zones and for all accelerative zones ($p < 0.001$).
Conclusion: It is recommended players and coaching staff implement sleep hygiene guidelines more regularly, as it may result in noteworthy performance improvements.

40: DON'T FORGET TO MIND THE MIND: A 12-MONTH PROSPECTIVE COHORT STUDY ON MENTAL HEALTH SYMPTOMS IN ACTIVE PROFESSIONAL MALE FOOTBALLERS

Lervasen Pillay[1], Dina C. Janse van Rensburg[2], Gopika Ramkilawon[3], Thor Einar Andersen[4], Gino Kerkhoffs[5], Vincent Gouttebarge[6]
Amsterdam UMC location University of Amsterdam, Department of Orthopaedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, The Netherlands 2. Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[1], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[2], Department of Statistics; University of Pretoria, Pretoria, South Africa[3], Oslo Sports Trauma Research Centre, Department of Sports Medicine, Norwegian School of Sport Sciences, Oslo, Norway[4], Amsterdam UMC location University of Amsterdam, Department of Orthopaedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, The Netherlands; Academic Centre for Evidence-based Sports Medicine (ACES), Amsterdam, the Netherlands 6. Amsterdam Collaboration on Health & Safety in Sports (ACHSS), IOC Research Centre of Excellence, Amsterdam, the Netherlands 7. Amsterdam Movement Sciences, Aging & Vitality, Musculoskeletal Health, Sports, Amsterdam, the Netherlands[5], Amsterdam UMC location University of Amsterdam, Department of Orthopaedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam,

The Netherlands 2. Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa; Academic Centre for Evidence-based Sports Medicine (ACES), Amsterdam, the Netherlands 6. Amsterdam Collaboration on Health & Safety in Sports (ACHSS), IOC Research Centre of Excellence, Amsterdam, the Netherlands 7. Amsterdam Movement Sciences, Aging & Vitality, Musculoskeletal Health, Sports, Amsterdam, the Netherlands 8. Football Players Worldwide (FIFPRO), Hoofddorp, the Netherlands[6]
drpillay@absamail.co.za

Background: Active professional male footballers need more scientific studies on Mental Health Symptoms (MHS) and specific stressors like severe injuries and/or surgeries. Therefore, we first aimed to explore the prevalence and 12-month incidence of MHS in active professional male footballers. Our second aim was to investigate the association between MHS and specific stressors like severe injuries and/or surgeries.
Methodology: Participants consisted of active professional male footballers recruited by Football Players Worldwide (FIFPRO) affiliated national unions. MHS were operationalised in symptoms of distress, anxiety, depression, disordered eating, sleep disturbance, alcohol misuse and drug misuse, all being assessed with validated questionnaires. Descriptive analyses (mean, standard deviation (SD), frequency and range) were performed for all variables. For the first aim prevalence was calculated using the adjusted Wald method for the confidence interval (CI) of 95% and incidence was calculated as the proportion of the number of participants with a newly determined mental health symptom at the 12-month follow-up relative to the total number of participants free from this mental health condition at baseline. For our second aim, logistic regression analysis was performed at baseline (for all participants) as well as at 12-month follow-up (for participants free from mental health symptoms and injuries and/or surgeries at baseline) and the odds of developing mental health symptoms with a history of injuries or surgeries were expressed as odds ratios (OR) with 95% CI.
Results: Of the 101 participants enrolled, the prevalence of MHS ranged from 6% for drug misuse to 53% for distress. The incidence ranged from 1% for anxiety to 29% for distress. At baseline, players suffering from injury/surgery were more likely to report depression (OR 1.35; 95%CI 1.10-1.70) and disordered eating (OR 1.22; 95%CI 1.02-1.47). At follow-up, players suffering from injury/surgery were more likely to report distress (OR 2.15; 95%CI 1.26-4.31) and drug misuse (OR 2.05; 95%CI 1.01-4.04).
Conclusion: The prevalence of MHS in active professional male footballers seems greater than in the global population and other sports. After severe injury/surgery, the risk of developing MHS is increased, confirming that particular attention should be given to the mental health of any injured player.

193: PHYSICAL DEMANDS COMPARISON OF DIFFERENT FORMATS OF SMALL-SIDED GAMES IN A SOUTH AFRICAN PREMIER SOCCER LEAGUE TEAM

Mduduzi Rhini[1], Rowena Naidoo[2], Takshita Sookan[3], Robert Hickner[4]
Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu Natal[1], Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu Natal[2], Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu Natal[3], Florida State University, Department of Health, Nutrition and Food Sciences, College of Education, Health, and Human Sciences[4]
rhinim@ukzn.ac.za

Background: Small-sided games (SSG) have gained popularity among modern soccer coaches over the years. This is due to their ability to integrate the reality of the game into training. However, there seems to be conflict in literature as to which sizes/formats best replicate the demands of the match. Purpose: To compare the physical demands of different formats of SSG utilised by a South African Premier Soccer League team.
Methodology: Data were collected on players belonging to the same Premier Soccer League team, using PlayerTek (10Hz) GPS devices. Data collected included total distance; high intensity running distance; power plays; top-end speed and distance per minute. These SSG were categorised according to the number of players: small-SSG (5v5); medium-SSG (6v6; 7v7); and large-SSG (8v8; 9v9; and 10v10).
Results: Variables differed significantly depending on the size of the game (p=0.001). Total distance was higher in 5v5 and 10v10 games, than in 6v6 and 7v7 games. High intensity running values were higher in 10v10 compared to all the other games. Similar results were evident for top-end speed and power plays, although the 5v5 games also had significantly more power plays compared to the 6v6, 7v7 and 9v9 games. Distance per minute was higher in a 5v5, compared to the 7v7; 9v9 and 10v10.
Conclusion: These findings indicates that the large-SSG 10v10 have the potential to exhibit greater high intensity actions such as high intensity running, power plays and top-end speed compared to all the other games. The small-SSG 5v5 showed higher values than the large-SSG 10v10 only in distance per minute. This confirms that the large-SSG 10v10 are more likely elicit greater high intensity actions compared to small- and medium-SSG. Whereas the small-SSG 5v5 may contribute to more actions per minute compared to the large-SSG.

283: A COMBINED PHYSICAL ACTIVITY AND MULTI-MICRONUTRIENT SUPPLEMENTATION INTERVENTION IN SOUTH AFRICAN PRIMARY SCHOOLS: EFFECTS ON PHYSICAL ACTIVITY, FITNESS, AND CARDIOVASCULAR DISEASE RISK FACTORS

Siphesihle Nqweniso[1], Cheryl Walter[2], Rosa du Randt[3], Larissa Adams[4], Danielle Dolley[5], Johanna Beckmann[6], Ivan Müller[7], Peter Steinmann[8], Christin Lang[9], Jürg Utzinger[10], Markus Gerber[11]
Department of Human Movement Science, Nelson Mandela University, Gqeberha, South Africa[1], [2, 3, 4, 5] Department of Sport, Exercise and Health, University of Basel, Basel, Switzerland[6], Department of Sport, Exercise and Health, University of Basel, Basel, Switzerland[7], Swiss Tropical and Public Health Institute, Allschwil, Switzerland[8], Department of Sport, Exercise and Health, University of Basel, Basel, Switzerland[9], Swiss Tropical and Public Health Institute, Allschwil, Switzerland[10], Department of Sport, Exercise and Health, University of Basel, Basel, Switzerland[11]
fnqweniso@mandela.ac.za

Background: The declining physical activity and cardiorespiratory fitness levels in children and adolescents is a global health concern. Concurrently, cardiovascular diseases (CVD) are on the rise in populations undergoing urbanisation and economic development. Therefore, the health consequences of these current trends in children and adolescents from low-and middle-income countries would later transfer into an adult population with a high prevalence of CVD. We examined the effects of a school-based health intervention on physical activity, cardiorespiratory fitness, and CVD risk factors in children ages 6-12 years.
Methodology: A cluster-randomised controlled trial was conducted in four schools located in marginalised communities in Gqeberha, South Africa. Children were randomly assigned to one of four intervention arms: (i) physical activity and multi-micronutrient supplementation (PA+MMNS), (ii)

PA+Placebo, (iii) MMNS, and (iv) placebo, serving as the control. The analyses included 1151 children at baseline (T1), 1003 post-intervention (T2) and 549 at follow-up (T3). The primary outcome physical activity was assessed via accelerometery. Secondary outcomes involved cardiorespiratory fitness (20m-shuttle-run test) and CVD risk factors (anthropometry, blood pressure, glycated haemoglobin [HbA1c], and lipid profile from capillary blood samples) using standard procedures. Mixed linear models were utilised to assess the impact of the intervention arms, controlling for baseline characteristics.
Results: Findings of the study revealed that none of the intervention arms had an impact on daily physical activity. Yet, the PA+MMNS arm was effective in reducing HbA1c ($p<0.001$), while the MMNS arm significantly increased cardiorespiratory fitness and reduced blood pressure ($p=0.001$ and 0.012, respectively). Additionally, the PA+MMNS arm was associated with increased body fat% and decreased HDL ($p=0.003$ and 0.003, respectively), while the PA+Placebo was associated with increased LDL ($p=0.007$) and the MMNS arm resulted in increased triglycerides ($p=0.012$).
Conclusion: While promising results were found on the impact of MMNS on cardiorespiratory fitness and CVD risk factors and the combined PA+MMNS on HbA1c, no clear picture has emerged. Since the first-year intervention period was short (T1-T2), and the COVID-19 pandemic complicated the implementation of the second-year intervention (T2-T3), the findings of the present study must be interpreted with caution.

346: ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND CARDIORESPIRATORY FITNESS OF ADULT WOMEN FROM A LOW-RESOURCED COMMUNITY: B-HEALTHY STUDY

Sarah J Moss[1], Nauris Tamulevicius[2], Guillermo R Oviedo[3]
Physical Activity, Sport and Recreation, North-West University, Potchefstroom, South Africa.[1],
Department of Health Sciences and Human Performance, University of Tampa, Tampa, FL, USA.[2],
ACTIUM Functional Anatomy Group, School of Medicine and Health Sciences, Universitat Internacional de Catalunya, Barcelona, Spain.[3]
hanlie.moss@nwu.ac.za

Background: According to publications reporting subjectively collected physical activity data, South African women are not meeting the WHO-recommended physical activity levels for health improvements. There is also a lack of information on women's cardiorespiratory fitness, which is a strong predictor of mortality. Therefore, this study aims to report objectively determined physical activity levels and cardiorespiratory fitness in adult women and the relationship between the variables.
Methodology: Women (n=118) from a low-resourced setting in the JB Marks municipality provided consent for data collection of objective physical activity with a combined heart rate and accelerometery device (ActiHeart, CamNTech, UK). Moderate to vigorous physical activity (MVPA) data was collected during seven consecutive days. Cardiorespiratory fitness was determined indirectly during the eight-minute calibration procedure of the ActiHeart device, with simultaneous direct oxygen consumption measured breath-by-breath (MetaMax, Cortex). Partial correlation analyses were adjusted for age to determine the relationship between habitual physical activity and CRF and between direct and indirect measured CRF.
Results: The 118 women aged 56±12 years reported 40.78 ± 57.38 min/week of moderate-to-vigorous physical activity. The direct assessment of VO2peak for the women was 18.15 ± 4.68 ml/kg/min. and the indirect VO2peak 16.48 ± 7.02 ml/kg/min. A significant positive correlation was present between

habitual MVPA and indirect VO2peak (r=.20; p = .03), but not for direct VO2peak (r= -.08; p = .40). The difference between the direct (oxygen consumption) and indirect (ActiHeart) VO2peak assessments were significant with the regression analyses presenting B = -.50; (p < 0.01).
Conclusion: Women from a low-resourced community met the recommended physical activity levels based on objective measurements. CRF levels were, however, very low compared to normative data from European and American women of similar age. Although the indirect CRF measurement correlated significantly with the indirectly determined CRF, there was a bias in the findings at the very low and very high CRF levels. More objective physical activity data is necessary within South Africa to understand the true association between physical activity and fitness and to inform future health improvement strategies.

230: BARRIERS, FACILITATORS OF SPORTS PARTICIPATION AND NEEDS OF ATHLETES LIVING WITH DISABILITIES IN SOUTH AFRICA

Siyabonga Kunene[1]
University of the Witwatersrand, Johannesburg, South Africa[1]
siyabonga.kunene@wits.ac.za

Background: Despite the transformative promise of "Leave No One Behind" stated in the United Nations' 2030 agenda, full inclusion of people living with disabilities remains a challenge in many countries including South Africa. Athletes living with disabilities are still left behind in low- and medium-socioeconomic countries. They still face various challenges that hinder their participation in sports. This study explored barriers and facilitators to sports participation and the needs of athletes living with disabilities (ALWDs).
Methodology: Interviews were conducted with ALWDs in South Africa. Permission was obtained from a physical disability association. Ethical clearance was issued by the University of the Witwatersrand. An interview schedule with predetermined questions was used to guide the interviews. Interviews were held face-to-face or online for 20-30 minutes per interview. All participants gave consent. The data were transcribed verbatim and analysed in themes deductively.
Results: 23 athletes participated. 12 females and 11 males participated. They were mostly Africans (n=13) with a mean age of 26 years. All had over five years of sporting experience. Barriers included: discrimination, stigma, lack of opportunities, poor access to key services, limited access to resources, lack of access to facilities, and lack of knowledge. Facilitators included: health, belonging, fulfilment, winning, and support from loved ones. Needs included: funding, healthcare services, coaching, and awareness.
Conclusion: Results showed a need to scale up disability inclusion, especially regarding the rendering of healthcare services and making resources available.

22: THE DETERMINANTS OF FALLS AMONG THE ELDERLY LIVING IN LONG-TERM CARE FACILITIES IN THE CITY OF CAPE TOWN

Nabilah Ebrahim[1], Prof. Lloyd Leach[2]
University of the Western Cape[1], University of the Western Cape[2]
nabilahebrahim77@gmail.com

Background: Falls are a common health burden with a multi-factorial origin causing physical, psychological, and social problems for the elderly and the society, especially within low- and middle-income countries. There is a great demand and significance for proper health care professionals in the public sector, especially within elderly care institutions where there is an absence of implementing physical activity programs in the prevention of falls. The amount of pressure and workload that allied health staff undergo places a huge burden on them, especially when working in a long - term care facility that is understaffed. This places them in vulnerable positions of which they neglect to fully complete important tasks.
Methodology: This study used the social-ecological theory, which functions on multiple levels in the study, interacting on an individual level, as well as recognising the impact of the environment. The study used a quantitative, cross-sectional, and descriptive design to investigate the elderly, aged 60 years and older, living in retirement facilities in the City of Cape Town. A total of 258 male and female participants were recruited using convenient sampling. A researcher-generated and self-administered questionnaire, based on the following sociodemographic characteristics, namely, age, gender, educational qualifications, marital status, and medical history, was used in the study. The Fall Risk Assessment Tool, the Berg Balance Scale, the Dynamic Gait Index, the Timed Up-and-Go test, and the Mini Mental State Examination were used as research instruments in the study. The WHO COVID-19 safety protocol was observed throughout the period of physical testing of the participants. The results were analysed using SPSS version 28. Descriptive statistical analysis (means, standard deviations, and frequencies) was used to describe the variables, such as age, height, and weight. The data was checked for normality using a Shapiro-Wilks test. The Chi-square test was used to determine statistically significant associations between the categorical risk factors (facility type, gender, BMI, age, marital status, educational qualifications, medications, and Fall Risk Assessment Tool risk factor checklist). The Spearman's rank correlation coefficient was also used to determine associations between falls and risk factors observed as well as various medications. Odds ratios were also presented.
Results: The determinants of falls were strongly associated with history of falls pertaining to the facility type ($p = 0.007$), level of education ($p = 0.029$), marital status ($p = 0.001$), concerning behaviours, ($X2 = 6.486$; p-value = 0.011) and other ($X2 = 4.951$; p-value = 0.026) risk factors not observed in the study. Antipsychotic [χ 2 (1) = 2.246, $p = 0.014$, OR = 0.143 (95% CI: 0.030, 0.678)] and diuretics [χ 2 (1) = 0.537, $p = 0.027$, OR = 4.123 (95% CI: 1.176, 14.453)] medications were the only drugs associated with falling. A strong correlation was observed between participant falls and the TUG ($p = 0.003$) and BBS assessment ($p = <.001$). However, a negative correlation was identified with the DGI assessment ($p = -.095$).
Conclusion: In conclusion, there is a need to raise awareness and educate health professionals on the determinants of falls, and to implement prevention strategies as well as appropriate health care professionals to contribute towards this global concern.

293: WHICH RUGBY LEAGUE TACKLE DRILLS HAVE THE HIGHEST PROBABILITY FOR HEAD ACCELERATION EVENTS (HAES)? A CASE STUDY APPROACH FOR SPORTS QUANTIFYING HAES DURING TRAINING ACTIVITIES

Cameron Owen[1], Ryan White[2], Dan Weaving[3], Greg Roe[4], Thomas Sawczuk[5], James Tooby[6], Ben Jones[7]
Leeds Beckett University, Leeds, United Kingdom[1,2,4,5,6,7], Edge Hill University, Liverpool, United Kingdom[3]
cameron.owen@leedsbeckett.ac.uk

Background: Globally, sports are proactively aiming to reduce concussions and head acceleration events (HAEs) given the potential dose-response association with neurodegenerative diseases. No data exists regarding HAEs from training or commonly performed drills, which is important, as arguably the training environment is more modifiable than matches. Therefore, this study aimed to describe the HAEs during common training drills used in rugby league.
Methodology: Fifteen male academy rugby league players from a professional Super League club participated. Players participated in three training sessions, with 7 standardised drills, designed in consultation with experienced coaches, completed in the same order in each session. Players wore a custom-fitted instrumented mouthguard (iMG) and each session was filmed. An iMG capture framework was developed and applied to synchronise and process the iMG and video data to verify the HAEs occurring in a drill. The probability of a HAE being observed in a drill was estimated using binomial logistic regression and exceedance probabilities using ordinal mixed effects regression.
Results: 1402 (93 ± 50 per player) drill observations were recorded, which resulted in approximately 133 observed HAEs (9 ± 8 per player). 130 HAEs were analysed further (wrestle = 48, tackler = 59, ball-carrier = 23). Standing wrestle had the highest overall probability of HAE occurrence of 41.3% (CI = 31.0 – 52.3%) than the other drills (range: 0.67 – 14.3%). HAE exposure was greater for tacklers than ball-carriers. Increasing the distance of the drill, e.g., tackle shield hit 1m (1.3% [0.5 – 3.4]) vs 3m (9.0% [6.2 – 12.8]), increased the probability of a HAE being observed. All drills were observed to have an exceedance probability of experiencing an HAE ≥25 g ~0.0% (CI = 0.0 – 0.8%), except for standing wrestle 1.0% (CI = 0.2 - 4.1%).
Conclusion: For the first time the findings from this study offer insights into HAE exposure from various common training drills in rugby league. While the overall chance of high-magnitude HAEs was relatively low, the contextual and constraint-based variability in HAE exposure between drills demonstrates the need for practitioners to consider how manipulating constraints may affect HAE exposure and accumulation.

113: PAIN, IMPAIRMENT, MEDICATION USE AND HEALTH-RELATED QUALITY OF LIFE OF RETIRED PROFESSIONAL RUGBY PLAYERS

Johan le Roux[1], Dina Christa Janse van Rensburg[2], Steve den Hollander[3], Gino Kerkhoffs[4], Vincent Gouttebarge[5]
Amsterdam UMC location University of Amsterdam, Department of Orthopedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, Netherlands[1], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[2], Division of Physiological Sciences and Health Through Physical Activity, Lifestyle and Sport (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, South Africa[3], Amsterdam UMC location University of Amsterdam, Department of Orthopedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, Netherlands[4], Amsterdam UMC location University of Amsterdam, Department of Orthopedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, Netherlands[5]
johanler13@gmail.com

Background: Retired elite male rugby players experience various physical and mental health conditions that negatively impact their quality of life. Retired rugby players also experience varying levels of pain, commonly in their back and joints. Research is scarce on how retired rugby players manage pain and how this affects their quality of life. This study aimed to understand joint pain and impairment, mental

and physical quality of life, and pain medication use in retired professional male rugby players through the following objectives: 1) describe their level of joint pain and impairment, and compare to matched controls, 2) describe their mental and physical quality of life and compare to matched-controls, 3) explore the association between levels of joint pain and mental and physical quality of life, and 4) describe their medication use and assess the association with the level of joint pain.
Methodology: A cross-sectional study was conducted using a questionnaire completed by retired professional male rugby players and matched controls from their peer group without an elite sporting background. Joint pain and impairment were explored through three questions, health-related quality of life was assessed through the PROMIS-GH, and medication use was explored through 12 questions.
Results: Retired rugby players reported higher scores than matched controls for joint pain and impairment, including significantly higher scores for joint impairments for activities of daily living. The global mental health scores of retired rugby players were significantly lower compared to matched controls and the global physical health scores were also lower in retired rugby players. Most retired rugby players reported not using prescription pain medication (75.3%) or over-the-counter pain medication (56.2%).
Conclusion: The findings of our study emphasise the considerable impact professional rugby careers have on the joint health and overall well-being of retired players. The elevated levels of joint impairment, particularly for activities of daily living, as well as the lower global mental and physical health scores compared to their peers from a non-elite sporting background, highlight the unique challenges retired professional rugby players experience. The findings emphasise the need for specific after-career support for the challenges faced by retired rugby players.

243: INJURY MITIGATION AMONG SOUTH AFRICAN TENNIS PLAYERS THROUGH VIRTUAL REALITY: A RANDOMISED CONTROLLED STUDY

David Kopping[1], Habib Noorbhai[2]
BEAHT Research Centre, Faculty of Health Sciences, University of Johannesburg, South Africa[1], BEAHT Research Centre, Faculty of Health Sciences, University of Johannesburg, South Africa[2]
davidmkopping@gmail.com

Background: Tennis players rely on traditional warm-up routines to mitigate injury occurrence. Despite these efforts, injuries remain a prevalent concern. Virtual Reality (VR) technology offers a novel approach to enhance the warm-up through a structured, immersive and engaging routine. Limited research has been conducted to ascertain whether tennis-based VR software may reduce the likelihood of injury occurrence. This study examines the potential of VR tennis warm-ups to mitigate injury risk among tennis players.
Methodology: A group of South African tennis players (n = 21; TSA, n = 11 ; non-TSA, n = 10) participated in a four-week randomised controlled study design and were divided into three groups: a control group performing a standard warm-up, a resistance band group (performing the FIFA11+S - a resistance band warm-up programme) and a VR group completing a tennis-specific VR warm-up programme designed to simulate common tennis strokes within a virtual environment. All groups underwent pre- and post-testing through the Functional Movement Screening (FMS) tool and Y-Balance Test Upper Quarter (YBT-UQ). Descriptive and inferential statistical analysis were computed for these variables using SPSS (Version 27, IBM). Level of significance was set at $p<0.05$.

Results: For the FMS, both the VR and FIFA11+S groups saw a decline in overall limb symmetry. The control and FIFA11+S groups showed a decrease in superolateral reach in the YBT-UQ test. Additionally, the FIFA11+S group also experienced reductions in inferolateral reach and total composite score. Conversely, the VR group showed improvements in all YBT-UQ tests. Furthermore, the VR group generally yielded positive results across the four-week period in the required drills.
Conclusion: The findings from this study suggests that a VR warm-up may be effective at improving upper extremity mobility. The FIFA11+S programme appears to improve FMS scores at the expense of upper extremity mobility. Further studies with larger sample sizes are warranted to determine the effectiveness of VR in reducing injury risk and to explore its potential benefits in improving (overall sport) performance.
Keywords: Virtual reality, Tennis, FIFA11+S, injury mitigation

316: INJURY EVENTS AND MECHANISMS ACROSS AGE GROUPS IN SOUTH AFRICAN FEMALE RUGBY UNION PLAYERS

Lara Paul[1], Wayne Viljoen[2], Clint Readhead[3], Mike Lambert[4], Jenna Hosking[5], Francois McKnight[6], Seipati Rasenyalo[7], Lynne Cantwell[8], Sharief Hendricks[9]
Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa.[1], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; South African Rugby Union[2], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; South African Rugby Union[3], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa.[4], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa.[5], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa.[6], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa.[7], South African Rugby Union[8], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape

Town, Cape Town, South Africa; Carnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, United Kingdom.[9]
lara.paul.0995@gmail.com

Background: The increased participation in women's rugby has led to an emphasis on both performance and player safety. Exposure to contact events on a regular basis increases the risk of injury. Understanding these injury events at various age groups, enables development of female specific injury prevention strategies and physical and technical preparation strategies. Therefore, the aim of this study is to report the different match injury events and mechanisms across different age groups (U16, U18, U20 and National) among female rugby union players in South Africa.
Methodology: All data were collected from annual South African women's rugby provincial or international competitions for each age group in 2023. These competitions include the u16 and u18 Girls Youth Weeks, SA U20 Women's competition and WXV 2 international Women's tournament. All injuries used for analysis were time-loss injuries. Injury data were presented as counts, proportions, and injury incidence. Overlap of confidence intervals were used to determine significant differences between groups.
Results: The tackle event had the highest injury proportion and incidence at U16, U18 and U20 age groups, whereas Open play injuries were the highest at the National age group. 43% of injuries at the U16 age group were ball carrier injuries, which equated to 38(95%CI:13-62) injuries per 1000 player hours. Tackler injuries accounted for 46% and 29% of all injuries for the U18 and U20 age groups. 22% of ball carrier injuries were caused by being Tackled side-on(regulation) and being Tackled front-on(high) for the U16 age group. Tackling front-on(regulation) accounts for 38% of tackling injuries for the U18 age group. At the U20 age group, 43% of the tackler injuries were Tackling front-on(regulation) injuries and 43% were Tackling side-on(regulation) injuries. At the National age group 75% of Open Play injuries were caused by Collisions.
Conclusion: Tackle-related injuries remain the primary contributors to injury proportion amongst the younger female age group. It is vital to prioritise Tackler and Ball Carrier technique coaching and conditioning for female rugby players to address these injuries, especially at the younger age groups. A video analysis study is required to further investigate tackler and ball-carrier technical proficiency in contact injuries.

172: A CONCEPTUAL MODEL OF INTERNATIONAL SPORTING SUCCESS FOR SOUTH AFRICA

Solomon Mthombeni[1], Yoga Coopoo[2], Habib Noorbhai[3]
BEAHT Research Centre, Faculty of Health Sciences, University of Johannesburg, South Africa[1], BEAHT Research Centre, Faculty of Health Sciences, University of Johannesburg, South Africa[2], BEAHT Research Centre, Faculty of Health Sciences, University of Johannesburg, South Africa[3]
smthombeni.solly@gmail.com

Background: Globally, nations invest in elite sports to enable athletes to achieve international sporting success for prestige and national pride. This requires nations to allocate resources to areas that increase the likelihood of success. The purpose of this study was to develop a conceptual model that would enable athletes to achieve international sporting success in a South African context, in line with the sport policy factors leading to international sporting success (SPLISS) model.

Methodology: A qualitative research approach was employed for this study whereby former Olympians (n = 15) and coaches (n = 10) who have represented South Africa internationally participated in semi-structured interviews, to provide their perceptions of policy priorities and factors that would enable international sporting success for South African athletes. Secondary data was collected from studies and documentation that have developed models for international sport success in South Africa. Data was analysed using two computer software programmes: Otter.ai (Otter.ai Inc.) and Atlas.ti (Version 22, Scientific Software Development GmbH) to transcribe and create themes.
Results: Based on the findings from the study informed by participants and supporting literature, a framework encompassing nine priorities of elite sport development in South Africa was identified as follows; (1) financial support provision; (2) coordinated sports policy promoting inclusivity; (3) foundation level sport exposure and internal development (4) coach development (5) access to competitions and talent identification (6) access to sports training facilities (7) provision of multi-disciplinary support system for athletes; (8) social protection and security for athletes and coaches; and (9) athletes internal traits (discipline, motivation and positive-self talk).
Conclusion: An international model for SPLISS was adapted, and based on research findings of this study, a framework model of international sporting success was conceptualised to align to a South African context. The findings of this study may inform policy makers of potential focus areas for resource allocation for South African sport success. However, further studies are needed to strengthen the validity of this model.

279: AIR QUALITY AND KINETICS OF VENOUS BLOOD GAS PARAMETERS DURING A 156KM ULTRA MARATHON

Philippe Noirez[1], Quentin Martinet[2], Alexandre Oliveira Alves[3], Francine Côté[4], Marion Falabregue[5], Benoit Mauvieux[6], Lilian Joly[7], Stéphane Besnard[8], Olivier Nocent[9], Romain Jouffroy[10], [11]
University of Reims Champagne-Ardenne, Reims, France[1], University of Reims Champagne-Ardenne, Reims, France[2], University Paris Cité, Paris, France[3], University Paris Cité, Paris, France[4], University Paris Cité, Paris, France[5], University of Caen, Caen, France[6], University of Reims Champagne-Ardenne, Reims, France[7], University of Caen, Caen, France[8], University of Reims Champagne-Ardenne, Reims, France[9], University Paris Cité, Paris, France[10], [11]
philippe.noirez@univ-reims.fr

Background: The overall health effects of ultra-endurance racing remain controversial. Hydro electrolyte and acid-base changes have been observed before and after ultra-endurance races. However, the kinetics of venous blood gas parameters have not been reported in any study.
Methodology: Fifty-five healthy volunteers, 12 females and 43 males, completed six identical loops of 26 km with 1000 m elevation gain (total of 156 km and 6000 m D+). During this race, air quality was measured in order to gain a better understanding of its relationship with physical activity, performance and venous blood gas parameters. Parameters such as pH, partial pressure of carbon dioxide and oxygen or base excess before, at the end of each loop and 24 hours after the end of the race. Samples were analysed immediately using the Stat Profile Prime (Nova Biomedical®, Waltham, MA, USA), which provides information on hydro-electrolyte and acid-base status. To measure air quality, 2 sensors (Air Quality Transmitter AQT530, Vaisala, Finland) were installed at a height of 1.70 m along the route. These sensors measured gases (nitrogen dioxide (NO2), nitrogen monoxide (NO), carbon monoxide (CO), ozone (O3) as well as fine particles (PM), fine particles with diameters < 1µm (PM1), 2.5µm (PM2.5) and 10µm

(PM10), and environmental parameters (temperature (°C), humidity (%RH) and atmospheric pressure (hPa)). Sports performance was measured with GPS watches (pace, running time, cadence, flat speed) and physiological parameters with a Hexoskin proShirt physiological vest (Carre Technologies Inc., Quebec) (heart rate (HR), respiratory rate (RR), minute ventilation (VE), respiratory volume (VR)).
Results: Of the 55 subjects enrolled in the study, 41 (75%) completed the race. Significant variations in pH, CO2 partial pressure, hematocrit, hemoglobinemia, ionized calcemia, total CO2 content, base excess and bicarbonate were observed between the different time points. For all gases, concentrations are well below WHO thresholds. However, for fine particles, maximum average concentrations over a 24-hour period of 3.38 ± 0.33 µg.m-3 for PM1, 8.28 ± 1.48 µg.m-3 for PM2.5 and 12.20 ± 2.15 µg.m-3 for PM10 were obtained. Cumulative times above reference thresholds were 290 minutes and 60 minutes respectively for PM2.5 and PM10 throughout the race. Performance data and physiological parameters were cross-referenced with air quality data collected during the event.
Conclusion: In this study, we observed significant variations in blood acid-base and hydro-electrolyte parameters throughout the race. Although these variations were observed, they seem to have a limited and low impact on the health of the participants, according to the homeostatic values of these parameters. This study demonstrated the feasibility of deploying a network of mobile, compact air quality sensors at a sporting event, where, despite the very rural setting, peak PM levels exceeding WHO reference levels were observed for a short period of time. These preliminary results need to be confirmed in other geographical contexts (altitude, temperature, hygrometry, air quality).

139: SPORTS-RELATED INJURIES AND ILLNESSES AMONGST ADOLESCENT ATHLETES IN AN URBAN SETTING PRESENTING TO A SPORTS MEDICINE PRACTICE: A ONE-YEAR PROSPECTIVE STUDY

Dr Celeste van Loggerenberg[1], Dr. Dimakatso A Ramagole[2], Dr Audrey Jansen van Rensburg[1], Prof. Christa Janse van Rensburg[1], Prof Piet Boer[3]
Section Sports Medicine, Faculty of Health Sciences, University of Pretoria[1], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria[2], 1Section Sports Medicine, Faculty of Health Sciences, University of Pretoria 2 Department of Human Movement Science, CPUT, Wellington[3]
celestevanloggerenberg@gmail.com

Background: An estimated 23 million sports-related injuries occur among adolescents in Africa annually, but the prevalence of illness in adolescent athletes on the continent is unavailable. The 2018 Youth Olympic Games (YOG) held in Buenos Aires reported 15.5 injuries and 8.4 illnesses per 100 athletes. South African sports injury and illness research focuses on event or sport-specific data, usually cross-sectional in nature. This study aimed to prospectively record and classify injuries and illnesses sustained by adolescent athletes presenting to a sports medicine practice in South Africa
Methodology: Over twelve months, a prospective longitudinal observation study was conducted on adolescent athletes presenting to a single urban sports medicine practice in South Africa. Data of all consenting adolescent (10-19 years) athletes were collected for each visit. Information was classified according to the International Olympic Committee (IOC) consensus statement: methods for recording and reporting epidemiological data on injury and illness in sport 2020.
Results: Three hundred seventy-three visits were recorded (injuries = 202; illnesses = 171). Athletes participating in team sports resulted in most injuries (63.9%), and those participating in individual sports resulted in most illnesses (65.5%). A large prevalence of injuries was reported in rugby (25.3%), and most illnesses were associated with athletics 21.6%. Injuries were mainly sustained in the lower limbs (60.9%)

and caused by joint and muscle sprains (21.8%). The respiratory system was the most affected organ system (54.0% of all illnesses), with most cases being infective (96.8%). For most injuries and illnesses, severity was categorised as 1-7 days' time-loss.
Conclusion: This study provides valuable insight over a 12-month period into the prevalence and nature of adolescent sports injuries and illnesses, as per the IOC consensus statement. Team sports had more injuries, mainly in the lower limbs. Respiratory tract infections were the predominant illnesses.

245: WHICH BUGS ARE BITING OUR ATHLETES? DATA FROM 210 ATHLETES WITH PATHOGEN-SPECIFIC ACUTE RESPIRATORY INFECTIONS PRESENTING AT A SPORT AND EXERCISE MEDICINE CLINIC

Marcel Jooste[1], Carolette Snyders[2], Martin Schwellnus[3]
Sport, Exercise Medicine and Lifestyle Institute and Section Sports Medicine, University of Pretoria[1], Sport, Exercise Medicine and Lifestyle Institute, University of Pretoria[2], Sport, Exercise Medicine and Lifestyle Institute, University of Pretoria; International Olympic Committee Research Centre of South Africa[3]
joostemarcel@gmail.com

Background: Acute respiratory infections (ARinf) are the most common illnesses affecting athletes. These infections are caused by several pathogens, but there are limited data on the aetiology of these in athletes. The aim of this study was to describe the causative pathogens of ARinf in athletes presenting at a Sport and Exercise Medicine (SEM) clinic, where point-of-care testing with a respiratory multiplex polymerase chain reaction (PCR) device was used to detect causative pathogens.
Methodology: This is a retrospective analysis of data collected (February 2018-June 2024) from athletes presenting with confirmed ARinf at a SEM clinical service facility providing care for athletes of all competitive levels. As a result of the COVID-19 pandemic, this period was divided into three periods (T1-T3): In T1 (February 2018–February 2020) and T3 (March 2023–June 2024), athletes (age 16–58) presenting with symptoms of an ARinf were evaluated and a nasopharyngeal swab was taken to determine the causative pathogen using multiplex PCR testing (Biomereaux RP2.1). During T2 (June 2020-October 2021) athletes (age 18–60) with confirmed SARS-CoV-2 infection were assessed 10-28 days after symptom onset (due to isolation regulations at the time). The main outcome variable for this study is the frequency (%) of confirmed ARinf for specific pathogens in all athletes, and during the T1+T3 periods.
Results: 210 athletes with confirmed ARinf were evaluated (51% female). The mean (±SD) age was 25 (±8) years. During T2, 95 athletes with SARS-C0V-2 infections were assessed (45% of all athletes seen). Among the 115 athletes evaluated during T1 and T3, a causative pathogen was identified in 90 (78%). The frequency (%) of the most common pathogens causing the ARinf were as follows: Rhinovirus=35 (30%), SARS-CoV-2=11 (10%), common Coronaviruses=11 (10%), Influenza A=10 (9%). Dual-pathogen infections were present in 8 (7%) athletes.
Conclusion: To our knowledge, this study represents the largest cohort of athletes with different pathogen-specific ARinf. Excluding the period during the COVID-19 pandemic, the most common pathogen causing ARinf in these athletes was Rhinovirus, followed by SARS-CoV-2, the other common Coronaviruses, and Influenza A. Future research should focus on the effects of these common pathogens on athletes.

130: COMPARISON OF SUDDEN CARDIAC ARRESTS/DEATHS IN SOUTH AFRICAN & EUROPEAN PROFESSIONAL FOOTBALL LEAGUES: RISKS, INCIDENCE, AND PREVENTIVE MEASURE: A SYSTEMATIC REVIEW

Loyiso Maqina[1]
University of Johannesburg[1]
loyisom@uj.ac.za

Background: Football, commonly known as soccer, is one of the most popular sports in the world with millions of players and supporters. Sudden cardiac arrest/death(s) (SCA/SCD) are rare but traumatising incidents in sports, particularly in football. SCD are the leading cause of death in young athletes, and this raise concerns in football. Soccer is a physically demanding exercise. Athletes with an undiagnosed cardiovascular abnormality may be at a risk for SCA/SCD.
Methodology: A literature search was done using Science direct, Oxford Academics, Sage Journals, Wiley Online Library, Taylor Francis Online, SpringerLink and PubMed using a combination of keywords and operators such as the Boolean search type to produce accurate results. Experimental studies, Observational Cross Sectional, Prospective and Exploratory Publications were included in our review if the articles focused on SCD/SCA in professional football leagues and studies conducted on professional football players in South Africa and European countries and articles written in English.
Results: A total of 5 confederation with 123 cases (mean age 37 ± 17 years, 100% men) with SCA/SCD were reported; 67 EUFA players (54.5%), 17 AFC players (13.8%), 16 (13%) CSDF players, 19 CAF (15.4%) & 4 CONCACAF players (3.3%) cases. A diagnosis by autopsy or definite medical reports was established in 140 cases (58.3%). The leading cause in players >35 years was CAD (76%) and in players ≤35 years was (SCD, 22%). In players ≤35 years the leading cause of SCD varied by region (CPR) resulted in a survival rate of 85% with the use of an (AED) compared with 35% without.
Conclusion: Education in SCD/SCA should be improved by national football registries. Immediate access to an AED at training and competition sites, as well as CPR training for players, coaches, and staff members, should be compulsory to improve survival from SCA/SCD. South Africa is currently on the rise with SCD/SCA, and our current study is focusing on the PSL & NFD risk profile data.

281: PRELIMINARY PERSPECTIVES OF ELITE COACHES ON OPTIMAL TRAINING STRATEGIES FOR 5000M TRACK ATHLETES IN SOUTH AFRICA

Clinton Swanepoel[1]
University of Johannesburg[1]
cswanepoel@uj.ac.za

Background: The 5000m race demands a nuanced approach to training and preparation for optimal performance. While existing studies have explored training variables in middle and long-distance running, the specific requirements of 5000m athletes remain underexplored. This study delves into the perspectives of elite coaches in South Africa, aiming to uncover their strategies for national and provincial 5000m athletes.
Methodology: Eight elite coaches renowned for their success in coaching male and female 5000m athletes at the national level were purposively selected. Gender equity principles guided the selection

process, ensuring inclusivity and diversity. Semi-structured interviews were conducted, recorded, and transcribed verbatim. Thematic coding and analysis using ATLAS.ti 22.2 software revealed key patterns and themes in coaches' strategies.
Results: Preliminary findings reveal that elite South African coaches employ various strategies to optimise 5000m athlete performance. These encompass tailored running programmes, mental conditioning, effective recovery strategies, customised nutrition plans, strength and conditioning, technical training, coaching methods, and individualised approaches. These elements underscore the significance of a comprehensive and personalised training regime.
Conclusion: This study sheds light on the preliminary perspectives of elite coaches regarding optimal training strategies for 5000m athletes in South Africa. While the findings offer valuable insights, they are preliminary and indicative of the need for further research. Nonetheless, they contribute to the understanding of the holistic approach required to prepare athletes for the demands of the 5000m race.

171: DETERMINING A NEW METHOD OF ANALYSING SPRINT AND CHANGE OF DIRECTION ABILITIES IN TRAINED ATHLETES

Gregory Gordon[1], Andrew Green[2]
Department of Human and Movement Studies, University of Johannesburg, Doornfontein Campus, South Africa[1], Department of Human and Movement Studies, University of Johannesburg, Doornfontein Campus, South Africa[2]
greg4gordon@gmail.com

Background: In modern sports, straight-line sprinting isn't sufficient to determine an overall sprint performance. Athletes need to excel at slowing down and changing direction quickly during match play. Contemporary methods do not provide a single metric that reflects an athlete's straight-line and COD abilities. Ideally, this metric could help assess how well athletes decelerate, control their balance, and transfer energy into movements like changing direction, which is essential for evading opponents during competition. This study aims to create a single measurement that reflects an athlete's overall multidirectional sprinting ability, which is crucial for success in many sports.
Methodology: 54 university athletes (Age: 21.0±1.5 years; Mass: 69.6±9.1 kg; Height: 172.6± 7.8 cm) performed linear sprints, decelerations and 45°, 90° and 135° COD tests, in both directions over 30 m. Sprint acceleration and deceleration were captured using a Stalker ATS II radar-gun and directional COD times were evaluated using stationary time gates. Sprint accelerations were used to plot coordinates based on the sprint directions, generating an octagon. The area of the octagon was calculated and divided into 4 sections, namely: forward (0°, 45°, 90°, 270°, 315°); backwards (90°, 135°, 180°, 225°, 270°); right (0°, 45°, 90°, 135°,180°); left (0°, 180°, 225°, 270°, 315°). Paired T-tests were used to analyse and determine the area differences between forward and backward in addition to left and right accelerations during sprints.
Results: The mean areas between forward (86.12%) and backward accelerations (13.88%) showed a significant difference ($p<0.001$). In addition, there was also a significant difference when comparing left and right accelerations ($p<0.001$). Sprints when accelerating right (55.28%), exhibited a greater area of the acceleration mean than that towards the left (44.72%).
Conclusion: This method provides a variable to determine a holistic view of the overall sprint performance in a multidirectional capacity of an athlete's abilities. This method gives insight into discriminating any distinctions between forward and backward sprint performance as well as any right

and left variances during sprint performance. Consequently, this approach has the capacity to identify the differential directional abilities to provide a more universal approach to analysing sprint performance.

153: THE ASSOCIATION BETWEEN THE GROWTH SPURT STATUS OF ADOLESCENT MALE CRICKET PLAYERS AND RISK OF INJURY DURING A CRICKET SEASON

Franso-Mari Olivier[1], Benita Olivier[2], Candice MacMillan[3]
Wits Cricket Research Hub for Science and Rehabilitation, Department of Physiotherapy, School of Therapeutic Sciences, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa[1], Centre for Healthy Living Research, Oxford Institute of Allied Health Research, Department of Sport, Health Sciences and Social Work, Oxford Brookes University, Oxford, United Kingdom Wits Cricket Research Hub for Science, Medicine and Rehabilitation, Department of Physiotherapy, School of Therapeutic Sciences, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa[2], Department of Physiology, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[3]
fransomari@gmail.com

Background: The adolescent growth spurt is considered a risk factor for injuries in sports. The aim of this study was to investigate the association between the adolescent male cricketer's growth spurt status and in-season injury risk.
Methodology: Seventy-six cricket players (13-18 years old) from two private all-boys high schools in Johannesburg participated in this prospective longitudinal cohort study. The Khamis Roche method was used to determine the growth spurt status as a percentage of predicted adult height (%PAH), categorising participants into pre-Peak Height Velocity (PHV), circa-PHV and post-PHV. Injuries were self-reported weekly via an online questionnaire. Descriptive statistics were performed and presented as means and standard deviations (SD). Injuries were profiled using two-way tables of association. Fischer exact and T-tests calculated the difference between injured and not injured participants during different parts of the season. The association between injury and growth spurt status for the season was determined using a mixed effects Poisson regression analysis.
Results: Thirty-seven players (48.68%) reported 60 injuries during the 6-month season, and 13.08 injuries were reported/1000 player hours. Most injured participants in the middle of season were in circa-PHV (66.67%, n=6). In the last part of season most injured participants were in post-PHV (62.5%, n=10). In the univariate analysis, previous injury was a significant predictor of injury (95% CI, p=0.034), resulting in players being 1.9 times more likely to obtain an injury if previously injured. No statistically independent relationship between rate of injuries and growth spurt status according to %PAH was found when adjusting for years pace bowling, the allrounder role, part of season and previous injury.
Conclusion: Although no association was found between growth spurt status and risk of injury, calculating %PAH could form part of injury prevention programmes, assisting in potentially protecting players by identifying periods around PHV when most injuries occur and adapting overall exposure.

CLINICAL CASE ABSTRACTS

INDEX	NAME	ABSTRACT TITLE
337	Dr Jessica Burgess	Hercules' poison – Severe muscle fibrosis as a complication of site oil injection – a case report
66	Mrs Mumtaz Chohan	Rehab of undiagnosed ankle injury
269	Dr Melissa Janse van Vuren	"When the delta sneaks up on you": An unexpected outcome of routine screening in an adolescent athlete
151	Dr Marcel Jooste	Bilateral exertional calf pain – It's not just tight calves after all
68	Dr Jo-Anne Kirby	Late trauma sequelae as cause for exercise induced headaches in a road runner
138	Dr Lervasen Pillay	The curious case of a meningioma in an active female
223	Dr Carolette Snyders (Cloete)	An injury which caused the endurance runner to stop
341	Dr Pierre Viviers	Lower back-pain in an adollescent athletes, an integrated approach for optimal management

337: HERCULES' POISON – SEVERE MUSCLE FIBROSIS AS A COMPLICATION OF SITE OIL INJECTION - A CASE REPORT

Jessica Burgess[1], Mamosilo Lichaba[2]
Department for Exercise Science and Sports Medicine (DESSM), School of Therapeutic Sciences, University of the Witwatersrand, South Africa[1], Department for Exercise Science and Sports Medicine (DESSM), School of Therapeutic Sciences, University of the Witwatersrand, South Africa[2]
drjessburgess@gmail.com

History: A 50-year-old male recreational weight - lifter presented to his local clinic with a history of bilateral upper limb pain, stiffness and muscle deformities following a 2 year history of unregulated, unsupervised, improper injection of a muscle - bulk enhancing MCT oil, Synthol.
Physical Findings: On examination, the patient was found in fixed flexed position of the elbow and fingers at rest. All the arm and shoulder muscle contours were bulky, irregular and "rock hard'. The skin showed patches of irregular hyper-pigmentation and dimpling.
All upper limb joint ranges of motion (ROM), were greatly limited in both active and passive movements, including visible contractures of the hands and the elbows.
Differential Diagnosis / Hypothesis: Elbow and hand contractures secondary to muscle fibrosis initiated by a chronic inflammatory or infective process or possible space-occupying foreign bodies.
Test and Results: An MRI scan of the right shoulder and forearm showed features in keeping with a foreign-body induced inflammatory process. Findings include a large fibrotic focus in the biceps brachii muscle belly, expansion of subcutaneous adipose tissue of anterolateral forearm with thickened septation and fibrosis were noted as well as T1 and T2 hyperintense diffuse musculature with multiple foci of forearms and shoulder girdle in keeping with fatty infiltration and fibrosis. No oil cysts or other collections were identified.
A muscle biopsy of the right biceps brachii showed exclusively fibrous tissue (with no remaining skeletal muscle). Additionally, a foreign body giant cell reaction was noted with intracytoplasmic lipid droplets within histiocytes with surrounding dense fibrosis and sparse lymphocyte inflammation. These findings were suggestive of a foreign body-induced diffuse muscle fibrosis.

Final / Working Diagnosis: Foreign – body induced muscle fibrosis complicated by upper body irregular, hardened muscle hypertrophy with flexion contractures of the elbows and hands.
Treatment and Outcomes: The patient has been managed with analgesia, physical and occupational therapy as well as intramuscular botulinum toxin ; all with poor results. He suffers from significant ongoing pain, stiffness and limited upper limb range of motion, negatively impacting his ability to perform daily tasks.The patient has been referred to an hand surgeon to consider release of the hand contractures whilst continuing physiotherapy and occupational rehabilitation.

66: REHAB OF UNDIAGNOSED ANKLE INJURY

Mumtaz Chohan[1]
MCG Biokineticist[1]
biomcg@gmail.com

History: Patient fell off a stool while trying to get something from a top shelf. At the time the patient felt some discomfort but was busy and continued with her day. Over the next few days she starting feeling more pain which she managed with pain medication, a soft guard and anti inflammatories (this helped mask the pain). After about the week the patient went back to her usual routine and couldn't really stay off her feet and over time the ankle began swelling and turning blue. Over some further time her family members noticed that she was limping. She "worked through the pain" until she realised that she was compensating considerably and sought help. XRAYS revealed no changes. Physio didn't give much relief
I saw the patient 8 weeks after the incident.
Physical Findings: Patient is better in a supported shoe such as a trainer. Her worst is barefoot and she can't walk for long periods this way. In a trainer she is able to walk but she is limping. As soon as she removes her shoes she is in pain and it is swollen. Patient is able to do pilates if she avoids all single leg exercises and plyometric exercises.She has lost all sense of balance. She presents with a flat foot - probably present before the accident. She relies on her toes for balance and not the ankle. Toe crunching is evident even in a static standing position. She still had some swelling when seeing me. She is unable to perform a single leg calf raise on the affected side. With a double leg calf raise she relies solely on her unaffected foot. All ankle movements are limited and painful. She has reduced strength in all ankle muscles on affected side.
Differential Diagnosis / Hypothesis: Ankle ligament strain, possibly grade 2.
Test and Results: Anterior draw - negative but unstable. Passive and Active strength - limited and decreased on affected side. Flexibility - reduced on unaffected side. Stork stand - unable to do.
Final / Working Diagnosis: Treating ankle ligament strain that was mostly left untreated in order to resolve limp and return to sport.
Treatment and Outcomes: Treatment was focused around strength, proprioception and balance. Patient was progressed from non weight bearing using Thera bands - to weight bearing but no additional weight. Thereafter weights and resistance was added. Final stage included plyometrics and strength work on uneven surfaces. After 4 months I was able to successfully get rid of the limp and equalise strength between the 2 feet. Patient attended biokinetics once a week for 30 minutes. Patient returned to running and went on to successfully complete a 21km run pain free. She has also gotten faster in her running.

269: "WHEN THE DELTA SNEAKS UP ON YOU": AN UNEXPECTED OUTCOME OF ROUTINE SCREENING IN AN ADOLESCENT ATHLETE.

Melissa Janse van Vuren[1], Adele Greyling[2], Wayne Derman[3]
Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa [1], Mediclinic Vergelegen, Cape Town, South Africa[2], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa [3]
melissajvv@sun.ac.za

History: A 17-year-old male sprinter underwent routine periodic health assessment. Prior to screening, he had completed a periodic health examination (PHE) form in which he had not identified any cardiac risk factors or relevant family history. On inquiry he reported a syncopal episode, which was possibly vasovagal and atypical chest pain. No palpitations were reported. He did complain of fatigue and poor performance which may be related to iron deficiency non-anaemia (IDNA) that was identified.
Physical Findings: BP: 125/83mmHG. HR: 53. Generally, well. Weight: 72 kg. Height: 178cm. CVS: Regular heart rhythm. Unremarkable cardiovascular examination. Normal systemic examination.
Differential Diagnosis / Hypothesis:
1. Orthostatic hypotension
2. Vasovagal syncope
3. Symptomatic IDNA
4. Cardiac arrhythmia
5. Other causes of fatigue

Test and Results: Resting ECG – sinus rhythm, rate 55/min, axis = 30 degrees, shortened PR interval of 100ms, QRSd 133ms. Pre-excitation in leads I, II, aVF, V3-V6, suggestive of a septal accessory pathway (AP).
Bloods: IDNA
Final / Working Diagnosis: Ventricular pre-excitation with cardiac syncope. IDNA (work-up pending)
Treatment and Outcomes: He was referred for cardiology and electrophysiology assessment and underwent an electrophysiology study (EPS). A high-risk mid-septal AP was identified with an AP effective refractory period (AERP)< 250ms, which is a risk for sudden cardiac death with pre-excited atrial fibrillation and ventricular fibrillation. Conservative ablation was performed due to proximity to the atrioventricular node. After the initial ablation AP conduction returned with AERP of 280ms on isoprenaline infusion. Further ablation successfully blocked the pathway. However, on discharge the ventricular pre-excitation had returned. He will follow up within one month, and if pre-excitation is still present, he will require another EPS. In the interim, he may exercise at usual intensity and frequency as the pathway conduction properties are no longer considered to be high-risk following the ablation.

151: BILATERAL EXERTIONAL CALF PAIN - IT'S NOT JUST TIGHT CALVES AFTER ALL

Marcel Jooste[1]
Sport, Exercise Medicine and Lifestyle Institute (SEMLI) and Section Sports Medicine, Faculty of Health Sciences, University of Pretoria[1]
joostemarcel@gmail.com

History: A 53-year-old male, ultra-distance runner, complained of exercise-related bilateral calf pain, which had progressively worsened over the past decade. The dull, burning pain occurs within the first 3kms of running and intensifies during incline running. The pain resolves within 1 minute of rest/walking. He reported no associated paraesthesia, weakness or swelling. His "tight calves" had not improved despite years of physiotherapy treatment and stretching. Recently, he had experienced non-exercise-related cramps, precipitated by being in certain positions while lying in bed. Daily magnesium supplementation had made no difference. Medical history of note was the use of Allopurinol for hyperuricaemia, with no history of arthritis. He had no modifiable risk factors for atherosclerosis, nor previous lower limb injuries.
Physical Findings: At rest, the lower limbs were normal in appearance and non-tender to palpation. Knee and ankle joints had full, pain-free range of motion. Limb reflexes, motor examination and sensation were normal. The popliteal, posterior tibial and dorsalis pedis pulses were palpable and equal bilaterally. No bruit was audible in the popliteal fossa at rest or with forced plantar flexion. The symptoms were not reproducible with repeated standing calf raises. Lumbosacral examination was normal.
Differential Diagnosis / Hypothesis: Popliteal artery entrapment syndrome. Chronic exertional compartment syndrome. Proximal tibial nerve entrapment syndrome. Lumbar stenosis.
Test and Results: Ankle-brachial-index: Resting: Normal. Post-exercise: 17-20% drop. (Left 0.91; Right 0.94). Immediately post-exercise, bruits were audible on auscultation over the popliteal fossa, bilaterally.
Duplex doppler: Resting: Normal venous and arterial doppler. Post-exercise: Initial diminished, monophasic, flow within the popliteal arteries, gradually becoming biphasic then triphasic. Normal flow within the femoral and external iliac arteries. Forced plantarflexion with the knee fully extended: Absent flow within the popliteal arteries.
Final / Working Diagnosis: Bilateral functional popliteal artery entrapment syndrome
Treatment and Outcomes: The patient was referred to a Vascular surgeon to confirm the diagnosis and manage surgically. Angiography showed complete occlusion of the popliteal arteries with forced plantarflexion, at the level of the upper border of the patella. Normal flows returned upon relaxation. Bilateral popliteal vascular entrapment release was performed. At 1-month follow-up: No compression was noted during forced plantarflexion on the duplex doppler. Rehabilitation was commenced. The first run following surgery was at 6 weeks post-operation, this was pain-free. Running loads were gradually increased over the subsequent six weeks.

68: LATE TRAUMA SEQUELAE AS CAUSE FOR EXERCISE INDUCED HEADACHES IN A ROAD RUNNER

Jo-Anne Kirby[1], [2]
Campus Health Service, Stellenbosch University, South Africa[1], Institute of Sport and Exercise Medicine, Stellenbosch University, South Africa[1],[2]
doc.kirby.sport.med@gmail.com; jkirby@sun.ac.za

History: A 22-year-old male student training for a marathon, presented with severe exercise-induced headaches. Does not resolve on cessation of exercise. Headache 4 hours, vomited once, stabbing in nature, top of the head. Sensitive to sound not light. One year prior he was in a motorcycle accident, he sustained a bleed of his adrenal glands and developed hypertension after discharge. Treated for 6 months and then terminated by his GP as his blood pressure (BP) returned to normal.

Physical Findings: BP Right 190/90 Left 170/90, Pulse rate 84. 36.6 deg. JACCOL neg. PEARL. Eye movements normal, fundoscopy normal. Neurology: power and sensation normal. C-spine normal, no trigger points in the neck. No signs of meningeal irritation. Cardiovascular exam normal. No radio-femoral delay. No bruits. No clinical features of Cushing's syndrome.
Differential Diagnosis / Hypothesis: Migraine. Concussion. Secondary hypertension. Kidney. Adrenal gland. Renin / Aldosterone. Other endocrine. Exogenous substances. Autonomic
Test and Results: In hospital CT scan reviewed (1 year old). Pulmonary contusion and pleural effusion, right adrenal hemorrhage, hepatic laceration. Post traumatic inflammatory changes extending to surround the kidney. Direct communication with the original reporting radiologist: bleed of adrenal gland, not a tumor. The kidney size was normal. Full Blood Count: normocytic normochromic Hb 15.4. Urea 7.7 creatinine 101 eGFR 89 (>90) electrolytes normal. Aldosterone 329 (70-1066 pmol/L) Renin > 300 (2.7-27.7 ng/L) Renin aldosterone ratio 1 pmol/ng. CT renal angiogram: Small caliber right renal artery. Right kidney atrophied. Normal left kidney. Renogram: No blood flow to or isotope excretion from the right kidney – 100% non-functional. Histology: large renal infarct, features of renal artery stenosis, marked tubular atrophy, interstitial inflammation and fibrosis.
Final / Working Diagnosis: Secondary hypertension due to renal trauma: renal artery stenosis, infarction and atrophy.
Treatment and Outcomes: Prexum plus 4/1.25 during work-up. Exercise restricted to light intensity until BP controlled. No heavy gym. As BP still elevated at 150/100mmHg and symptoms of light-headedness with running, HCTZ 12.5mg added. Patient informed that it is banned in sport. He is not elite and not a medal candidate (social runner). 2 weeks later BP 125/80. Once the renal angiogram report was available:
Nephrectomy. Complete resolution of hypertension without meds. Return to sport after surgical recuperation. No headaches.

138: THE CURIOUS CASE OF A MENINGIOMA IN AN ACTIVE FEMALE

Lervasen Pillay[1], Chris Pofyris[2], Ronald Veenis[3], Simon Lawson[4]
University of Pretoria[1], Netcare Milpark Hospital[2], Sandton Sports Medicine[3], Morningside Chiropractic and Sports Injury Center[4]
drpillay@absamail.co.za

History:A 44 year old active female would had suffered from previous polytrauma many years ago, presented with acute onset right calf pain as a clinical acute DVT. The pain has alternated between the left and right calf, thighs and hamstring for a long period of time. However, this presentation was extremely painful (VAS 8-9/10). There was no history of trauma but there was a history of increased activity levels, recent travel and poor hydration.
Physical Findings: The right calf was swollen, tender and tight. The dorsal pedal pulse and posterior tibial pulse were not easily palpable and there with poor capillary refill of the toenails. There was a positive Homan's sign. Lumbar examination was positive for radiculopathy around 45 degrees of straight leg raise but no other neural fallout was present.
Differential Diagnosis / Hypothesis: 1. Acute DVT due to recent travel and poor hydration and possible other underlying factors (previous polytrauma) - URGENT EVALUATION WAS REQUIRED. 2. Acute lumbar disc herniation.

Test and Results: Duplex-doppler examination and D-dimers, INR, PI/PTT was done. Duplex-doppler was negative but d-dimers was slightly raised. A CT angiogram was done, which was negative.
Final / Working Diagnosis: The patient was put on muscle relaxants and pregabalin with the assumption of a lumbar disc herniation. A subsequent lumbar MRI and neurosurgeon opinion excluded lumbar pathology. We discussed the need for an MRI brain as she began presenting with mixed upper and lower motor neuron fallout signs of the lower limbs that were not consistent. Muscle strength recruitment could not be achieved. This was after discussion with the physiotherapist and chiropractor. The patient was initially against an MRI brain but agreed after a discussion a further evaluation. The final diagnosis was a Large Meningioma (110mmx82mmx30mm; 58.3g), WHO grade 2 located in the left cerebral hemisphere.
Treatment and Outcomes: She was referred to a neurosurgeon specialising in tumors. Subsequently, debulking surgery was performed and radiation therapy was started. Within 2 days of surgical intervention, normal lower limb function already began returning. The plan is to complete radiation treatment, and continued lesion monitoring as it is benign and convert to malignant.

223: AN INJURY WHICH CAUSED THE ENDURANCE RUNNER TO STOP

Carolette Snyders[1]
Sport, Exercise Medicine and Lifestyle Institute (SEMLI), Faculty of Health Science, University of Pretoria[1]
carolette.cloete@semli.co.za

History: A 47-year-old male long-distance runner preparing for the Comrades marathon, presented with deep medial calf pain, intermittently radiating down to the ankle. Pain since mid-March, progressive in nature. Since May, he experienced residual pain after a run, even at rest. Pain prevented him from completing a recent 21km race. He subsequently developed right knee pain without a specific mechanism of injury. No previous medical history of note. No chronic medication use.
Physical Findings: Right lower leg: Ankle movements normal and no pain on active or resisted movement. No swelling or discolouration. Pain over medial border of superior third of tibia. No pain to anterior tibial border. Medial gastrocnemius calf muscle tenderness. Tuning fork test negative. Hop test positive. Fulcrum test of tibia positive. Right knee: Tender to palpation inferior lateral pole of the patella. Tender distal iliotibial band (ITB). Patella tendon and Hoffa's fat pad normal. No increased laxity of anterior or posterior cruciate ligaments. McMurray test negative. Right hip: Normal and painless range of movement. Piriformis triggers with radiation to posterior aspect of leg. Trendelenburg test: Positive with pelvic tilt more pronounced right side. Lumbar spine: Tenderness L2-L5, no paraspinal pain. Slump test negative.
Differential Diagnosis / Hypothesis:
Right lower leg: Right tibia stress fracture. Right medial gastrocnemius muscle strain. Right knee: Patella femoral pain (patella maltracking)
Test and Results: Imaging: MRI right lower leg. Blood tests: Serum calcium and vitamin D3 levels
Final / Working Diagnosis: Stress fracture right proximal tibia diaphysis (medial and posterior border) with marked accompanying periosteal thickening and oedema. No calf muscle abnormality. Altered biomechanics, and weakness resulting in patella femoral pain.

Treatment and Outcomes: Non-weight bearing mobilisation, on crutches. Physiotherapy: Soft tissue treatment to calf muscle, gluteal triggers and tight ITB. Isometric exercises to prevent muscle wasting. Vitamin D supplementation. Follow up in 2 weeks, once pain free weight bearing, to walk without crutches, then non-weigh bearing exercises (e.g. cycling) with slow progression to weight bearing exercises, and ultimately running. Soft tissue treatment for muscle triggers, and strengthening exercises for patella maltracking. Education on prevention of future stress fractures.

341: LOWER BACK-PAIN IN AN ADOLLESCENT ATHLETES, AN INTEGRATED APPROACH FOR OPTIMAL MANAGEMENT

Pierre Viviers[1], Prof Wayne Derman[2]
Institute of Sport and Exercise Medicine, Stellenbosch University[1], Executive Head, Departement of Sport, Exercise and Life-style Medicine, Stellenbosch University[2]
plviviers@sun.ac,za

History: History: 16-year-old male rugby union player presents with lower back-pain and stiffness after sport related physical activity, relieved by rest and non-steroidal anti-inflammatories. Pain is in the spine, posteriorly, and in the midline of lower thoracic and upper lumbar vertebral bodies, with no distal radiation distally. No previous traumatic incident, constitutional symptoms, or underlying disease were reported. He presented with similar symptoms and signs, at the end of his rugby season 11 months before, which forced him to visit a sports medical practitioner clinic. A spinal x-ray demonstrated multi-level endplate degenerative changes, and he was managed conservatively. He confirmed previous use of creatinine to build muscle and he played cricket at the from a young age. His father noticed a growth spurt. Family medical history is unremarkable.
Physical Findings: Physical Findings: General findings normal. Slight right sided scoliosis. Reduced range of motion. Pain elicited with deep touch in the midline of the lower thoracic and upper lumbar region. Neurological examination was normal and no abnormal findings in the rest of the systems
Differential Diagnosis / Hypothesis: Vertebral column fractures (including stress fractures), spondylolysis, spondylolisthesis, intervertebral disc herniation, Scheuermann's disease (a-typical), infectious disease (including tuberculosis), inflammatory disease, neoplastic disorders, hematological disease, or congenital disease.
Test and Results: Laboratory tests (FBC, ESR, CRP) – normal. MRI (including STIR studies) – intervertebral disc desiccation (L2-3 & L5-S1), endplate irregularity, Schmorl's nodules, and multi-level mild broad-based intervertebral disc protrusions without nerve root compromise.
Final / Working Diagnosis: Lumbar (a-typical) Scheuermann's disease.
Treatment and Outcomes: Shared decision making (conservative approach), reduce spinal load and discontinued rugby related activities, physical therapy, reconditioning (calisthenic program) and change of sport, return to rugby, guided by disease progress and skeletal maturity.

POSTER PRESENTATION ABSTRACTS

INDEX	NAME	TITLE
		Friday 18 October – Station 1.1
121	Mr Ghaleelullah Achmat	Developing physical activity guidelines for firefighters with coronary heart disease: A scoping review
213	Mrs Faatima Adam	Health profiles of African para-athletes at a commonwealth games federations GAPS camp
115	Dr Adelle Kemlall Bhundoo	Physical activity levels during SARS-CoV2- pandemic: a focus on South African data from the ASAP study
111	Mr Jed Davidson	Influencing factors of sports and recreation facility usage at teachers' colleges in Bulawayo, Zimbabwe
228	Ms Ronel du Plessis	The effects of exercise on blood pressure and blood glucose levels in patients with diabetic peripheral neuropathy in South Africa
154	Dr Clement Gambelli	The effect of schoolbag's mass on the gait of children
83	Prof Jeanne Grace	Effects of eccentric exercise on work- related performance and physical activity levels in rheumatoid arthritis patients
43	Ms Chante' Johannes	Strategies and Best Practices That Enhance the Physical Activity Levels of Undergraduate University Students: A Systematic Review
311	Prof Philippe Noirez	Human blood ACE2 in young men is modulated by exercise intensity
199	Ms Vuyelwa Radebe	Retro walking in a therapeutic context: a systematic review
335	Dr Lynn Smith	A toolkit to assess health-related quality of life amongst patients with selected NCDs
389	Mr Uyanda Tyusha	A descriptive study of player wellness in a South African male football (soccer) academy
		Friday 18 October – Station 1.2
282	Mr Taine Buys	The Development of a Smart Exercise Ball: A Case Report
259	Dr Jason Constantinou	Recurrent metatarsal fracture in a competitive bodybuilder, a case report
390	Mr Marc Du toit	Confirmatory factor analysis of the African big-5 sport psychological assessment tool (big-5 spat) using an independent sample
233	Mr Johann Els	Evidence of elevated arterial carbon dioxide and cardiac dysfunction during exercise amongst young and old
268	Dr Melissa Janse van Vuren	Experimental use of high-intensity electromagnetic field therapy in the treatment of spasticity in a male swimmer with a spinal cord injury: a case study
31	Mr Dimitrije Kovac	Regression of the lumbar disc protrusion/extrusion following the comprehensive exercise program: A case series
220	Mr Tony Yiqun Li	NGS Training for Pathogen Genomic Surveillance across Africa
164	Dr Takshita Sookan-Kassie	Body composition and nutritional intake of rural and urban primary school learners in Zimbabwe

149	Ms Kendra Szeles	The Impact of Various Taping Techniques on Drop Landing kinetics and kinematics
156	Dr Mark Troxler	Current Physician Knowledge of the Therapeutic Use Exemption
203	Dr Helene van der Hoven	“Persistent pain after ankle sprain and the overlooked role of the peroneus brevis tendon”: a case series
42	Ms Su-ané Zwiegelaar	A multidisciplinary approach to hypermobility spectrum disorder, Raynaud’s phenomenon, and biomechanical soft tissue injuries in an adolescent boy: a case report
Friday 18 October – Station 1.3		
273	Dr Francois du Toit	Isokinetic muscle strength and endurance (knee extension / knee flexion) in cyclists with patellofemoral pain compared with non-injured matched controls
270	Ms Micaela Groenewald	The effects of acute rhinovirus infection on muscle strength and muscle endurance in physically active individuals; A preliminary analysis
67	Mrs Cheryl Haley	Cardiorespiratory fitness response to endurance training in athletes post-COVID-19 compared to unaffected athletes in South Africa
144	Mrs Esme Jordaan	Illness and injury prevention are key for improved performance and health in Half Marathon runners
71	Ms Esme Jordaan	An increasing number of entries, the occurrence of injuries, allergies and chronic disease are factors influencing the training volume of 56km Two Oceans runners
278	Mr Darren Kwong	Dynamic postural stability predictors during unilateral drop landings
108	Ms Laralyn Lenice Naidoo	Reported stress and lower back pain amongst nurses during the severe acute respiratory syndrome, coronavirus 2, across public and private hospitals in Durban, South Africa
276	Prof Philippe Noirez	Metabolic pathways during submaximal exercise in young male athletes compared to sedentary individuals
170	Dr Takshita Sookan-Kassie	Waist and neck circumferences efficacy in determining Type 2 Diabetes Mellitus: A Scoping Review
310	Mr Johannes PJ Stofberg	Unilateral jump tests reveal persistent force production asymmetries in ACL rehabilitation: a combined discrete and continuous data analysis
309	Dr Mariaan van Aswegen	Assessing neuromuscular adaptation and recovery in ACL patients using force-velocity profiling
184	Dr Andries van Oort	The relationship between relative schoolbag load and dynamic lung volume variables among South African learners
Friday 18 October – Station 1.4		
190	Dr Marelise Badenhorst	Two sides of a coin: Community rugby union stakeholders’ beliefs around concussion-related risk and prevention
255	Dr Retief Broodryk	Investigating the role of the quiet eye in rugby union goal-kicking

143	Dr James Brown	Professional men's rugby players wearing headgear have higher collision and head injury removal rates than players without headgear
25	Dr James Burger	Championing mental health: sport and exercise psychiatry for low- and middle-income countries using a model from South Africa
107	Dr Tom Comyns	Comparison of training injuries in male adult amateur community rugby union and schoolboy rugby union in Ireland
174	Dr Nessan Costello	Energy expenditure of international female rugby union players during a major international tournament: a doubly labelled water study
248	Mr Charles Deacon	Does a bout of high intensity collision sport have an effect on oculomotor function measurements in collegiate rugby players?
280	Ms Molly Fownes-Walpole	A systematic review and Delphi-consensus study to identify optimal neck exercise training interventions to reduce head acceleration events in sport
305	Mr Johan Le Roux	Knee and shoulder health of retired elite rugby players
287	Dr Cameron Owen	Playing your cards right with head acceleration events in Rugby League, going higher or lower in the tackle
301	Dr Cameron Owen	Moving beyond the average: Simulation as a tool to understand reference ranges of HAE exposures in rugby union
289	Mr James Tooby	Instrumented mouthguards in women's rugby league: quantifying head acceleration events during matches
133	Prof Giles Warrington	Comparison of women's and men's injury epidemiology in amateur community rugby union
Friday 18 October – Station 1.5		
72	Ms Esme Jordaan	Environmental conditions in an ultramarathon have implications for illness prevention strategies
391	Jo-Anne Kirby	South African institute of drug-free sport position statement on CBD (cannabidiol) and THC (tetrahydrocannabinol)
313	Mr Simphiwe Alpheus Nkosi	Breaking barriers: Inclusive high-performance strategies for all levels of sport
135	Dr Phoebe Runciman	The South goes North – a case study of a South African para-athlete living and playing wheelchair basketball in Europe
136	Dr Keri-Ann Walton	The incidence of injuries and illnesses sustained by athletes with short stature participating at the London 2012, Rio 2016 and Tokyo 2020 Paralympic Games
253	Dr Gavin Shang	Pre-race medical screening and targeted medical education – the effect on all and serious/life-threatening medical encounters in the 90km Comrades Ultra-Marathon
99	Mr Mandisi Sithole	The prevalence of heavy metals and trace elements in selected commercial whey protein products in the South African market
140	Dr Johannes Lodewikus van Zyl	The incidence of injuries sustained by athletes with visual impairment at the London 2012, Rio 2016 and Tokyo 2020 Paralympic Summer Games

117	Dr Eirik Halvorsen Wik	Cross-cultural adaptation of the Oslo sports trauma research center questionnaire on health problems (OSTRC-H2) for South African adolescent athletes
Saturday 19 October – Station 2.1		
348	Mr Muhammed Behardien	Effects of resistance training on physiological and biomechanical factors in marathon runners: Reactive strength vs. heavy weight training
178	Dr Nessan Costello	Understanding the dietary behaviours of male academy football players: using the nominal group technique to select and specify target behaviour(s)
95	Dr Steve den Hollander	The impact of match workload and international travel on injuries in professional men's football
333	Dr Liske Kotze-Horstmann	Association between physical activity and health-related quality of life amongst university students
126	Ms Thembisile Mbatha	Breaking the glass ceiling: a case of female football coaches at varsity level
132	Mr Siphamandla Nyawose	Physiological, performance and perceptual effects of an L-arginine and L-citrulline beverage prior to a repeated bout of intensive running among university soccer players
122	Mr Nick Pereira	Injury incidence and burden during senior inter-provincial field hockey tournaments
39	Dr Lervasen Pillay	Active professional male footballers do not have significant neurocognitive function domains affected, but attention deficits and impairments are associated with concussion/s
274	Ms Itumeleng Rammusa	Analysing soccer players' jumping during a dynamic heading task
249	Dr Helene van der Hoven	Mental health assessment and monitoring tools used in elite athletes with and without disabilities: a systematic review
251	Ms Cheryl-Ann Volkwyn	Analysing the sports science curriculum in South African universities: A SAQA document review
Saturday 19 October – Station 2.2		
102	Dr Leyekun Gebru	Positional comparisons in anthropometry and physical fitness characteristics of Ethiopian under 17 Male soccer players: A nationwide cross-sectional study
91	Mr Nico Grobler	The development of a questionnaire to assess training and match demand in adolescent cricketers
157	Ms Caeleigh King	A preliminary investigation comparing injuries in padel, tennis and squash players
112	Mr Johan Le Roux	Health conditions among retired elite rugby players: a scoping review
296	Mr Michael Lumb	Brainwave activity localisation, mood symptoms and balance impairment in a male South African rugby player with persisting symptoms after concussion: a case report

288	Ms Ammaarah Patel	The batting back lift technique among professional female cricket players
352	Dr Isla Shill	Is a neuromuscular training warm-up enough for high school female rugby players? A multifaceted approach to injury prevention may be needed
62	Mr Mohammed Sonday	Cricket injury prevention strategies implemented at high school level in Makhanda, Eastern Cape province, South Africa
125	Mr Michael Turner	Rugby union and strength and conditioning coaches' perspectives and practices on visual and auditory skills training
Saturday 19 October – Station 2.3		
166	Mrs Jhana Barnard	Exploring prehabilitation as a treatment modality for biokineticists in the orthopaedic landscape
150	Ms Maria Vittoria Caporossi Cugildi	Attitudes and perceptions of school-related physical activity and physical education
177	Dr Nessan Costello	An audit of sport nutrition services within male and female international rugby union: implications for research and practice
180	Mr KP Dlamini	South African coaches and sport managers' views of sports participation in athletes with disabilities during COVID-19
307	Dr Simone Ferreira	A Biokinetics sports injury prevention model: Lessons learned from long-distance running and rugby
168	Prof Andrew Green	Sticking the landing: Assessing the effectiveness of ankle taping
246	Mr Martin Grove	Refinement of a physical activity knowledge questionnaire for South African adults
106	Ms Lauren Guilfoyle	What we don't know can hurt us: the under-reporting of coach education characteristics in sports injury prevention research
129	Ms Faye Jackson	Can only the wealthy afford to have a sports-related concussion in South Africa? Healthcare Practitioners' involvement in the management of this condition
79	Dr Shaundre Jacobs	The effectiveness of elite sport policy in South Africa: a multi-dimensional approach applied to the case of the Western Cape
198	Dr Candace Vermaak	From setback to comeback: first steps in a gymnast's rehabilitation journey following a spinal cord injury
Saturday 19 October – Station 2.4		
146	Ms Mia Adendorff	Running on empty: unveiling the prevalence of and risk factors associated with low energy availability in female athletes – a systematic review and meta-analysis
109	Mr Kilian Bibby	An international investigation on exercise induced breast pain and contact breast injuries among female rugby union players
101	Dr Roisin Cahalan	Injury toll: A qualitative study of elite ladies Gaelic football and camogie players' understanding and experience of injury
176	Dr Nessan Costello	The role of the chef in professional football: a survey of current practice in the English premier and football leagues
247	Mr Charles Deacon	Evaluation of single rater reliability of an oculomotor function device for diagnosing concussions

21	Dr Henriëtte Hammill	Relationships between quadriceps: hamstring strength ratio and lower extremity injuries in netball players
303	Dr Omar Heyward	Acute fatigue in indoor court-based team sports: A systematic review
147	Dr Audrey Jansen van Rensburg	Injury patterns and illness occurrence in elite female netball players: Preliminary data from the 2023 netball world cup
98	Prof Ian Kenny	Five year analysis of playing surface injuries in female and male adult amateur community rugby union
114	Prof Julian David Pillay	Musculoskeletal injuries in amateur pole sport athletes: prevalence and impact
128	Dr Danielle Pistorius	Injury has a lower incidence but higher severity burden than illness in elite South African netball players: A prospective cohort study
312	Ms Joni Rice	Establishing the prevalence and risk factors of shoulder injuries amongst CrossFit members in Johannesburg Metropolitan Municipality, South Africa
Saturday 19 October – Station 2.5		
298	Dr Chandra Adisha Bholah	Evaluation of the impact of a 20 week exercise referral scheme on Mauritian adults diagnosed with non-communicable diseases
265	Dr Jill Borresen	Does the prevalence of health behaviours change during the first four years of a Medical students' degree?
300	Mr André Matthew Coetzee	Comparing the sensorimotor neural correlates of forward and backward gait in individuals with mild to moderate Parkinson's Disease
314	Dr Danielle Dolley	Effect of the KaziBantu school-based health intervention on non-communicable disease risk factors of children from low-income schools in Gqeberha, South Africa
159	Mrs Louise Engelbrecht	The effect of a 3-day mountain bike race on sleep and mood
383	Ms Natalia Ferreira	The effect of pilates reformer-based exercises compared to pilates mat-based exercises on pain and function in individuals suffering from chronic non-specific lower back pain
355	Ms Hanlie Jordaan	Restricted training and competing during lockdown increased triathlete's risk for depression
330	Dr Liske Kotze-Horstmann	Feasibility and implementation of the MaRooN Health Passport as a health surveillance system at a tertiary educational institution
332	Dr Liske Kotze-Horstmann	How healthy are our students really? Lifestyle-related health risk behaviour patterns in student-athletes and non-athlete students
163	Ms Nokuthula Mtshali	Diabetes related knowledge, attitude, and practice towards exercise and its benefits among individuals with type-2 diabetes mellitus
351	Mr Fhatuwani Walter Ramalivhana	Relationships between non-communicable disease risk factors, functional performance and health-related quality of life of rural and low-resourced urban communities of South Africa

121: DEVELOPING PHYSICAL ACTIVITY GUIDELINES FOR FIREFIGHTERS WITH CORONARY HEART DISEASE: A SCOPING REVIEW

Ghaleelullah Achmat[1],Charlene Erasmus [1],Lloyd Leach [1]
University of the Western Cape, department of sport, recreation and exercise science[1]
gachmat@uwc.ac.za

Background: Firefighters have many duties, including fire response, emergency medical treatment and rescue operations. Non-compliance with physical activity recommendations heightens the risk of hypertension, obesity, diabetes and smoking. All these are major causes of premature death from coronary heart diseases stemming from illness while performing fire department duties. This scoping review aims to determine the effects of physical activity on the occupational performance of firefighters with coronary heart disease risk factors
Methodology: This scoping review was carried out following the PRISMA-ScR and PRISMA Protocol standards. It included an extensive search for peer-reviewed literature in multiple databases such as Cochrane, PubMed, Medline, EbscoHost, Web of Science, Academic Search Complete, CINAHL (EBSCO), SAGE Journals, ScienceDirect, and Scopus, covering publications from their inception up to June 2023. A researcher-generated data form with the key characteristics of each study was used to retrieve all relevant details from the selected studies for initial eligibility screening. The Rayyan Intelligent Systematic Review tool was used to screen and select studies for inclusion, and information from the included studies was captured on the researcher-generated data extraction form.
Results: Eight intervention studies were included in this scoping review, observing the effects physical activity had among firefighters with coronary heart disease risk factors. These interventions target health behaviour change, with guidelines recommending 150 minutes per week of aerobic, flexibility, and strength activities. Firefighters should receive guidance on initiating and maintaining physical activities for 150 minutes to promote health strategies effectively.
Conclusion: Firefighters with long-term health issues cannot achieve the recommended 150 minutes of physical activity, so they should participate in light exercises interventions that suit their capabilities and avoid being inactive. Nevertheless, fire departments should take into account physical activity as a cost-effective health promotion strategy for firefighters at risk of cardiovascular issues. Fitness programs for the fire service need to be tailored to fit the specific needs of the culture, focusing on functional abilities, teamwork, fitness and overall well-being.

213: HEALTH PROFILES OF AFRICAN PARA ATHLETES AT A COMMONWEALTH GAMES FEDERATIONS GAPS CAMP

Faatima Adam[1], Kristina Fagher[2], Eirik Halvorsen Wik[3], Rangana Hettige[4], Laurent Koglin[5], Wayne Derman[6], Phoebe Runciman[7]
Division of Sport and Exercise Medicine, Department of Exercise, Sport, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa[1], Department of Health Sciences, Faculty of Medicine, Lund University, Sweden[2], Division of Sport and Exercise Medicine, Department of Exercise, Sport, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa[3], Sports Medicine Unit, Teaching Hospital Peradeniya, Sri Lanka[4], Swiss Olympic Medical Centre, Hospital de la Tour, Meyrin, Geneva, Switzerland[5], Division of Sport and

Exercise Medicine, Department of Exercise, Sport, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa[6], Division of Sport and Exercise Medicine, Department of Exercise, Sport, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa[7]
19435487@sun.ac.za

Background: The development of Para sport across African countries has seen considerable progress, with increasing participation of Para athletes at National and International levels. However, there remains a scarcity of literature regarding the health of African Para athletes. This study aimed to describe the health profiles garnered during periodic health evaluations (PHEs) in a cohort of African Para athletes participating in a Commonwealth Games Federations GAPS camp.
Methodology: Forty-two Para athletes from 13 African countries selected to attend the Commonwealth Games Federations GAPS camp in South Africa were invited to participate in this study. All athletes underwent standardised International Olympic Committee PHEs at the camp, conducted by qualified medical practitioners, and 24 athletes consented for their medical records to be analysed. Health profiles were described according to demographics, medical history, physical examination findings, and special investigations.
Results: There were 11 female and 13 male athletes (age: 30.7±9.7 years). The most prevalent impairments were brain disorders (n=4), limb deficiency (n=4), neuromuscular disorders (n=4), and spinal cord-related disorders (n=4). Musculoskeletal complaints/conditions were the most common during history taking (42%) and during physical examinations (92%), particularly to the lower limbs (86%). Eight athletes reported previous hospitalisation (8% Malaria, 13% orthopaedic surgery, 13% unknown). Five athletes had persistent blood pressure elevations ≥140/90 mmHg which resulted in either prescription medication or referral. Mean haemoglobin concentrations were 14.4 ±2.3g/dL, and glucose concentrations were 5.2±0.6mmol/L. However, mean female athlete (27%) haemoglobin concentrations were ≤10.8g/dL indicating possible anaemia. Dental (46%) and dermatological (42%) conditions were also prevalent. Sixteen cases required referral to health professionals (54%) or additional imaging or blood tests (13%). Findings in the case of two evaluations resulted in time loss from sport.
Conclusion: This study provides a first insight into the health profiles of African Para athletes, highlighting the prevalence of musculoskeletal, dental, and dermatological conditions in this cohort. Hospitalisation and hypertension amongst Para athletes have been reported in previous studies, however hospitalisation due to Malaria may be specific to African Para athletes. Some health conditions are similar to global athlete trends, while others may be influenced by region-specific health backgrounds of African Para athletes.

115: PHYSICAL ACTIVITY LEVELS DURING SARS-COV2- PANDEMIC: A FOCUS ON SOUTH AFRICAN DATA FROM THE ASAP STUDY

Adelle Kemlall Bhundoo[1], Jan Wilke[2], Julian David Pillay[3]
Department of Basic Medical Sciences, Durban University of Technology[1], Department of Neuromotorics and Movement, University of Bayreuth[2], Faculty of Health Sciences, Durban University of Technology[3]
adeller@dut.ac.za

Background: In March 2020 the SARS-CoV2 pandemic immerged in South Africa. Due to the highly contagious nature of this virus, government employed lockdown restrictions to decrease the rate of infections and deaths. These restrictions prohibited the use of shared exercise facilities, which inadvertently decreased physical activity (PA) opportunities. This article provides a sub-analysis of the SA dataset within the worldwide ASAP study, specifically focusing on physical activity and compliance with guidelines of the World Health Organisation (WHO) in South Africa.
Methodology: The study utilised an online cross-sectional questionnaire that evaluated PA volume pre and during restrictions using the Nordic Physical Activity Questionnaire-short (NPAQ-short), and WHO PA guidelines compliance using a five-point Likert scale.
Results: Results revealed a decrease in overall moderate to vigorous and vigorous PA by 53.5% and 58%, respectively; 30% of the sample reported decreased WHO PA guidelines compliance during lockdown when compared to compliance before lockdown.
Conclusion: The lockdown measures adopted during the pandemic, aided in decreasing the spread of the virus but contributed significantly to the decrease in PA among the healthy population. This decrease may impact individuals' health and increase the risk for non-pandemic related health conditions. Hence, PA and the availability and access to remote PA resources need to be considered in the preparedness for future pandemics and natural disasters.

111: INFLUENCING FACTORS OF SPORTS AND RECREATION FACILITY USAGE AT TEACHERS' COLLEGES IN BULAWAYO, ZIMBABWE

Jed Davidson[1], Jenitha Ndlovu[2]
University of Kwa-Zulu Natal[1], Zimbabwe Open University[2]
davidsonj@ukzn.ac.za

Background: Participation in physical and recreational activities at tertiary level is frequently encouraged and promoted at tertiary education institutions, however, this is only made possible if sporting facilities are available, accessible and well maintained (Reimers et al, 2014). Students who use sporting facilities for recreational/physical activities acquire skills that assist in them in their societal development, and retention is higher for those who use sporting facilities (Garland, 2010). In Zimbabwe, studies carried out with the country's state universities indicate lack of facilities affecting participation (Zvapano, 2017). However, no study has been carried out with teachers' colleges specifically. The study then aimed to determine factors that contribute to students' usage of sporting facilities at teachers' colleges in Zimbabwe.
Methodology: The study was conducted in Bulawayo Metropolitan Province, Zimbabwe. Quantitative and qualitative methods were used to collect data to establish factors that influence students' usage of sporting facilities. Clustering technique was used to select teachers' colleges in Bulawayo Metropolitan Province, while a purposive sampling technique allowed selection of a sample of students and management staff. Students voluntarily answered the questionnaire on availability and usage of facilities at their institution. Management staff were interviewed, and a facility assessment tool was utilized by the researcher using observational critique of the facilities. Strata V15.1, t-test, chi square and Kruskal Wallis analysed data.
Results: Findings suggest students' usage of sporting facilities may have been affected most by factors of availability, abundance, proximity and accessibility, and conditions of sporting facilities. Through

questionnaire responses and facility analysis, indications are that where facilities were available, accessible and maintenance effected, a positive response on usage was noted, and vice versa. This study also established that not all teachers' colleges have similar sporting infrastructure, as a result the different institutions presented differences in utilization and engagement.
Conclusion: The study concluded that institutions should evaluate their campuses for barrier to physical activity, and aim to create an enabling environment that promotes active participation, as availability of and access to quality sporting facilities is seemingly imperative to drive usage.

228: THE EFFECTS OF EXERCISE ON BLOOD PRESSURE AND BLOOD GLUCOSE LEVELS IN PATIENTS WITH DIABETIC PERIPHERAL NEUROPATHY IN SOUTH AFRICA

Ronel du Plessis[1], Susan Bassett[2]
Department of Sport, Recreation and Exercise Science, University of the Western Cape, South Africa[1],
Department of Sport, Recreation and Exercise Science, University of the Western Cape, South Africa[2]
roduplessis@uwc.ac.za

Background: Diabetes mellitus is a metabolic disorder that affects one's quality of life. The prevalence of diabetes mellitus is still increasing rapidly each year. As a result, diabetes mellitus can have a major impact on one's quality of life. Chronic implications of diabetes mellitus can be associated with neuropathic changes that affect the longest nerve axons at their proximal end, known as diabetic peripheral neuropathy. The aim of the study was to investigate the effect of exercise on blood pressure and fasting blood glucose in patients with diabetic peripheral neuropathy.
Methodology: Patients diagnosed with diabetic peripheral neuropathy were asked to participate in the study. The final study sample consisted of 14 participants, aged 18 – 80 years. All participants underwent pre- and post-intervention testing, that consisted of blood pressure and glucose measurements. They were then randomly divided into an intervention group and a control group. The intervention group received a 10-week training programme specifically designed for people with diabetic peripheral neuropathy. The Mann Whitney test was used to determine the median differences between the intervention and the control group for the pre-and post-intervention measures. The Mann Whitney test was also used to determine any significant changes in blood pressure and blood glucose at baseline (pre-intervention) and after a 10-week follow-up (post-intervention) between the intervention and the control group. Lastly, the Wilcoxon Sign rank test was used to determine the within-group difference through matching the pre-intervention and the post-intervention variables. The level of significance was set at $p<0.05$.
Results: Although there was no statistically significant differences, a clinically significant decrease was observed in the intervention group for blood pressure and blood glucose levels. In the control group, there was an increase in these variables after 10 weeks.
Conclusion: Exercise has been shown to decrease blood pressure, and it is an effective way to control blood glucose levels and enhance insulin action.

154: THE EFFECT OF SCHOOLBAG'S MASS ON THE GAIT OF CHILDREN

Clement Gambelli[1], Andries van Oort[2], Mark Kramer[3], Suleen Peens[4]
Physical Activity, Sport and Recreation Research Focus Area (PhASRec), Potchefstroom Campus, North-West University (NWU), Potchefstroom, South Africa[1], Physical Activity, Sport and Recreation Research

Focus Area (PhASRec), Potchefstroom Campus, North-West University (NWU), Potchefstroom, South Africa[2], Physical Activity, Sport and Recreation Research Focus Area (PhASRec), Potchefstroom Campus, North-West University (NWU), Potchefstroom, South Africa[3], Physical Activity, Sport and Recreation Research Focus Area (PhASRec), Potchefstroom Campus, North-West University (NWU), Potchefstroom, South Africa[4]
clement.gambelli@nwu.ac.za

Background: Considering the time children spend carrying a schoolbag during a normal school day, as well as when they walk to and from their means of transport, the effect of increased mass of a schoolbag on altered gait patterns should be investigated more comprehensively by researchers. Currently, there is no international or national set of rules regulating the mass of a schoolbag. However, based on the available research, various institutions suggest that a schoolbag's mass should be between 10% and 15% of a child's body-mass, yet 60% of children carrying that percentage of their body-mass report musculoskeletal discomfort (de Paula et al., 2015). The objectives of this study are 1) to establish the proportion of children carrying a schoolbag superior to 15% of their body-mass and compare their anthropometric measures; 2) compare gait spatiotemporal parameters and plantar kinetics of children carrying a schoolbag with a mass superior to 15% of their body-mass (B>15) with children carrying a schoolbag with a mass inferior to 15% of their body-mass (B<15).
Methodology: 142 children from 12 to 17 years-old were asked to walk at their self-selected speed on a Zebris pressure platform without their schoolbag and with their schoolbag. The schoolbag's mass carried by each child was measured on the day the research team visited the school and included the books and other material for the day. For both objectives, T-tests for independent samples were used to compare anthropometric parameters, gait spatiotemporal parameters and plantar kinetics between B>15 and B<15.
Results: Among the 142 children, 83 (58%) carried a schoolbag with a mass superior to 15% of their body-mass (18.0±6.8 kg) and 59 (42%) carried a schoolbag with a mass inferior to 15% of their body-mass (15.7±4.5 kg). The schoolbag's mass carried by B>15 corresponded to 20±5 % of their body-mass while the schoolbag's mass carried by B15 compared to B15 compared to B15 had lower maximal force only on the midfoot than B>15, the maximal midfoot force is the lowest during stance (≈ 0.25 BW), followed by the maximal hindfoot force (≈ 0.65 BW) with the greatest being the maximal forefoot force (≈ 0.95 BW). Even though the absolute schoolbag's mass between B>15 and B15. Our results show that 58% of the children carry a schoolbag with a mass superior to 15% of their body-mass and it increases the plantar forces during gait.
Conclusion: While most studies compare gait parameters without a schoolbag and with a schoolbag, this study aimed at understanding the effect of a schoolbag's mass superior to 15% of the child's body-mass. Our results revealed that 58% of children carry a schoolbag with a mass superior to most institutions' recommendations. The children carrying a schoolbag's mass superior to 15% of their body-mass did not exhibit modifications of spatiotemporal parameters of gait but showed increase in hindfoot and forefoot maximal plantar forces during stance. These modifications may be due to altered gait patterns that may cause musculoskeletal disorders. Further research is required to understand the consequences of these gait modifications.

83: EFFECTS OF ECCENTRIC EXERCISE ON WORK- RELATED PERFORMANCE AND PHYSICAL ACTIVITY LEVELS IN RHEUMATOID ARTHRITIS PATIENTS

Jeanne Grace[1], Amidu Yekini[2]
University of KwaZulu-Natal, College of Health Sciences, Discipline of Biokinetics, Exercise and Leisure Sciences, Durban, South Africa[1], University of KwaZulu-Natal, College of Health Sciences, Discipline of Biokinetics, Exercise and Leisure Sciences, Durban, South Africa[2]
Gracej@ukzn.ac.za

Background: There is a high prevalence of work productivity loss among patients with rheumatoid arthritis (RA), with a seeming link between loss of work productivity and RA disease activity. The increase in poor clinical outcomes associated with disease activity in this population has largely contributed to poor work performance, thereby creating a huge burden on patients with RA. Notwithstanding the reported more beneficial effects of eccentric exercise compared with conventional resistance training, there appears to be a death of information about the effects of this intervention on RA conditions. This study aimed to investigate the effects of an eccentric exercise intervention on work-related performance and physical activity in RA patients.
Methodology: Thirty-seven RA patients aged 30–65 (9 males; 28 females), who participated in the study were randomized into exercise and control groups. The Health and Work Performance Questionnaire and Health Assessment Questionnaire assessed RA patients' work-related performance. Physical activity at work was assessed with the Global Physical Activity Questionnaire.
Results: The study's results confirmed that an eccentric exercise significantly improved work performance in the RA population (Absenteeism –1.5 P = 0.005, Presenteeism +8.33 P = 0.014). Further, our study found that an eccentric exercise intervention improved physical function in patients with RA (–0.263 P = 0.004). Interestingly, a significant increase in moderate-intensity physical activity was reported among RA patients who participated in the 12-week eccentric exercise intervention program (+106.66 P = 0.008).
Conclusion: The findings, therefore, confirm that an eccentric exercise intervention could improve work-related performance and physical activity levels among RApatients.

43: STRATEGIES AND BEST PRACTICES THAT ENHANCE THE PHYSICAL ACTIVITY LEVELS OF UNDERGRADUATE UNIVERSITY STUDENTS: A SYSTEMATIC REVIEW

Chante Johannes[1], Nicolette Roman[2], Sunday Onagbiye[3], Simone Titus[4], Lloyd Leach[5]
Department of Sports, Recreation, and Exercise Science, University of the Western Cape[1], Centre for Interdisciplinary Studies of Children, Families, and Society, University of the Western Cape[2], Department of Sports, Recreation, and Exercise Science, University of the Western Cape & Department of Health and Exercise Sciences, Frederick Community College[3], Department of Sports, Recreation, and Exercise Science, University of the Western Cape & Centre for Health Professions Education, Stellenbosch University[4], Department of Sports, Recreation, and Exercise Science, University of the Western Cape[5]
3450962@myuwc.ac.za

Background: Significant numbers of undergraduate university students are not meeting the physical activity guidelines recommended by the World Health Organisation. These guidelines suggest that university students should aim for 150–300 min of moderate or 75–150 min of vigorous physical activity. Strategic interventions need to be implemented to address this global public health concern. The aim of

this study was to review the strategies and best practices to enhance the physical activity levels of undergraduate university students.
Methodology: Utilising the PRISMA guidelines, electronic databases— PubMed, Science Direct, Academic Search Complete, ERIC, Web of Science, CINAHL, SAGE, and SPORTDiscus—were searched between September 2022 and February 2023 using terms and synonyms related to physical activity, strategies, best practices, and undergraduate university students. Studies were critically assessed for their quality using an adapted version of the CASP and RE-AIM frameworks.
Results: Eleven articles met the inclusion criteria for the review. The studies reported the use of social media platforms, mobile phone applications, web-based technology, online text messages, in-person classes, and an "exergame" as methods to increase engagement in physical activity. Findings from this review indicated that validated questionnaires emerged as the predominant measurement tool. Furthermore, the frequent use of social network sites served as a best practice for implementing and promoting physical activity interventions.
Conclusion: It is recommended that universities promote health-enhancing physical activities based on current trends and strategies, such as technology-based interventions and the use of social media, that are relevant to contemporary university students.

311: HUMAN BLOOD ACE2 IN YOUNG MEN IS MODULATED BY EXERCISE INTENSITY

Philippe Noirez[1], Rosol Alatiyat[2], Haidar Djemai[3], Maïlys Osmont[4], Rami Hammad[5], Bilal Azad[6], Ibrahim M. Dabayebeh[7]
University of Reims Champagne-Ardenne, Reims, France[1], University of Jordan, Amman, Jordan[2,3,6],, University Paris Cité, Paris, France[4], UQAM, Montréal, Canada[5], University of Jordan, Amman, Jordan[7]
philippe.noirez@univ-reims.fr

Background: Angiotensin converting enzyme 2 (ACE2) is a regulatory enzyme in the renin-angiotensin-aldosterone system. Found on the surface of many cells, it has a protective function. ACE2 is also the key protein in COVID-19 physiology. The aim of our study was to evaluate variations of ACE2 levels in the blood of 7 trained athletes and 7 sedentary individuals, all Jordanian male volunteers, during submaximal exercise at three different intensities, and thereby determine whether exercise has an effect on those levels.
Methodology: Exercise consisted of 20-min sessions on an ergometric bicycle at 45%, 65%, or 85% of maximal aerobic power (MAP). Both heart rate, Rate Perceived Exhaustion (RPE) and blood ACE2 levels were measured before, during, and immediately after exercise, and after 30 min of recovery.
Results: While age, weight, height, and BMI did not differ significantly between the two groups, MAP did. ACE2 levels increased with exercise intensity and varied over time.
Conclusion: Under the experimental conditions of our study, we demonstrated a relationship between ACE2 levels and exercise. Exercising outdoors at the above intensities potentially increases the risk of acquiring the SARS-CoV-2 virus.

199: RETRO WALKING IN A THERAPEUTIC CONTEXT: A SYSTEMATIC REVIEW

Vuyelwa Radebe[1], Leon Lategan[2], Ranel Venter[3]
Division of Movement Science and Exercise Therapy, Stellenbosch University[1], Department of Sport and Movement Studies, University of Johannesburg[2], Division of Sport Science, Stellenbosch

University[3]
vradebe@sun.ac.za

Background: Walking is used by physical therapists as both a technique for rehabilitation and as a measure of success in order to treat a number of diseases. The ability. The ability to walk in multiple directions including backward is an imperative for activities of daily living and survival Retro walking is not simply the reverse of forward walking and with the changes in the direction there are changes to the joint kinematics occurring at the ankle, knee, and hip. The main aim of the study was to determine the therapeutic benefits of retro walking.
Methodology: The research design used was a systemic review. The sources of the systematic review included both randomised and non-randomised controlled trials which utilised "retro walking and/or backward walking". The search of published literature was completed using databases. The sources of the research were published before 1 November 2021 which utilised retro walking in a physical rehabilitation context. The studies included in the literature review included adults (above 18 years old) both male and female. The articles that met the inclusion criteria were analysed by means of the data extraction form. From the articles that were analysed, the results were drawn up. Six articles were included and analysed to address the research question.
Results: Six studies met the criteria and were analysed. Two of the studies utilized backwards walking for patients with knee osteoarthritis. Three of the studies analysed the use of retro walking for stroke rehabilitation. One of the studies investigated retro walking on those with general and abdominal obesity
Conclusion: Retro walking is imperative in health care and serves many therapeutic benefits. Retro walking may be administered by physical therapists applying clinical skills analysis, assessment, treatment, and evaluation of a variety of cases. Retro walking in a clinical setting may be used to treat, address and manage orthopaedic, neurological and chronic conditions.

335: A TOOLKIT TO ASSESS HEALTH-RELATED QUALITY OF LIFE AMONGST PATIENTS WITH SELECTED NCDS

Lynn Smith[1], Heather Morris-Eyton[2]
University of Johannesburg[1], University of Johannesburg[2]
lynnvr@uj.ac.za

Background: The current burden on the public healthcare system in South Africa has been exacerbated by a shortage of medical staff, insufficient consultation time and patients' inability to have regular health screenings due to financial constraints and logistical challenges. An integrated toolkit assessing health-related quality of life would be useful in identifying the areas that need improvement in disease management, enabling patients to reach their full potential.
Methodology: This study aimed to develop a valid and reliable toolkit to assess the health-related quality of life of patients with hypertension, type 2 diabetes and cardiovascular disease in South Africa. The study followed a sequential and exploratory mixed method research design. An expert panel of healthcare practitioners (n1=12) and pilot group (n2=14) underwent focus group discussions and semi-structured interviews. Test-retest was conducted on patients with hypertension, type 2 diabetes and/or cardiovascular disease (n3=257). Principle component analysis was performed on all items. The Pearson and Spearman correlation coefficients, interclass correlation coefficient (ICC) and the coefficient of repeatability (CR) were computed to determine the relative and absolute reliability of the items.

Results: The long form (37 items) and short form (25 items) make up the final toolkit. Each questionnaire yielded an excellent Pearson's r (0.89*; 0.89*), Spearman's rho (0.88*; 0.89*), and ICC (0.94; 0.94). The CR was considered acceptable, at ±12.04% for the long form and ±12.50% for the short form.
Conclusion: Both forms of the toolkit are highly reliable and provide healthcare practitioners with a comprehensive and cost-effective tool to assess and manage noncommunicable diseases.

389: A DESCRIPTIVE STUDY OF PLAYER WELLNESS IN A SOUTH AFRICAN MALE FOOTBALL (SOCCER) ACADEMY

Uyanda Tyusha[1], Jesse Bredekamp[2]
Division of Sport Science, Department of Exercise, Sport and Lifestyle Science, Faculty of Medicine and Health Sciences, Stellenbosch University[1], Division of Sport Science, Department of Exercise, Sport and Lifestyle Science, Faculty of Medicine and Health Sciences, Stellenbosch University[2]
23704381@sun.ac.za

Background: For the optimal development of young football (soccer) players, it is important to balance the demands of football exposure (training sessions and matches) and other potential stressors (e.g., academic load or other commitments) against their recovery. This requires an understanding of players' psychophysiological readiness, which in team sports is often assessed by distributing subjective questionnaires regularly throughout a season. The use of these questionnaires is described in athletic youth populations elsewhere, however, knowledge about wellness profiles within the South African context is limited. With the intention to contribute to the epistemology of wellness profiles of South African adolescent football players, we primarily aim to describe the wellness profiles of South African academy players over one competitive season. Additionally, we will compare their wellness responses following weeks of higher and lower workload (training and match hours). We expect to see differences between the different age groups, more specifically in the older age group(s) (e.g., greater fatigue in older age groups compared to younger). We also hypothesise that there will be increased fatigue, muscle soreness and stress – and possibly decreased mood – during periods of high workload.
Methodology: The study is a prospective observational cohort study, including data from approximately 60 players from the U12, U14, U16 and U18 teams of one professional South African football club. Players will respond to a short electronic wellness questionnaire (via REDCap) prior to the first training session each week throughout the 2024 competitive season (April through September). The wellness profiles will consider fatigue, mood, sleep, muscle soreness and stress (scored from 1 to 5). Training and match minutes will be recorded (via REDCap) continuously to determine the players' workload. We will extract the data from the wellness questionnaire to use in our research. We will describe the average responses for each age group and compare high-volume (one standard deviation above the mean) to low-volume weeks (one standard deviation below the mean). For comparisons between high and low-volume weeks, we will use a paired t-test, and if assumptions for this test are violated, the non-parametric alternative is the Wilcoxon Signed-Ranks test.

282: THE DEVELOPMENT OF A SMART EXERCISE BALL: A CASE REPORT

Taine Buys[1], Kristiaan Schreve[2], Karen Welman[3], André Coetzee[4]
Department of Mechanical and Mechatronic Engineering, Stellenbosch University[1], Department of Mechanical and Mechatronic Engineering, Stellenbosch University[2], Division of Movement Science and

Exercise Therapy, Department of Exercise, Sport & Lifestyle Medicine, Stellenbosch University[3], Division of Movement Science and Exercise Therapy, Department of Exercise, Sport & Lifestyle Medicine, Stellenbosch University[4]
22572635@sun.ac.za

Background: Exercise balls are a widely used tool by many practitioners for both rehabilitation and strength and conditioning. However, conventional exercise balls provide no means of measuring biofeedback which limits the use of the exercise ball, as reliable feedback has many benefits in the therapeutic space. Many feedback devices currently available are costly and have limited applications based on their design. The aim of this study was to determine if the newly designed feedback device, the Smart Exercise Ball, can be used with equivalent accuracy and sensitivity to that of a currently available feedback device, the Biodex System 4 Isokinetic Dynamometer.
Methodology: The participant was a 63-year-old male with Parkinson's Disease (H&Y: 3; Disease duration: 5-years; PIGD subtype) that participates in regular exercise. The participant performed two equivalent tests, one using the Biodex System and the other using the Smart Exercise Ball. Each test consisted of two sets of three repetitions of shoulder external rotation, with each repetition being a five second maximum voluntary isometric contraction. Testing was done on each arm using the Biodex System and then again on the Smart Exercise Ball. Two-sample pooled T-tests were done to compare the two devices.
Results: The data from the Biodex system had a mean value of 23.6±0.532 Nm while the Smart Exercise Ball recorded a mean value of 18.04±1.72 Nm. The T-tests provided conflicting results as the left arm data showed equivalence between the devices while the right arm did not. Due to the T-test results, a qualitative comparison of the data was performed. The Smart Exercise Ball data had many similarities to the Biodex System data. The data clearly defined the start and end point of each repetition, detecting a change of 19.8 Nm in 360 ms, with the sensitivity required to detect changes as small as 0.0323 Nm in the torque applied within each repetition.
Conclusion: The findings of this case show that the Smart Exercise Ball can detect small changes in isometric torque application as well as larger instantaneous changes. This shows potential for the device to be further developed as an accurate and reliable feedback device that is more accessible.

259: RECURRENT METATARSAL FRACTURE IN A COMPETITIVE BODYBUILDER, A CASE REPORT

Jason RT Constantinou[1]
Emergency Department[1]
constantinoujrt@gmail.com

History: A 42-year-old male competitive bodybuilder sustained a non-displaced fracture of the first metatarsal diaphysis of the right foot after direct impact with a weight in October 2023. The fracture was immobilised with a Controlled Ankle Motion (CAM) walking boot for a total of six weeks before removal after orthopaedic consultation. No x-ray was repeated at this stage, but clinical improvements were consistent with a healed fracture. X-ray imaging following re-presentation one month later for ongoing pain since the CAM boot removal revealed a fracture consistent with the initial x-ray image and the CAM boot was continued for an additional six weeks. Four months later, the patient presented for the third time with the complaint of ongoing pain in the same area of the foot. Throughout this time, the patient

continued their weightlifting protocol in preparation for a bodybuilding show four months from the latest presentation, with self-modifications of certain exercises to reduce impact on the affected foot.
Physical Findings: Erythema, swelling, tenderness, and a skin callus were present over the first metatarsal head of the right foot. Non-weight bearing on the medial aspect of the foot and walking in foot inversion since CAM boot removal, with an associated compensatory left knee pain.
Differential Diagnosis / Hypothesis: A stress fracture of the first metatarsal due to consistent, high energy forces due to significant load bearing due to weight training prevented effective fracture healing and led to re-fracturing of the metatarsal.
Test and Results: X-ray imaging revealed bony callus formation at the previous fracture site with a new linear lucency adjacent to this, indicating an acute fracture.
Final / Working Diagnosis: Recurrent first metatarsal diaphysis fractures evidenced by an acute fracture with adjacent initial fracture healing.
Treatment and Outcomes: Treatment required consideration of the balance of continued weight training in preparation for the upcoming competition and allowing the fracture to heal effectively whilst preventing further injury and imbalance. Forefoot strapping to support and shift load bearing from the first metatarsal provided instant relief and improved gait. Referral to the physiotherapy and orthopaedic team was paramount for collaborative treatment optimisation without compromising competition preparations. Review post-competition is arranged to assess healing progress and future injury prevention.

390: CONFIRMATORY FACTOR ANALYSIS OF THE AFRICAN BIG-5 SPORT PSYCHOLOGICAL ASSESSMENT TOOL (BIG-5 SPAT) USING AN INDEPENDENT SAMPLE

Marc Du toit[1], Mina Lipinski[2], Heinrich Grobbelaar[3], Maretha Claasen[4]
Stellenbosch University[1], Stellenbosch University[2], Stellenbosch University[3], Private Practise[4]
24360201@sun.ac.za

Background: Psychological assessment tools must undergo a rigorous process of item and scale development, and thereafter testing to ensure their reliability and validity when used within applied contexts. The aim is to establish the factorial validity of the 40-item and 25-item versions of Grobbelaar's (unpublished), African BIG-5 Sport Psychological Assessment Tool (Big-5 SPAT) using an independent sample. The BIG-5 SPAT was designed after an analysis of Wheaton's (1998) original Psychological Skills Inventory yielded poor psychometric properties. The BIG-5 SPAT measures five factors, i.e., Freedom from competition worries (Buffalo), Goal setting (Leopard), Visualisation (Elephant), Competition confidence (Lion), and Competition concentration (Rhino). A cross-sectional design will be used to analyse an independent data sample of 400 delinked datasets. The analysis will include Goodness-of-Fit Indices and a Confirmatory Factor Analysis (CFA) using diagonally weighted least squares (DWLS) to test the five-factor model of the 40-item and 25-item versions of the scale. We anticipate that the factorial validity of the 40-item version will be better than that of the 25-item scale.
Methodology: We will subject the five subscales of the Big-5 SPAT to a CFA, using the diagonally weighted least square, they include 1) Freedom from competition worries, 2) Goal setting, 3) Visualisation, 4) Competition confidence, and 5) Competition concentration. The CFA test includes the Root mean square error of approximation (RMSEA); Goodness of Fit index (GFI); and Adjusted goodness of fit index (AGFI). Upon receiving the results of the CFA tests, we will analyse and interpret the data. Based on the statistical merit of the factors and the current literature surrounding the

standard of CFA scale development, we will advise whether the African Big-5 SPAT should continue in its current trajectory of scale evaluation or if the scale needs to be redeveloped.
Results: Study in Progress
Conclusion: Study in progress

233: EVIDENCE OF ELEVATED ARTERIAL CARBON DIOXIDE AND CARDIAC DYSFUNCTION DURING EXERCISE AMONGST YOUNG AND OLD

Johann Els[1]
Health Professions Council of South Africa[1]
je@medicisesa.co.za

History: "Carbon dioxide is a gas and metabolic product that influences several cellular processes, including respiration, the affinity of haemoglobin for oxygen, and regulation of blood pH and acid-based balance. Healthy people can regulate CO_2 levels by negative feedback mechanisms modulated by central and peripheral chemoreceptors. Hypercapnia is the elevation in the partial pressure of carbon dioxide ($PaCO_2$) above 45 mm Hg. Hypercapnic acidosis inhibits cardiac contractility and reduces systemic vascular resistance. The net impact of mild hypercapnia is an increase in cardiac output through activation of sympathoadrenal mechanisms and sympathetic tone, increasing preload, decreasing afterload, and increasing contractility, heart rate, capacitance, and venous return. Depending on the severity, it can progress to hemodynamic instability, fatal arrhythmias, and death. On the other hand, hypercapnia can produce cardiovascular depression with direct inhibition of cardiac and smooth muscle cell contractility, independently of pH levels". – Almanza-Hurtado et al, 2022.
Physical Findings: Cardiopulmonary Exercise Testing was performed on 34 subjects (20 males, 14 females) ranging from 17 – 84 years of age in the period January – June 2024 in Panorama, Cape Town. The average partial pressure for carbon dioxide ($PaCO_2$ [est]) was measured at 44.35 mm Hg. Hypercapnia is present amongst 32.35% of the sample. The average stroke volume at peak oxygen uptake measured 95.85 ml. The average stroke volume ratio increases from rest-to-maximal exertion measured 1.48-fold.
Differential Diagnosis / Hypothesis: Evidence of significant elevated arterial carbon dioxide during exercise, combined with cardiac dysfunction is currently present amongst young and old in Cape Town, South Africa. These findings were not observed in 2020 during the Covid-19 pandemic. The data leads to the development of the following statement: In the post Covid-19 era evidence confirms elevated arterial carbon dioxide and reduced stroke volume at peak oxygen consumption amongst young and old. Is there a correlation between Covid-19 and elevated arterial carbon dioxide and left ventricular dysfunction? Evidence suggest rapid development of hypercapnia levels during exercise is a common finding today.
Test and Results: Subjects underwent the following battery of tests:
Components of Screening and risk profiling on the Medicine Patient Management System consist of:
1. Completing the PAR-Q questionnaire 2. Informed consent. 3. Exercise participation 4. Known diagnoses (cardiovascular/metabolic/renal) 5. Signs and symptoms suggestive of cardiovascular/metabolic/renal disease 6. Risk factors 7. Medical history
Cardiometabolic assessments include: (a) Resting metabolic rate assessment (b) Spirometry (c) Cardiopulmonary Exercise Test. The sample consisted of 34 men and women (after referral for

exercise training with non-communicable diseases); age distribution: 17 – 84 years, both male and female. Risk profiling was done through screening and pre-exercise evaluation protocol as per guidelines by the American College of Sports Medicine. Data from a resting metabolic rate towards maximal exertion were gathered using MetaLyzer®3B and MetaSoft®Studio software (analysing 86 physiological variables/calculations) from CORTEX Biophysik GmbH and Custo Cardio 300 (analysing comprehensive ECG variables) from Custo Med GmbH. A physiological analysis followed to identify the maximal $PaCO_2$ during exercise, stroke volume (est) at peak oxygen uptake, and stroke volume ratio increases from rest-maximal-exertion. The results showed the clinical importance of cardiopulmonary exercise testing in a clinical setting.
Final / Working Diagnosis: Elevated arterial carbon dioxide and cardiac dysfunction is a common observation during exercise in the post Covid-19 era. Hypercapnia is rapidly rising during exercise amongst young and old, with no evidence of returning to normal, but rather increasing exponentially over time. This creates superior risk for mortality and morbidity in future.
Treatment and Outcomes: Patients were referred to a medical doctor to allow for a multi-interventional approach consisting of appropriate medication, nutrition, and exercise within the lipid metabolism. The subjects will continue following treatment for 6-months before a follow-up cardiopulmonary exercise test will be performed to compare the results.

268: EXPERIMENTAL USE OF HIGH-INTENSITY ELECTROMAGNETIC FIELD THERAPY IN THE TREATMENT OF SPASTICITY IN A MALE SWIMMER WITH A SPINAL CORD INJURY: A CASE STUDY

Melissa Janse van Vuren[1], Wayne Derman[2]
Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa [1], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa [2]
melissajvv@sun.ac.za

History: A novel reported application of high-intensity electromagnetic field therapy is the treatment of spasticity. This unique approach was used in the treatment of a 29-year-old male swimmer who sustained an incomplete C4/C5 spinal cord injury 7 years ago. Despite relearning to walk, the patient still experienced significant spasticity, particularly in his lower limbs (LL). In the first 2 years post-injury, his recovery was notable, however, slowed in subsequent years.
Physical Findings:
General: Height = 1.95m Weight = 78 kg. Lean adult male. Marked muscle atrophy of lower limbs. Gait: Spastic gait. CNS: Increased tone and reflexes in the extensor compartments of LL (left>right) and upper limbs (UL) (right>left). Clonus is present in the UL and LL. Reduced quadriceps strength and marked spasticity of the hamstrings (left>right).
Differential Diagnosis / Hypothesis: Use of high-intensity electromagnetic field therapy for treating spasticity would increase muscle activation and reduce spasticity resulting in increased muscle strength and range of motion (ROM) of the treated limbs.
Test and Results: Mobile muscle dynamometry was used to measure pre-and post-treatment ROM and strength of the LL. Treatment was given in 2 sets of 3 hours sessions over 2 consecutive days followed by a 4-day break; followed by further 3 days of consecutive treatments. A follow-up treatment session was given 12 weeks later. Varying degrees of improvement in ROM and max force were observed in

knee flexion and extension. The left LL did not react favourably to every treatment session with fatigue and irritability reported at times, particularly in the second treatment. He reported a positive but delayed reaction to treatment following 2-3 days where he would feel “stronger”.
Final / Working Diagnosis: Not applicable
Treatment and Outcomes: High-intensity electromagnetic field therapy appears to be a well-tolerated adjunctive experimental treatment for spasticity. However, treatment protocols should be refined and personalized. This case forms a basis for an extended clinical trial protocol with this intervention.

31: REGRESSION OF THE LUMBAR DISC PROTRUSION/EXTRUSION FOLLOWING THE COMPREHENSIVE EXERCISE PROGRAM: A CASE SERIES

Dimitrije Kovac[1]
Fitness Medico, rehabilitation centre, Belgrade, Serbia[1]
dmtrjkovac888@gmail.com

Background: Recent studies show a high possibility of reductions in lumbar disc protrusions and extrusions after conservative treatment. The regression of the LDH is a complex physical-chemical process, including inflammatory response, phagocytosis, neovascularization and matrix degradation. Exercise therapy is a cornerstone of conservative treatment, but it is unclear how and to what extent it contributes to the regression of protrusions and extrusion reabsorption. Also, no exercise program has proven to be superior to the others. This case series aims to present the positive outcomes of a comprehensive exercise program on reducing lumbar disc protrusions and extrusions and associated symptoms.
Methodology: Eleven patients with symptomatic lumbar disc protrusion or extrusion underwent a comprehensive exercise program. All patients had a similar clinical profile: flexion intolerance and reduced range of motion, positive SLR and Slump test, with no reduction in sensibility and muscle strength (Table 1). Each patient had an MRI scan before and after the intervention (figure 1-11). After examination, each patient received an exercise program according to current symptoms. The intervention lasted 16 weeks and included 4 phases (table 2). In the first phase (0-4 weeks), the emphasis was on centralizing symptoms and increasing sciatic nerve mobility. After reducing leg pain and increasing the range of motion in the SLR test, each patient was introduced to stabilization exercises that were progressively loaded every 4 weeks (12-16 weeks).
Results: At the end of the sixteen-week exercise program, all patients had a complete reduction of symptoms, increased trunk flexion, negative Slump and SLR test. In ten out of eleven patients, the control MRI showed a complete reduction of the protrusion, reabsorption of the extrusion and reduced pressure on the affected nerve (figure 1-11).
Conclusion: A comprehensive exercise program described in this case series, comprising a combination of neural mobilization, McKenzie centralization, and stabilization exercises, produced a significant reduction in the symptoms, improvement in function and MRI findings.

220: NGS TRAINING FOR PATHOGEN GENOMIC SURVEILLANCE ACROSS AFRICA

Yiqun Tony Li[1]
UCT[1]
lxxyiq001@myuct.ac.za

Background: The next generation sequencing (NGS) Academy, together with the Africa CDC, has designed and delivered a number of training courses for individuals looking to broaden their knowledge and expand their capabilities to implement NGS for pathogen surveillance. The training was designed to develop skills in the use of pathogen genomics in Africa to address the increasing demand for greater response capacity for disease outbreaks in resource-limited environments. The training program includes a recommended curriculum for public health institutes, links to existing course materials, where available and open, a trainer database and a helpdesk ticketing system for longer support for trainees. Due to the pandemic, the immediate need was for training in NGS for SARS-CoV-2 surveillance.
Methodology: Virtual courses were run for wet-lab technicians and bioinformaticians in Africa CDC Pathogen Genomics Institutes across the continent. The key topics were sample preparation, sequencing, bioinformatics analysis, phylogenetics and epidemiology covered through a set of independent modules. The courses were all designed to ensure an engaging online learning experience. The applicants were exposed to a wide variety of material throughout the online course with live Q&A sessions with experts, group discussions, and long-term mentorship support.
Results: A follow up course focused on data curation, sharing, advanced bioinformatics analysis, workflows, and presenting data to inform policy makers. Additional foundation skills courses have been provided to develop bioinformatics skills, such as programming, GitHub, HPC, workflows and containerization.
Conclusion: We will need more support, and data to reach out and train more students, people across Africa.

164: BODY COMPOSITION AND NUTRITIONAL INTAKE OF RURAL AND URBAN PRIMARY SCHOOL LEARNERS IN ZIMBABWE

Takshita Sookan-Kassie[1], Robert Munyaradzi Munodawafa[2]
Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu-Natal, South Africa[1], Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu-Natal, South Africa[2]
Sookan@ukzn.ac.za

Background: The body composition and nutritional intake of rural and urban children and adolescents is diverse in both the developed and developing world. In most developed countries, extensive comparative studies have been carried out on these differences; whereas in most developing countries, such as sub-Saharan Africa, and Zimbabwe in particular, there are limited studies. The aim of this study was to establish the association between body composition and nutritional intake of rural and urban primary school learners in Zimbabwe.
Methodology: A descriptive, comparative, cross sectional design was used in the study. A total of 501 participants were used in this study, which included 250 rural (n=117 males and n= 133 females) aged 11.44 ± 0. 28 years and 251 urban (n=135 male and n= 116 females) aged 11.48 ± 0.181. Body composition measurements included height; weight; body mass index (BMI) skinfolds (triceps, biceps, abdomen, calf and right thigh), and circumferences (chest, waist, hip, right arm and right thigh). Nutrition was measured using the validated Children's Nutrition Questionnaire (CNQ).
Results: The results showed that the body composition of the urban participants was significantly different to that of the rural participants, in anthropometric measurements ($p < 0.000$), skinfold

measurements ($p < 0.000$) and circumference measurements ($p < 0.000$). Furthermore, the study results showed that a significant proportion of urban participants consumed more dairy products, meat, sweets and fatty foods ($p < 0.000$) compared to their rural counterparts, who consumed more fruit and vegetables ($p < 0.000$). There was a significant relationship between the nutrition consumed and body composition in both rural and urban areas ($p < 0.000$). The rural participants had lower BMI compared to their urban participants.
Conclusion: The study concluded that there was a positive association between body composition and nutrition in the rural participants, compared to the urban participants. Nutritional interventions are required in developing countries to educate children and adolescents regarding healthy body composition and nutritional choices.

149: THE IMPACT OF VARIOUS TAPING TECHNIQUES ON DROP LANDING KINETICS AND KINEMATICS

Kendra Szeles[1], Andrew Green[2]
Department of Sport and Movement Studies, Faculty of Health Science, University of Johannesburg.[1],[2]
kendraszeles@gmail.com

Background: Knee stability is crucial for lower limb function and injury prevention, with knee injuries being fairly common in netball players, often due to knee valgus collapse during landing tasks. Drop landing (DL) analysis is essential for identifying poor landing mechanics where different taping techniques may enhance knee stability. The aim of the study was to investigate the effects of different tapping conditions on knee joint stability during a DL.
Methodology: Twenty-one female netball players (age: 23±2.70 years; height: 167.76±7.50 cm; mass: 63.32±9.59 kg) performed a series of 40cm drop landings. Kinetic and kinematic analyses were conducted using four controlled taping conditions- no tape (NT), dynamic tape (DT), rigid tape (RT), and kinesio tape (KT). Continuous biomechanical data were analysed using spm1d repeated measures ANOVA ($p<0.05$).
Results: No significant changes were found in ground reaction force (GRF) across all conditions. Additionally, no statistical difference in the Time to stabilization (TTS) were noted across conditions ($p=0.707$). SPM1D analyses revealed significant changes in ankle abduction (2-15%, $p = 0.032$) and rotation (1-4%, $p = 0.047$; 44-49%, $p = 0.045$; 51-58%, $p = 0.041$; 70-72%, $p = 0.05$), as well as knee flexion (65-67%, $p = 0.048$; 72-83%, $p = 0.02$) and rotation (1%, $p = 0.049$; 34-101%, $p < 0.001$) during the movement cycle, with no changes in hip movements.
Conclusion: The study aimed to investigate the impact of various taping conditions on knee joint stability during a DL. The SPM1D analyses suggest that while there are observable biomechanical changes in ankle and knee movements with different taping conditions, these do not translate into significant differences in overall stabilization times. This highlights the need for a multi-faceted approach to improving knee joint stability and suggests that taping should be one part of a broader injury prevention and performance enhancement strategy.

156: CURRENT PHYSICIAN KNOWLEDGE OF THE THERAPEUTIC USE EXEMPTION

Dr Mark Troxler DO MBA FACP FACSM[1]
National Chair, Anti-Doping Education, USA Track & Field[1]
marktroxler@texashealth.org

Background: Only physicians are allowed to sign the Therapeutic Use Exemption (TUE) of the Prohibited Lists (PL) in national and international sports organizations. Review of studies has reported the important role physicians play in the TUE process. These studies have involved different physicians with different degrees of knowledge throughout the world. Physicians have different degrees of attitudes about doping and beliefs about prevention. The literature was reviewed to determine the current knowledge of practicing physicians of the TUE.
Methodology: Several online medical databases were accessed by computer literature search for studies from 1996 to 2024 in order to identify available publications for all studies of measurements of practicing physician knowledge of the TUE. The publications were reviewed and included in the analysis if data or discussion was included concerning physician knowledge of the TUE during the time of the published studies. Publications that were in English or translatable to English were included in the evaluation of physician knowledge of the TUE.
Results: Over fifty studies were identified. Many studies stress the important role physicians place in the TUE process. Many studies also noted multiple times with each study that physician education was critical to a successful TUE program. However, no study to date has actively measure physician knowledge of the TUE. Also no study has measured the effect of an educational intervention on physicians or Athlete Support Personal.
Conclusion: Physician knowledge of the TUE has not been measured or studied and may be limited and doping issues are encountered daily by practicing physicians. Further research and education is recommended since only physicians are allowed to sign the Therapeutic Use Exemption (TUE) of substances on the PL. Current physician knowledge of TUE may be limited and doping issues are encountered daily by practicing physicians.

203: "PERSISTENT PAIN AFTER ANKLE SPRAIN AND THE OVERLOOKED ROLE OF THE PERONEUS BREVIS TENDON": A CASE SERIES

Helene van der Hoven[1], Matt Durrans[2], Wayne Derman[3]
Institute of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa[1], Dr Matt Durrans Inc.[2], Institute of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa[3]
helene@capeboneandjoint.com

History: History of three cases: a) 18-year-old rugby player sustained a left ankle inversion injury during practice. Despite conservative management four weeks later he remained symptomatic. Four months later he presented with ankle instability and "popping". b) A 20- year-old rugby player with a history of previous ankle sprains presented with a 3-month-old left ankle inversion injury and symptoms included ongoing pain, swelling and 'giving away'. c) A 55-year-old male with a previous rugby-related ankle injury, presented for removal of a bunionette. In addition, he complained of pain, instability and lateral swelling of his right ankle with physical activity.
Physical Findings: a) At four weeks: mild swelling. Stable ATFL and CFL. At four months: left peroneal discomfort, mild synovitis and subluxation in maximum dorsiflexion and inversion. b) Swelling and episodic clicking of the left peroneal tendons, laxity of ATFL and CFL. c) Postero-lateral swelling of the right ankle, right peroneal tendon pain and crepitus, ATFL and CFL laxity.

Differential Diagnosis / Hypothesis: All three these cases presented with persistent pain following lateral ankle ligament sprain injuries. Whilst a wider differential of the "difficult ankle" was entertained, various durations and degrees of instability and peroneal involvement was noted for each of the cases.
Test and Results: MRI in two of the cases which revealed: a) A lateral complex sprain/tear, some signal changes in peroneus brevis tendon and a retinacular tear (four weeks post injury and CSI). b) ATFL, CFL, Peroneus Brevis and Peroneus longus tears.
Final / Working Diagnosis: Final Diagnosis at imaging or surgery proved to be more severe than initially expected, including complete rupture of the lateral ankle ligaments (ATFL and CFL) and peroneus brevis tendon injuries that necessitated surgical repair.
Treatment and Outcomes: All three patients underwent surgical repair, followed by rehabilitation and return sport. The Peroneus Brevis is a dynamic stabiliser of the lateral ankle and often overlooked in ankle injuries. Involvement should raise a high index of suspicion of possible more severe associated lateral ligament injuries. Delayed surgical intervention can result in worse long-term outcomes.

42: A MULTIDISCIPLINARY APPROACH TO HYPERMOBILITY SPECTRUM DISORDER, RAYNAUD'S PHENOMENON, AND BIOMECHANICAL SOFT TISSUE INJURIES IN AN ADOLESCENT BOY: A CASE REPORT

Su-ané Zwiegelaar[1], Deepthi Raju Abraham[2], Olivia Roman[3], Karen Welman[4]
Division of Movement Science and Exercise Therapy, Department of Sport, Exercise, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University[1], Department of Paediatrics and Child Health, Faculty of Medicine and Health Sciences, Stellenbosch University[2], Olivia Roman Physiotherapy[3], Division of Movement Science and Exercise Therapy, Department of Sport, Exercise, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University[4]
suanezwieg@gmail.com

History: A 16-year-old male with hypermobility spectrum disorder (HSD) and Raynaud's phenomenon (RP) was referred to a Bio kineticist by their paediatric rheumatologist. The patient presented with arthralgia, particularly in the left knee and shoulder. Specifically, the left knee presented discomfort during activities of daily living (ADL), such as stair climbing. The left shoulder had a reduced range of motion resulting from pain. Hence the individual had a recent history of physiotherapy treatment to achieve optimal, pain-free range of motion. Finally, complaints of painful fingers were also significant due to increased RP flare-ups during winter.
Physical Findings: A posture analysis was conducted, indicating suboptimal posture and muscle tone. Range of motion and manual muscle testing were also suboptimal in the shoulders, but optimal in the knees and hips. The Kendal test, patella compression test, and Clarke's sign were conducted due to knee pain. Functional tests included a pelvic bridge, squat, Neer's test, and wall push-ups. Lastly, the paediatric clinical test of sensory interaction in balance was completed to determine the ability of the balance systems to integrate to maintain postural control.
Differential Diagnosis / Hypothesis:
1. Patellar tendinopathy
2. Patellofemoral pain syndrome
3. Shoulder impingement
4. Scapula dyskinesia

Test and Results: Special Tests: Shoulder: bilaterally positive empty can test and 90-degree external rotation, and bilaterally negative belly press test. Knee: positive Kendal test, patella compression, and Clarke's sign on the left knee. Functional Tests: Shoulder: inferior and medial scapula winging during Neer's test and wall push-up. Knee: lack of hip stability during the pelvic bridge, and a squat indicated hamstring dominancy with pain in the left knee during knees over toes. Balance Examination: the difficulty of integrating sensory information from the balance systems was determined.
Final / Working Diagnosis:
1. Scapula dyskinesia related to HSD.
2. Supraspinatus impingement due to weak rotator cuffs and scapular dyskinesia.
3. Patellofemoral pain syndrome due to the diffused pain behind the patella and HSD.
Treatment and Outcomes: The Biokinetics treatment plan included the provision of a foot, knee, and hip kinetic chain strengthening home program for 12 weeks and hand exercises as needed to aid in the pain and stiffness experienced during RP flare-ups. At a six-month Biokinetic follow-up, the patient showed improvement with a pain-free range of motion to conduct ADLs.

273: ISOKINETIC MUSCLE STRENGTH AND ENDURANCE (KNEE EXTENSION / KNEE FLEXION) IN CYCLISTS WITH PATELLOFEMORAL PAIN COMPARED WITH NON-INJURED MATCHED CONTROLS

Francois du Toit[1], Martin Schwellnus[2], Helen Bayne[3], Esmè Jordaan[4], Sonja Swanevelder[5], Paola Wood[6]
Sport, Exercise Medicine and Lifestyle Institute (SEMLI) and Division of Biokinetics and Sports Science, Department of Physiology, Faculty of Health Sciences, University of Pretoria, South Africa[1], Sport, Exercise Medicine and Lifestyle Institute (SEMLI), University of Pretoria, South Africa; International Olympic Committee (IOC) Research Centre, South Africa[2], Sport, Exercise Medicine and Lifestyle Institute (SEMLI) and Division of Biokinetics and Sports Science, Department of Physiology, Faculty of Health Sciences, University of Pretoria, South Africa[3], Biostatistics Unit, South African Medical Research Council, South Africa; Statistics and Population Studies Department, University of the Western Cape, South Africa[4], Biostatistics Unit, South African Medical Research Council, South Africa[5], Sport, Exercise Medicine and Lifestyle Institute (SEMLI) and Division of Biokinetics and Sports Science, Department of Physiology, Faculty of Health Sciences, University of Pretoria, South Africa[6]
fc.dutoit@semli.co.za

Background: Patellofemoral pain (PFP) is common in cyclists, but factors associated with PFP in cyclists have not been well studied. The study aimed to determine if isokinetic muscle strength and endurance are associated with PFP in cyclists.
Methodology: This was a matched case-control study including 38 recreational cyclists comprising of a PFP group (clinically diagnosed) (n=19) (PFP injured limb vs. PFP uninjured limb), and a matched CON group (n=19) (PFP injured limb vs. CON limb). Cyclists were matched by age (±5 years of age), sex (male/female), body mass index (±3 units) and years of cycling (±5 years). The association between PFP and isokinetic muscle strength of the knee extension (KE) / knee flexion (KF) at 60°/sec (5 reps), and at 180°/sec (10 reps) were explored.
Results: There were no significant differences in any of the lower limb isokinetic muscle strength and endurance test variables between the PFP injured limb and the CON limb [(a) 60°/s (i)KE, (ii)KF: peak torque (Nm) (p=0.7381), (p=0.6226); peak torque/body weight ratio (%) (p=0.4653), (p=1.0000); max. rep total work (J) (p=0.8906), (p=0.3321); avg. power (W) (p=0.7983), (p=0.3076); total work (W) (p=0.8906), (p=0.1956); agonist/antagonist ratio (%) [flexion/extension] (p=0.7161); (b) 180°/s (i)KE,

(ii)KF: peak torque (Nm) (p=0.4716), (p=0.6866); peak torque/body weight ratio (%) (p=0.8317), (p=0.8906); max. rep total work (J) (p=0.3321), (p=0.2253); avg. power (W) (p=0.9217), (p=0.8288); total work (J) (p=0.5949), (p=0.4653); agonist/antagonist ratio (%) [flexion/extension] (p=0.9530)]. During 180°/s KE, the peak torque/body weight ratio (%) was significantly greater in the PFP injured limb (median=171.3%) versus the PFP uninjured limb (median=170.9%) (p=0.0456). We note that these differences are small (1%) and may not be clinically relevant.
Conclusion: PFP in cyclists was not associated with reduced isokinetic knee extension or knee flexion muscle strength and endurance. This study adds to the limited body of knowledge on the mechanisms and risk factors associated with PFP in cyclists. Other factors, such as abnormal lower limb biomechanics during the downstroke in cycling, may be more important risk factors associated with PFP in cyclists. This area requires substantial more research to aid clinicians in the pursuit of injury prevention strategies for cyclist with PFP.

270: THE EFFECTS OF ACUTE RHINOVIRUS INFECTION ON MUSCLE STRENGTH AND MUSCLE ENDURANCE IN PHYSICALLY ACTIVE INDIVIDUALS; A PRELIMINARY ANALYSIS

Micaela Groenewald[1], François du Toit[2], Marcel Jooste[3], Martin Schwellnus[4]
Sport, Exercise Medicine and Lifestyle Institute (SEMLI) and Division of Biokinetics and Sports Science, Department of Physiology, Faculty of Health Sciences, University of Pretoria, South Africa[1], Sport, Exercise Medicine and Lifestyle Institute (SEMLI) and Division of Biokinetics and Sports Science, Department of Physiology, Faculty of Health Sciences, University of Pretoria, South Africa[2], Sport, Exercise Medicine and Lifestyle Institute (SEMLI), University of Pretoria, South Africa[3], Sport, Exercise Medicine and Lifestyle Institute (SEMLI), University of Pretoria, South Africa. International Olympic Committee (IOC) Research Centre, South Africa[4]
micaela.groenewald@semli.co.za

Background: Acute respiratory illness, mostly infections, is the most common cause of medical illness in the athletic population. Multiple pathogens can cause respiratory infection with Rhinovirus being the most common pathogen. To date there are no data available that describes the effects of acute respiratory infections caused by Rhinovirus on muscle strength and muscle endurance in physically active individuals.
Methodology: This is a prospective cohort study of 21 physically active participants (male=7; female=14) with confirmed Rhinovirus infection. Participants were initially assessed by a Sports and Exercise Medicine Physician and then underwent muscle strength and muscle endurance testing, with 2 repeat assessments during recovery from infection over 28 days (T1 at <72 hours post onset of symptoms; T2 at ±10 days post-onset, and T3 at ±28 days post onset). Muscle strength was determined using the 1-minute push up test (no. of valid repetitions) and muscle endurance using the maximal plank test (seconds). Changes in the variable over time (T1, T2, and T3) were analysed.
Results: There were no significant differences in the variables over time during recovery post-infection for: 1) muscular strength (n; 95%CI) (T1=29.61; 24.30-34.03: T2=32.22; 26.76-37.68: T3=32.11; 26.32-37.90) (p=0.067), and 2) muscular endurance (sec: 95%CI) (T1=;118; 95.98-140.01: T2=125.88; 107.95-143.82: T3=127.16; 104.89-149.45) (p=0.480).
Conclusion: In this preliminary analysis, acute Rhinovirus infection, which is the most common acute illness in the athletic population, does not appear to cause an acute reduction in muscular strength and

muscular endurance performance over time. This is an ongoing study and the results will be analysed once the data set is complete.

67: CARDIORESPIRATORY FITNESS RESPONSE TO ENDURANCE TRAINING IN ATHLETES POST-COVID-19 COMPARED TO UNAFFECTED ATHLETES IN SOUTH AFRICA

Cheryl Haley[1]
Department of Physiotherapy, School of Therapeutic Sciences, Faculty of Health Sciences, University of the Witwatersrand[1]
cheryl@ourphysio.co.za

Background: Endurance sport primarily attracts athletes over the age of 35, who impose an exceptionally rigorous and sustained demand on their cardiorespiratory system. They are expected to exceed the published cardiorespiratory fitness thresholds of healthy adults, failing which, concerns regarding possible impairments arise. The impact of long-COVID on endurance athletes remains equivocal. The aim of the study was to determine the influence of COVID-19 on the cardiovascular, pulmonary, and skeletal muscle function of endurance athletes with persistent symptoms affecting their exercise capacity. Secondly, to compare the exercise response of endurance athletes post-COVID-19 to those unaffected using cardiopulmonary exercise test-related variables.
Methodology: This is a prospective observational cohort study of endurance athletes. An exposure group with persistent symptoms limiting their exercise capacity underwent a resting lung function test and maximal cardiopulmonary exercise test. These were repeated after eight weeks of endurance training and compared to the published reference values and a control group. IBM SPSS was used for all data analyses, comparing means of two groups according to normality of distribution. Odds ratios determined the likelihood of limitations to aerobic capacity after having COVID-19.
Results: The post-COVID-19 exposure group (n=57), mean age 44.5 (8.1) years was tested on average 6.6 months post-illness and showed poorer cardiorespiratory fitness than the control group (n=34), mean age 41.8 (7.7) years, with lower respiratory exchange ratio (p=0.048), ventilatory threshold (p=0.004), and workload (p=0.045). Mean inspiratory pressure improved at follow-up in the COVID-19 group compared to the controls (p=0.028). Increased odds of pulmonary and skeletal muscle limitation to aerobic capacity after COIVD-19 exist. The COVID-19 group responded positively to endurance training with improved VO2peak (p=0.005), mean inspiratory pressure (p=0.037), oxygen-pulse (p=0.022), and maximal workload (p<0.001).
Conclusion: Pulmonary and extrapulmonary limitations to exercise capacity exist up to nine months after recovering from COVID-19. Tailored physical activity intensity and duration to restore mitochondrial and skeletal muscle health is vital after COVID-19. Respiratory muscle rehabilitation will be valuable in athletes suffering from respiratory illnesses, and further studies investigating the effectiveness thereof are recommended. This multidisciplinary rehabilitation approach addressing specific limitations will optimise the resumption of participation in long-distance events.

144: ILLNESS AND INJURY PREVENTION ARE KEY FOR IMPROVED PERFORMANCE AND HEALTH IN HALF MARATHON RUNNERS

Marlise Dyer[1], Humphrey Brydon[2], Esme Jordaan[3], Nicola Sewry[4], Martin Schwellnus[5]

Sport, Exercise Medicine and Lifestyle Institute (SEMLI), Faculty of Health Sciences, University of Pretoria, South Africa[1], Statistics and Population Studies Department, University of the Western Cape, Cape Town[2], Biostatistics Unit, South African Medical Research Council, South Africa; Statistics and Population Studies Department, University of the Western Cape, Cape Town[3], Sport, Exercise Medicine and Lifestyle Institute (SEMLI), Faculty of Health Sciences, University of Pretoria, South Africa; IOC Research Centre of South Africa[4], Sport, Exercise Medicine and Lifestyle Institute (SEMLI), Faculty of Health Sciences, University of Pretoria, South Africa; IOC Research Centre of South Africa[5]
marlisedyer@gmail.com

Background: The half marathon distance is an increasingly popular event in distance running worldwide. Limited literature is available on the extent chronic illness, recent running injuries have on a half marathon (21.1km) runner's improvement in performance.
Methodology: 7942 consenting runners who completed the half marathon at least twice over the 4 year period is included in the analysis. Improvement in performance (decrease in finish time) for a 21.1km over 4 year period. Univariate models separately including chronic illness and recent running injury, adjusted for age, sex and BMI (confounders). The estimated difference between consecutive finish times, 95%CIs value and p-value for significance are reported. Questionnaire data is self-reported. Participation in 21.1km events before 2012 were not accounted for.
Results: Univariate model reported a significant decrease in average finish time between first and second races (-2.6378 minutes, 95%CI: -2.3140; -2.9616), with no further decrease found in following number of races. Runners reporting no chronic illness, had a larger improvement in average finish time (-2.6607 minutes, 95% CI -3.0577; -2.2637) compared to runners reporting 2 chronic illnesses (-1.8251 minutes; 95% CI -3.0209; -0.6293). Runners reporting no recent injury, had a larger improvement in average finish time (-2.684 minutes, 95% CI -3.0289; -2.3391) compared to runners reporting a recent injury (-2.4045 minutes; 95% CI -3.6724; -1.1365).
Conclusion: In 21.1km, runners on average improve their performance from the first to the second race, particularly when not affected by injury or chronic illness. The prevention of illness and injury therefore is vital to athletes from both a health and performance point.

71: AN INCREASING NUMBER OF ENTRIES, THE OCCURRENCE OF INJURIES, ALLERGIES AND CHRONIC DISEASE ARE FACTORS INFLUENCING THE TRAINING VOLUME OF 56KM TWO OCEANS RUNNERS

Esme Jordaan[1], Martin Schwellnus[2]

Biostatistics Research Unit, South African Medical Research Council, Tygerberg, South Africa and Statistics and Population Studies Department, University of the Western Cape, South Africa.[1], Sport, Exercise Medicine, and Lifestyle Institute (SEMLI), Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa and International Olympic Committee (IOC) Research Centre, Pretoria, South Africa.[2]
esme.jordaan@mrc.ac.za

Background: Success in an ultramarathon like the 56km Two Oceans marathon requires physical preparation and a deep commitment to the training process. With the right preparation, athletes can

achieve their best performance while minimizing the risk of injury. The 56km Two Oceans is a popular ultramarathon with more than 8 000 entries per year.
Methodology: From 2012 to 2015 data was collected for the 56km Two Oceans marathon under the SAFER studies. Runners completed a health questionnaire online during registration, providing information on various chronic conditions, injuries which occurred during the 12months prior to registration, and allergies. Data from runners who only participated in the 56km races was used for analysis, and runners who entered the Two Oceans races from 2008 to 2011 were excluded. In total 13 257 entries (ranging from 1 and 4 entries per runner), for 9 752 runners were included in the study. The objectives of the study were to investigate (1) if an increasing number of times participated (experience) over the 4 years of the study was associated with a change in the training (distance per week in km) of runners in the past 12 months before the race, and (2) if the occurrence of chronic diseases, injuries and allergies had an influence on the training (distance per week in km) from year to year.
Results: Experience of previous 56km Two Ocean races, sex, the occurrence of injuries, chronic diseases and allergies were significant factors influencing the distance trained in the past 12 months before the race ($p=0.0005$). In addition, experience of previous 56km Two Ocean races influence the distance trained in different ways depending on the age of the athlete ($p=0.007$). The age group 31-50 increased their distance trained with each increasing year of entry, However the younger and older runners increase their training distance only up to their 2nd entry.
Conclusion: Assessing the factors affecting the training volume of runners is crucial for ensuring their health and performance. By carefully considering these factors, runners can tailor their training volume to maximize performance while minimizing the risk of injury and burnout.

278: DYNAMIC POSTURAL STABILITY PREDICTORS DURING UNILATERAL DROP LANDINGS

Darren Kwong[1], Andrew Green[2]
Department of Sport and Movement Studies, Faculty of Health Sciences, University of Johannesburg, South Africa.[1], Department of Sport and Movement Studies, Faculty of Health Sciences, University of Johannesburg, South Africa.[2]
darrenk@uj.ac.za

Background: Dynamic postural stability (DPS) is crucial for injury prevention, reflecting the kinetic forces during the transition from dynamic motion to a near static state. In netball, footwork rules restrict player movement upon ball possession, requiring stable unilateral landings. The dynamic postural stability index (DPSI) quantifies this stability, but its relationship to intrinsic landing characteristics commonly associated to landing performance, is not well understood. This study aimed to investigate whether functional ankle instability, maximal dynamic power, dynamic balance, and limb dominance could predict DPS in 40 cm drop landings of varied directions and level of rotation.
Methodology: Twenty-four high-level netball players (age: 20.68 ± 2.01 years; height: 174.36 ± 4.72 cm; body mass: 67.17 ± 9.51 kg) participated in the study. Participants performed three 40 cm unilateral drop landings per limb in forward, diagonal, and lateral directions, for both standard (non-rotational) and 180˚ (mid-air rotation) landing variations, totalling 36 landings. Participant also completed the Identification of Functional Ankle Instability Questionnaire for both limbs, executed three maximal countermovement jumps (concentric maximum power), completed the modified Star Excursion Balance Test bilaterally (dynamic balance), and performed the Ball Kick Test (limb dominance). The DPSI during drop landings

and maximal concentric power during the countermovement jump were analysed from ground reaction force plate data (1000 Hz) using custom MATLAB code. Six backward stepwise regressions were conducted to identify the best intrinsic predictors of DPSI during multidirectional and rotational drop landings. Entry and removal probabilities for variables were set at .05 and .10, respectively
Results: Functional ankle instability, concentric maximal power and dynamic balance accounted for approximately 43 - 44.5% of the variance in dynamic postural stability during the 180˚ forward (R2 = .445, p = .002) and 180º diagonal tasks (R2 = .445, p = .002). No significant regression models were found for predicting DPSI in the standard drop landing variations (all p<.05).
Conclusion: The results may suggest that dynamic postural stability experienced during unilateral landings with a mid-air rotation may be more contingent on intrinsic characteristics of functional ankle instability, concentric maximal power and dynamic balance, in comparison to non-rotational landings.

108: REPORTED STRESS AND LOWER BACK PAIN AMONGST NURSES DURING THE SEVERE ACUTE RESPIRATORY SYNDROME, CORONAVIRUS 2, ACROSS PUBLIC AND PRIVATE HOSPITALS IN DURBAN, SOUTH AFRICA

Laralyn Lenice Naidoo[1], Jed Luke Davidson[2]
University of Kwa-Zulu Natal (UKZN)[1], University of Kwa-Zulu Natal (UKZN)[2]
lenice.naidoo@gmail.com

Background: The Covid-19 pandemic strained the healthcare sector and workers. Nurses (frontline workers), experienced stress and burnout due to the strain in resources, limited staff and exposure risk. Resultant lower back pain (LBP) was prevalent. Nurses were poorly equipped to manage these conditions physically and psychologically.
Methodology: Pain and stress were during the peak of the Covid-19 pandemic (March 2022 – March 2021), determined using questionnaires. Quantitative, descriptive design and convenient sampling used. Chi-square goodness-of-fit-test tests significant BPFS responses (12 daily activities LBP) and determines relationship between pain and stress before and during Covid-19 in relation to current time. Chi-square test of independence used on cross-tabulations to determine a relationship between the two variables (stress and LBP) represented. Fisher's exact test used for conditions not met. The Binomial test - to test significance of yes/no response to medication use. Questionnaire on exercise levels and provision by workplace to manage/reduce LBP symptoms.
Results: Higher pain and higher stress during versus prior to the Covid-19 pandemic. BPFS showed no difficulty performing majority of activities. Small percentage used medication, showing no significant change. Majority did not perform exercise prior to versus during Covid-19 for their LBP. Exercise intervention not provided by workplaces by majority, during or prior to the Covid-19 pandemic.
Conclusion: LBP and reported stress levels increased during the Covid-19 pandemic peak. Provision of LBP education and exercise intervention in preventing and managing LBP in hospital nurses needed. Adds to stress and LBP information knowledge base in South Africa.

276: METABOLIC PATHWAYS DURING SUBMAXIMAL EXERCISE IN YOUNG MALE ATHLETES COMPARED TO SEDENTARY INDIVIDUALS

Philippe Noirez[1], Mélanie Bourgin[2], Haidar Djemai[3], Sylvère Durand[4], Rosol Alatiyat[5], Rami Hammad[6], Bilal Azad[7], Maria C. Maiuri[8], Guido Kroemer[9], Ibrahim M. Dabayebeh[10]

University of Reims Champagne-Ardenne, Reims, France[1], Université Paris Cité, Paris, France.[2], University of Jordan, Amman, Jordan[3], Université Paris Cité, Paris, France.[4], University of Jordan, Amman, Jordan[5], University of Jordan, Amman, Jordan[6], University of Jordan, Amman, Jordan[7], Université Paris Cité, Paris, France.[8], Université Paris Cité, Paris, France.[9], University of Jordan, Amman, Jordan[10]
philippe.noirez@univ-reims.fr

Background: Identification of serum metabolome may reveal metabolites changes of enhanced physical performance. It has been shown that the metabolome can be affected by exercising. It would be interesting to evaluate the metabolome adaptations following different types of sub-maximal exercise intensities.
Methodology: We evaluated variations of metabolite levels in the blood of Jordanian male volunteers (7 trained athletes and 7 sedentary individuals), during submaximal exercise at three different intensities, and thereby determine whether exercise has an effect on those levels. Exercise consisted of 20-min sessions on an ergometric bicycle at 45%, 65%, or 85% of maximal aerobic power (MAP). Blood samplings were preformed before, during, and immediately after exercise, and after 30 min of recovery, to obtain the metabolomic profile through 4 spectrometers: UHPLC/q-Exactive (Thermo Scientific); LC/QTRAP 6500+ (AB Sciex); LC/QQQQ 6410 (Agilent); GC/7000C (Agilent)) coupled with different liquid or gas chromatography methods.
Results: 364 metabolites and metabolite ratios from different pathways were identified. Overall, changes in medium-chain acylcarnitine's, bile salts, and fatty acids were reported in the non-athletic subjects, whereas indole derivatives and glycine-conjugated primary bile salt metabolites were associated with the athletic subjects. We also compared metabolomic profiles at different exercise intensities.
Conclusion: In conclusion, metabolomic analysis allowed to identify different metabolite profiles at baseline and at different exercise intensities between athletic and sedentary young male.

170: WAIST AND NECK CIRCUMFERENCES EFFICACY IN DETERMINING TYPE 2 DIABETES MELLITUS: A SCOPING REVIEW

Takshita Sookan-Kassie[1], Luke Richardson[2], Chelsea Fortune[3], Keshena Naidoo[4]
Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu-Natal, South Africa[1], Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu-Natal, South Africa[2], Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu-Natal, South Africa[3], Discipline of Family Medicine, School of Clinical Medicine, University of KwaZulu-Natal, South Africa[4]
Sookan@ukzn.ac.za

Background: Anthropometry is an underutilised tool in the screening of patients at risk for Type 2 Diabetes Mellitus (T2DM). Abdominal adiposity is a well-established risk factor in the development of insulin resistance and T2DM. However, there is emerging evidence of an association between neck circumference and T2DM. The aim of the study is to conduct a scoping review to search for evidence to determine the efficacy of waist and neck circumference in predicting T2DM.
Methodology: Following the guidelines set out by Arksey and O'Malley, this scoping review searched five electronic databases including EBSCOhost, ScienceDirect, PubMed, Cochrane Library and Clinical

Key, to identify relevant articles that determined the efficacy between neck and waist circumference and the ability to predict T2DM. Three separate searches identified five relevant articles. Articles were only included if participants were defined as having T2DM and neck or waist circumference was measured at least once. Articles were excluded if they were published prior to 2010.
Results: Five of the 491 articles sourced met the inclusion criteria. Neck circumference was shown to be an effective and simple tool to indicate pathogenic fat deposition. Whilst, waist circumference has a proven link to metabolic disorders. However, studies reported a lack of standardization and reliability.
Conclusion: In conclusion the findings suggest that neck circumference could be used as an accurate and reliable screening tool for T2DM. Further research is needed to improve standardization and reliability

310: UNILATERAL JUMP TESTS REVEAL PERSISTENT FORCE PRODUCTION ASYMMETRIES IN ACL REHABILITATION: A COMBINED DISCRETE AND CONTINUOUS DATA ANALYSIS

Johannes PJ Stofberg[1], Mariaan van Aswegen[2], Mark Kramer[3]
Physical Activity, Sport, and Recreation (PhASRec), Centre for Health and Human Performance (CHHP), North-West University[1], Physical Activity, Sport, and Recreation (PhASRec), North-West University[2], Physical Activity, Sport, and Recreation (PhASRec), North-West University[3]
Jean.Stofberg@nwu.ac.za

Background: The unilateral countermovement (CMJUL) and drop jump (DJUL) tests are vital for evaluating recovery and readiness to return to play (RTP) post-ACL reconstruction (ACLR). Most studies focus on discrete (0D) performance metrics like jump height (JH) and peak force (PF), while continuous (1D) data analysis, revealing movement strategies, is under-researched in ACLR patients.
Methodology: Fifteen ACLR participants underwent CMJUL and DJUL assessments using dual force plates to capture force-time curves, reactive strength index (RSI), PF, and JH for both injured and uninjured limbs. Evaluations occurred at weeks 16 (phase 3) and 20 (phase 4) to analyse limb-specific force production capacities and asymmetries using the asymmetry angle (AA).
Results: Persistent force production asymmetries were observed within the force-time domain for both CMJUL and DJUL during ACL rehabilitation phases. Notable between-leg force asymmetries (AA = 4%-10%) were found before the amortization phase of CMJUL and during the amortization phase of DJUL, compounding before take-off. Significant between-limb differences in RSI and JH persisted across rehabilitation phases. For CMJUL RSI, significant differences were seen in phase three (Mdiff = 0.05 arb, $p < 0.001$, $d = 1.32$) and phase four (Mdiff = 0.05 arb, $p < 0.001$, $d = 1.36$). For JH in CMJUL, significant differences occurred in phase three (Mdiff = 0.05 m, $p < 0.001$, $d = 1.7$) and phase four (Mdiff = 0.04 m, $p < 0.001$, $d = 1.53$). The DJUL RSI showed significant differences in phase three (Mdiff = 0.11 arb, $p < 0.001$, $d = 1.41$) and phase four (Mdiff = 0.10 arb, $p < 0.001$, $d = 1.13$). For DJUL JH, significant differences were observed in phase three (Mdiff = 0.04 m, $p < 0.001$, $d = 2.01$) and phase four (Mdiff = 0.04 m, $p < 0.001$, $d = 1.42$).
Conclusion: This study underscores the need to analyse both discrete (0D) and continuous (1D) data to understand force production asymmetries during ACL rehabilitation. Persistent between-limb asymmetries in force production, RSI, and JH were observed throughout rehabilitation. These findings suggest rehabilitation protocols should address both performance outcomes and movement strategies to improve recovery and RTP readiness.

309: ASSESSING NEUROMUSCULAR ADAPTATION AND RECOVERY IN ACL PATIENTS USING FORCE-VELOCITY PROFILING

Mariaan van Aswegen[1], Johannes PJ Stofberg[2], Mark Kramer[3]
Physical Activity Sport and Recreation (PhASRec), North-West University[1], Physical Activity Sport and Recreation (PhASRec), Centre for Health and Human Performance (CHHP), North-West University[2], Physical Activity Sport and Recreation (PhASRec), North-West University[3]
20383800@nwu.ac.za

Background: Multidirectional field sport participants are prone to anterior cruciate ligament (ACL) injuries, necessitating ACL reconstruction (ACLR) and extensive rehabilitation. Functional neuromuscular assessments are critical during rehabilitation to guide return-to-play decisions. This study investigated the use of loaded squat jumping (SJ) to evaluate neuromuscular adaptation using the force-velocity (FV) profile and recovery in ACLR patients. Objectives include: (i) quantifying FV-profiles to identify performance variability and asymmetry, and (ii) to compare the association between loaded and unloaded jumping metrics.
Methodology: ACLR patients (n=15) performed loaded SJs on dual force plates with incremental loads of 0%, 20%, 40%, and 60% of body mass at week 20 (phase 4) of rehabilitation. FV-profiles were analysed using least squares linear regression to determine maximal theoretical force (F0; N.kg-1) and velocity (v0; m.s-1) via extrapolation. Associations between force-velocity parameters (F0 and v0) and key metrics from unloaded jumps (reactive strength index, jump height, peak force) were explored through correlation analyses. Limb asymmetry across time points was assessed using the asymmetry angle to determine the magnitude of asymmetry during jumping tasks.
Results: Asymmetrical loading was evident with asymmetries of 4-10% beyond ~50% of the normalized propulsive phase and exceeded 25% prior to take-off. Weak-to-moderate negative correlations (r= -0.16 to -0.43) were evident between v0 and unloaded jumping metrics, whereas moderate-to-strong positive associations (r = 0.43 to 0.75) were evident between F0 and unloaded jumping metrics. FV-profiles indicated reduced force capabilities at higher velocities, pinpointing specific areas for performance improvement.
Conclusion: Jumping analyses in the ACLR cohort provided novel insights, showing weak-to-strong associations between loaded (F0, v0) and unloaded jump metrics, and uniform asymmetry magnitudes across all SJ loading conditions, with substantial asymmetries (>25%) in the latter part of the propulsive phase. The utility of the FV-profile lies in identifying specific muscle strength deficits, facilitating tailored rehabilitation programs. Individualized training based on FV-profiling can potentially enhance neuromuscular coordination and reduce imbalances, thereby improving recovery and overall performance.

184: THE RELATIONSHIP BETWEEN RELATIVE SCHOOLBAG LOAD AND DYNAMIC LUNG VOLUME VARIABLES AMONG SOUTH AFRICAN LEARNERS

Andries van Oort[1], Alison Allan[2]
Physical Activity, Sport and Recreation Research Focus Area[1], Physical Activity, Sport and Recreation Research Focus Area[2]
abie.vanoort@nwu.ac.za

Background: Dynamic lung volume variables may indicate pulmonary restriction when learners carry a schoolbag load greater than 10% of their body mass. The study aimed to determine the relationship between schoolbag load and dynamic lung volume variables among South African learners.
Methodology: A cross-sectional observational study design was used to identify the relationship between the relative schoolbag load and pulmonary function among South African learners. The mass of the participant and school bag was determined using an electronic scale. The relative load of the school bag was calculated as a percentage of each learner's body mass. Dynamic lung volume variables were measured with the EasyOne® spirometer. Dependent t-tests were performed to determine statistically significant differences between forced expiratory volume (FEV1), forced vital capacity (FVC), FEV1/FVC ratio, and peak expiratory flow rate (PEFR) with and without the bag. Partial correlations were determined between relative schoolbag mass and FEV1, FVC, FEV1/FVC and PEFR.
Results: Sixty male and 60 female learners participated in the study, with a mean (M) age of 14.78 ± 1.49 years, a mass (M) of 61.67 ± 15.93 kg, a stature of 1.66 ± 9.80 metres and a relative load of the school bag of 17.08 ± 5.34%. All dynamic lung volumes decreased significantly when carrying a schoolbag, including FEV1 (Mno bag = 3.36 ± 0.77 L, Mbag = 3.28 ± 0.76, $p < 0.001$), FVC (Mno bag = 3.72 ± 0.90 L; Mbag = 3.36 ± 0.87 L, $p < 0.001$), PEFR (Mno bag = 6.77 ± 1.53 L/s; Mbag = 6.63 ± 1.39 L/s, $p < 0.001$) and FEV1/FVC ratio (Mno bag = 90.80 ± 5.75; Mbag = 90.67 ± 5.73, $p < 0.001$). A significant inverse correlation was found between relative schoolbag mass and FVC ($r = -0.201$, $p = 0.029$), a positive correlation with FEV1/FVC ($r = 0.209$, $p < 0.024$), while the correlation was statistically insignificant for FEV1 and PEFR.
Conclusion: Higher relative schoolbag loads negatively affected pulmonary function, as evidenced by decreases in FEV1, FVC, PEFR, and FEV1/FVC ratio. These results emphasise appropriate guidelines to limit schoolbag mass to mitigate possible adverse effects on pulmonary health in learners.

190: TWO SIDES OF A COIN: COMMUNITY RUGBY UNION STAKEHOLDERS' BELIEFS AROUND CONCUSSION-RELATED RISK AND PREVENTION

Marelise Badenhorst[1], Danielle Salmon[2], Janelle Romanchuk[3], James Brown[4], Sharief Hendricks[5], Simon Walters[6]
Sports Performance Research Institute New Zealand, School of Sport and Recreation, Auckland University of Technology, New Zealand[1], New Zealand Rugby, Wellington, New Zealand; World Rugby, Dublin, Ireland[2], New Zealand Rugby, Wellington, New Zealand[3], Carnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK; Institute of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Stellenbosch, South Africa[4], Carnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK; Division of Physiological Sciences and Health through Physical Activity, Lifestyle and Sport Research Centre, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa[5], Sports Performance Research Institute New Zealand, School of Sport and Recreation, Auckland University of Technology, New Zealand[6]
marelise.badenhorst@aut.ac.nz

Background: Concussion is an ongoing concern in rugby union. Community perceptions of concussion-related risks may impact decisions around participation as well as attitudes towards prevention initiatives. Understanding these community perceptions may be vital for designing and implementing

prevention initiatives. Thus, the aim of this study was to explore community rugby union stakeholders' perceptions of concussion risk and the need for prevention.
Methodology: This study adopted a pragmatic qualitative approach. Semi-structured interviews were conducted with 62 school and club-level community rugby stakeholders (including players, parents, coaches, general practitioners, school contacts, and provincial union representatives) from across New Zealand. Reflexive thematic analysis was used to analyse the data.
Results: Three main themes were developed from the data. The first theme, "Avoid, manage or accept" described a spectrum of risk-related perceptions that ranged from believing concussion is a serious problem, to the perception that concussion is only a problem if not managed well, or that overall, the risk is exaggerated. A second theme, "Prevention: important, or impossible?", described perceptions around the importance of technique and conditioning, compared to opposing beliefs such as 'as long as there is contact, there will be concussion'. As part of these themes, participants appeared to align strongly with a particular perspective on one end of the spectrum. However, in the final theme ("On the fence") contrasting perceptions that include both favourable and unfavourable aspects were identified, such as the belief that concussion is unavoidable, but that prevention efforts are still important.
Conclusion: The findings revealed diverse community perspectives regarding the risks of concussions and the need for prevention. There is a need for education and behavioural interventions that address unfavourable beliefs and facilitate the prioritization of both prevention and effective management.

255: INVESTIGATING THE ROLE OF THE QUIET EYE IN RUGBY UNION GOAL-KICKING

Retief Broodryk[1], Lee Moore[2], Ankebe Kruger[3]
Physical Activity, Sport, and Recreation (PhASRec), North-West University, South Africa[1], Department for Health, University of Bath, Bath, United Kingdom.[2], Physical Activity, Sport, and Recreation (PhASRec), North-West University, South Africa, Centre for Health and Human Performance (CHHP), North-West University, South Africa.[3]
retief.broodryk@nwu.ac.za

Background: Longer quiet eye (QE) durations have proved crucial for performance in various sporting tasks, but no studies have investigated its role in rugby union goal-kicking. In addition, few studies have investigated the QE during different phases of task execution and between varying levels of skill, limiting our understanding regarding the mechanisms through which the QE affects motor performance. Therefore, this study aimed to assess the QE both before (i.e., QE-pre) and during (i.e., QE-online) a rugby union goal-kicking task, examining whether these two QE durations predicted goal-kicking performance and differed between successful and unsuccessful kicks and higher- and lower-skilled kickers.
Methodology: Eighteen male university-level rugby union players participated (Mage = 21 ± 2.03 years; Mexperience = 7.67 ± 2.3 years) and respectively performed three goal-kicks from six different locations (18 goal-kicks in total) while wearing a mobile eye tracker.
Results: The results revealed that neither QE-pre ($p = 0.975$) or QE-online durations ($p = 0.251$) predicted kicking performance. The QE-pre durations did not differ based on proficiency ($p = 0.054$, $d = 0.49$) or expertise ($p = 0.923$, $d = 0.07$). However, significantly longer QE-online durations accompanied successful kicks compared to unsuccessful kicks ($p = 0.019$, $d = 0.61$). The higher-skilled kickers displayed longer QE-online durations than lower-skilled kickers but only reached practical significance ($p = 0.238$, $d = 0.82$).

Conclusion: The findings suggest that the QE-online duration plays a vital role during the rugby goal-kicking task. Therefore longer QE-online durations might benefit rugby goal-kicking performance and could be a target for gaze behaviour training interventions.

143: PROFESSIONAL MEN'S RUGBY PLAYERS WEARING HEADGEAR HAVE HIGHER COLLISION AND HEAD INJURY REMOVAL RATES THAN PLAYERS WITHOUT HEADGEAR

James Brown[1], Marc Douglas[2], Manish Mohan[3], Sharief Hendricks[4], Wilbur Kraak[5], Brady Wiseman[6], Matthew Boshoff[7], Stephanie Phillips[8], Michael Bromfield[9], Amy Howard[10], Ross Tucker[11]
Leeds Beckett University[1], World Rugby[2], Leeds Beckett University[3], University of Cape Town[4], University of the Western Cape[5], Stellenbosch University[6], Stellenbosch University[7], Stellenbosch University[8], Stellenbosch University[9], Stellenbosch University[10], World Rugby[11]
jamesbrown06@gmail.com

Background: The latest consensus statement for sports-related concussion (SRC) recommends the use of headgear to prevent SRCs. However, the protective effects of the soft-padded headgear in rugby are disputed, with inconsistent evidence for SRC protective effects. In addition, World Rugby has limited, through regulation, the thickness and associated attenuation capacity of headgear. The aim of this study was to assess if players wearing headgear were associated with a greater or lesser amount of head injury assessments.
Methodology: Video analysts noted the following information about Super Rugby players during the 2018 and 2019 seasons: if they were wearing headgear, their primary playing position, total match time, tackle (ball carry and tackler) involvements and whether the player was removed for an off-field screen. Off-field screen removal rates were calculated per 1000 hours and per 1000 tackle event involvements. Rates were compared between players wearing headgear and not wearing headgear, using rate ratios with 95% confidence intervals.
Results: On average, headgear-wearing players had a higher off-field screen incidence (31.6 per 1000 hours) and tackle involvement rate (14.2 tackle events per hour) than non-headgear wearing players (20.7 per 1000 hours and 13.2 tackle events per hour). Off-field screen removal incidence was thus 1.53 (95% CI: 1.02-2.29) greater in headgear wearing players. When off-field screen removal propensity was compared, no significant differences existed between groups, with similar likelihoods of removals per 1000 tackle involvements (IRR: 1.49, 95% CI: 0.99-2.23).
Conclusion: Wearing soft padded headgear does not alter off-field screen removal rate in players once their number of tackle involvements is considered. Indeed, professional men's players wearing headgear had a significantly higher HIA removal incidence than players not wearing headgear, but this effect was no longer significant once their higher tackle rate per hour of play was adjusted for. The higher tackle rate in players wearing headgear may be explained by the different positional match activity involvements, but there was insufficient data to explore positional effects. Limitations of this study were not being able to assess this effect by positional groups, in a female cohort and with a longitudinal design to assess changes in player behaviour.

25: CHAMPIONING MENTAL HEALTH: SPORT AND EXERCISE PSYCHIATRY FOR LOW- AND MIDDLE-INCOME COUNTRIES USING A MODEL FROM SOUTH AFRICA

James Burger[1], Bonginkosi Mafuze[2], Janine Brooker[3], Jon Patricios[4]

Division of Neuropsychiatry, Department of Psychiatry and Mental Health, University of Cape Town[1], Department of Psychiatry, School of Clinical Medicine, Nelson R. Mandela School of Medicine, University of KwaZulu-Natal[2], Department of Psychiatry, School of Clinical Medicine, Nelson R. Mandela School of Medicine, University of KwaZulu-Natal[3], Wits Sport and Health, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand[4]
james.burger@uct.ac.za

Background: Sport and exercise medicine (SEM) has gained recognition as a clinical speciality in South Africa, laying the foundation for the emergence of sport and exercise psychiatry (SEP) as a vital complementary discipline supporting the biopsychosocial approach to medical care for athletic populations. The mental health of athletes has been identified internationally as an area for prioritisation, supported by new clinical tools and resources. We outline the approach to developing SEP in South Africa and its applicability to similar settings globally.
Methodology: Recognising both the need and the synergy with SEM, a local cohort of psychiatrists and sports physicians has adopted the Plan-Do-Study-Act model, an iterative model for quality improvement, as our approach to developing SEP. We are applying this to five strategic focus areas: advocacy, creating partnerships, building capacity, training and education, and sustainability.
Results: Stakeholder engagement highlighted the need for mental health support systems for athletes with improved individual and organisational access to SEP services. Given limited resources, we recognised that although individual and systemic approaches are needed to improve the management of athlete mental health, focusing on systemic change through involvement in policy and planning may be the most effective early strategy. This inclusive South African model fosters relationships with local stakeholders in the SEM domain, such as sports physicians, sports psychologists, and through group affiliation with the South African Sports Medicine Association. International mentorship is further contributing to capacity building. Task-sharing initiatives can address the mental health treatment gap in LMICs. As the South African College of Sport and Exercise Medicine develops its training programmes, support from SEP for the inclusion of mental health in their curricula will help expand the expertise of specialists in SEM to deliver general mental health services.
Conclusion: Sport and exercise psychiatry, particularly in LMICs, can play a pivotal role in improving athlete mental health and promoting the population's mental wellbeing through physical activity. As a pioneering model, the South African network helps provides a roadmap for strategic development. Psychiatrists in LMICs might draw upon this model to advance SEP in their respective contexts, thereby championing mental health for athletes and those who seek to be active.

107: COMPARISON OF TRAINING INJURIES IN MALE ADULT AMATEUR COMMUNITY RUGBY UNION AND SCHOOLBOY RUGBY UNION IN IRELAND

Tom Comyns[1], Lauren Guilfoyle[2], Patrick Dolan[3], Roisin Cahalan[4], Giles Warrington[5], Liam Glynn[6], Mark Lyons[7], Helen Purtill[8], John Mulvihill[9], Mark Campbell[10], Ian Kenny[11]
Sport and Human Performance Research Centre, University of Limerick, Ireland[1], Sport and Human Performance Research Centre, University of Limerick, Ireland[2], Sport and Human Performance Research Centre, University of Limerick, Ireland[3], School of Allied Health, University of Limerick. Ireland[4], Sport and Human Performance Research Centre, University of Limerick, Ireland[5], School of Medicine, University of Limerick[6], Sport and Human Performance Research Centre, University of Limerick, Ireland[7], Department of Mathematics and Statistics, University of Limerick[8], Bernal Institute,

University of Limerick[9], Sport and Human Performance Research Centre, University of Limerick, Ireland[10], Sport and Human Performance Research Centre, University of Limerick, Ireland[11]
tom.comyns@ul.ie

Background: Injury surveillance in male adult amateur and schoolboy Rugby Union has principally focused on match injuries with limited data on training injuries. To provide an accurate injury profile, research on training injuries is warranted. This study aimed to monitor the diagnosis, type, location, mechanism, and severity of training injuries.
Methodology: Analysis was conducted over one season (September 2022-May 2023) on 878 male adult amateur players from 22 men's clubs, and 481 schoolboy players (16-18 yrs old) from 14 teams. Each team registered their players on an online portal (IRISweb) and designated an injury recorder, medic or first-aider, to report injuries. A 24-hour time-loss injury definition was used. Measures included injury diagnoses, type, body location, mechanism and severity.
Results: For male adult amateur players there were 116 training injuries. The most common injury diagnosis was hamstring strain (18%) followed by ankle sprain (11%) and concussion (6%). The posterior thigh (18%) was the most common injury location, followed by the knee and ankle at 13%. Strains were the most frequent injury type (39%) and the training event responsible for the most men's injuries were non-contact activities (34%). Most training injuries for male adult players were moderate (42%, 8-28 days absence) or severe (44% >28 days).
For schoolboy players there were 46 injuries. The most common training injury diagnosis was hamstring strain (15%) followed by ankle sprain (13%) and shoulder sprain (13%). The ankle (17%) was the most common injury location followed by posterior thigh (15%). Sprains were the most frequent injury type (36%). Contact drills were the event that resulted in the greatest number of injuries (50%). Most training injuries were moderate (39%) or severe (52%).
Conclusion: There are similarities between the adult and schoolboy players regarding profile, namely diagnoses and injury location. However, the most common injury type for schoolboy players (sprain) differs to that of the adult players (strain). A higher percentage of the schoolboy injures were deemed severe compared to the injuries of the adult players. The mechanism of injury also differs, and any injury reduction protocols should reflect the specific injury profile of the target population.

174: ENERGY EXPENDITURE OF INTERNATIONAL FEMALE RUGBY UNION PLAYERS DURING A MAJOR INTERNATIONAL TOURNAMENT: A DOUBLY LABELLED WATER STUDY

Dr Nessan Costello[1], Mrs Lara Wilson[2], Professor Ben Jones[3], Professor Susan Backhouse[4], Mr Andy Boyd[5], Mr Frazer Menzies[6], Dr Cameron Owen[7], Dr Carlos Ramirez-Lopez[8], Steph Roe[9], Dr Catherine Hambly[10], Professor John Speakman[11]
Leeds Beckett University[1], Leeds Beckett University[2], Leeds Beckett University[3], Leeds Beckett University[4], Scottish Rugby Union[5], Scottish Rugby Union[6], Leeds Beckett University[7], Scottish Rugby Union[8], Leeds Beckett University[9], Aberdeen University[10], Aberdeen University[11]
n.costello@leedsbeckett.ac.uk

Background: The increasing professionalism in female rugby necessitates quantifying total energy expenditure (TEE) to provide accurate nutritional recommendations, as 47% of players risk low energy availability. This mismatch of energy intake and expenditure can negatively impact performance and health, causing menstrual dysfunction, reduced bone density, endocrine and metabolic disturbances,

and increased risk of illness and injury. Therefore, this study aims to establish the TEE of international female rugby union players using the doubly labelled water (DLW) method for the first time during an in-season period, including competitive match-play.
Methodology: Fifteen players were assessed over 14-days throughout an international multi-game tournament, which represented two consecutive one-match microcycles. Resting metabolic rate (RMR) and TEE were assessed by indirect calorimetry and DLW, respectively. Physical activity level (PAL) was calculated (TEE:RMR).
Results: Mean RMR, TEE, and PAL were 6.60 ± 0.93 MJ.day-1, 13.51 ± 2.28 MJ.day-1, and 2.0 ± 0.3 AU, respectively. There was no difference in TEE (13.74 ± 2.31 vs. 13.92 ± 2.10 MJ.day-1 ; p = 0.754), or PAL (2.06 ± 0.26 AU vs. 2.09 ± 0.23 AU; p = 0.735) across microcycles, despite substantial decreases in training load (total distance: -8088 m, collisions: -20 n, training duration: -163 min). After correcting for body composition, there was no difference in TEE (13.80 ± 1.74 vs. 13.16 ± 1.97 adj. MJ.day-1, p = 0.190), RMR (6.49 ± 0.81 vs. 6.73 ± 0.83 adj. MJ.day-1, p = 0.633) or PAL (2.15 ± 0.14 vs 1.87 ± 0.26 AU, p = 0.090) between forwards and backs. For injury (n=1), TEE reduced by 1.7 MJ.day-1 from pre-injury. For participants with illness (n = 3), TEE was similar to pre-illness (+0.49 MJ.day-1).
Conclusion: Mean TEE was consistent across two one-match microcycles. Female rugby players should consider fuelling for muscle damage as well as kinematic work, and practitioners should maintain consistent nutrition and recovery plans across microcycles. Adjusted for body composition, TEEs were similar for forwards and backs, suggesting fuelling should be individualised based on fat-free and fat mass rather than position. These findings offer a basis for evidence-based nutritional strategies to support female rugby players.

248: DOES A BOUT OF HIGH INTENSITY COLLISION SPORT HAVE AN EFFECT ON OCULOMOTOR FUNCTION MEASUREMENTS IN COLLEGIATE RUGBY PLAYERS?

Charles Deacon[1], James Brown[2], Wayne Derman[3], Wilbur Kraak[4], Maaike Eken[5]
Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Stellenbosch, South Africa[1], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Stellenbosch, South Africa AND Carnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK AND Division of Physiological Sciences and Health through Physical Activity, Lifestyle and Sport Research Centre, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa[2], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Stellenbosch, South Africa AND International Olympic Committee (IOC) Research Centre, South Africa[3], Department of Sport, Recreation, and Exercise Science, University of the Western Cape, South Africa AND Department of Exercise and Sport Science, Faculty of Health Sciences, University of the Free State, South Africa[4], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Stellenbosch, South Africa AND Institute of Orthopaedics and Rheumatology, Winelands Mediclinic Orthopaedic Hospital, Stellenbosch, South Africa[5]
chdeacon@gmail.com

Background: The latest consensus statement for sport-related concussion (SRC) recommends the measurement of oculomotor function as a supplementation to the protocol for diagnosis. Ocular microtremor (OMT) is a high frequency involuntary fixational eye movement and a form of oculomotor function testing, which can be measured by the iTremor One device. Current head injury assessment protocols in rugby recommend performing baseline testing as a healthy comparison for when the player is suspected of having an SRC. However, exercise and exertion may influence the results of these assessments. Therefore, the aim of this study is to investigate if OMT frequency remains similar after playing a rugby match.
Methodology: Collegiate rugby players (male: n = 39; female: n = 9) participated in the study. Three OMT measurements on each eye were taken at baseline (pre-season), and after matches or at time of substitution in players who were not suspected of having an SRC ('match-control'). A paired samples t-test was used to investigate whether there was a difference between the mean frequency (Hz) of three OMT measurements at baseline (pre-season) and match-control (for left eye and right eye separately).
Results: The results showed that mean OMT frequencies in match-controls were higher compared to mean OMT frequencies at baseline for both the left eye (baseline: 75Hz (SD 4); match control: 77Hz (SD 4); mean difference: 1.5Hz (SD 0.1), (95%CI 1.2 – 2.8) p=0.035) and the right eye (baseline: 77Hz (SD 3); match control: 80Hz (SD 4); mean difference: 3.1Hz (SD 0.7) (95%CI 2.5 – 4.1), p<0.001).
Conclusion: These results suggest that OMT increases after playing a high intensity collision sport. Further research is required to assess the clinical relevance and physiological reason underpinning this change while exploring the utility of the device in comparing concussed and non-concussed players.

280: A SYSTEMATIC REVIEW AND DELPHI-CONSENSUS STUDY TO IDENTIFY OPTIMAL NECK EXERCISE TRAINING INTERVENTIONS TO REDUCE HEAD ACCELERATION EVENTS IN SPORT

Molly Fownes-Walpole[1], Kevin Till[2], Omar Heyward[3], Lois Mackay[4], Anna Stodter[5], Marwan Al-Dawoud[6], Melanie Bussey[7], Leigh Gordon[8], James Hairsine[9], Christopher Kirk[10], Ben Jones[11]
Carnegie Applied Rugby Research (CARR) centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK[1], Carnegie Applied Rugby Research (CARR) centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK[2], Carnegie Applied Rugby Research (CARR) centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK[3], Carnegie Applied Rugby Research (CARR) centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK[4], Centre for Sport Coaching, Carnegie School of Sport, Leeds Beckett University, Leeds, UK[5], Carnegie Applied Rugby Research (CARR) centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK[6], University of Otago, Dunedin, New Zealand[7], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town and the Sports Science Institute of South Africa, Cape Town, South Africa[8], Rugby Football Union, Twickenham, UK[9], Sport and Human Performance Research Group, School of Sport and Physical Activity, Sheffield Hallam University, Sheffield, UK[10], Carnegie Applied Rugby Research (CARR) centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK[11]
m.fownes-walpole@leedsbeckett.ac.uk

Background: Head acceleration events (HAEs) can result in acute injury and long-term health consequences. The reduction and mitigation of HAEs and concussions is a current research priority in sports. Improvements in neck musculature could have a protective effect for athletes against HAEs. In practice, neck training interventions are implemented in sports; however, peer-reviewed literature demonstrates conflicting results and heterogeneity in study designs. Therefore, this two-part study

aimed to I) systematically review the literature of neck training interventions in collision and combat sports; and II) undertake a Delphi consensus on the best practices for neck training implementation, to reduce HAEs.
Methodology: In part I, a systematic search of four databases (PubMed, Scopus, CINHAL, SPORTDiscus) was undertaken from the earliest records to June 2023. The updated Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) were followed, and quality assessment was completed using a modified Downs and Black assessment tool. Papers were eligible if they implemented a repeatable exercise intervention targeting the neck and assessed changes in the physical profile of the neck, head-neck injury incidence, and/or HAEs within a collision or combat sporting population. In part II, an expert panel of 18 international experts with experience in research and/or applied practice of neck training, concussion, and/or HAEs in sport was formed. Experts reviewed the findings from part I before completing a three-round Delphi consensus (defined by ≥70% agreement) to establish best practices for neck training implementation, to reduce HAEs.
Results: Nineteen papers were included in part I, which included a total of 586 participants and highlighted the heterogeneous nature of existing neck training interventions. In part II, a total of 57 statements reached expert consensus and were coded into five categories: contextual factors (n=17), neck training periodisation (n=12), training adaptations (n=10), neck training content (n=15), and athlete compliance (n=3).
Conclusion: This study has developed guidelines to inform neck exercise training interventions in sport to possibly reduce HAEs. This study will facilitate and improve the design and interpretation of future neck training interventions in research and practice.

305: KNEE AND SHOULDER HEALTH OF RETIRED ELITE RUGBY PLAYERS

Johan le Roux[1], Dina Janse van Rensburg[2], Simon Kemp[3], Mike Lambert[4], Clint Readhead[5], Keith Stokes[6], Wayne Viljoen[7], Gino Kerkhoffs[8], Vincent Gouttebarge[9]
Amsterdam UMC[1], University of Pretoria[2], Rugby Football Union[3], University of Cape Town[4], University of Cape Town[5], Rugby Football Union[6], University of Cape Town[7], Amsterdam UMC[8], Amsterdam UMC[9]
johanler13@gmail.com

Background: Professional rugby players experience various health problems after they retire. Osteoarthritis (OA) is one of the more common health conditions in retired rugby players. Rugby players also often experience shoulder and knee injuries. Despite the extent of shoulder and knee injuries in rugby, scientific evidence on shoulder and knee OA in retired rugby players is lacking. This study had three objectives: 1) To describe the prevalence of clinical diagnosed shoulder and knee OA among retired male professional rugby players, 2) to determine the association of severe injury and related surgery with clinical diagnosed shoulder and knee OA among this group, and 3) to describe the level of shoulder and knee function among retired male professional rugby players and compare it to matched controls.
Methodology: An observational study with a cross-sectional design was conducted using an electronic questionnaire. The study population consisted of retired professional rugby players recruited by the International Rugby Players and matched controls were from a non-elite sporting background. The Western Ontario Osteoarthritis of the Shoulder (WOOS) Index assessed the level of shoulder function. The Knee Injury and Osteoarthritis Outcome Score Physical Function Short Form (KOOS-PS) assessed the level of knee function.

Results: The prevalence of clinical shoulder OA was 14% in retired rugby players. For every shoulder surgery, retired rugby players were twice as likely to have clinical shoulder OA. The prevalence of clinical OA in the knees was 23%. For every knee surgery, retired rugby players were almost twice as likely to have clinical knee OA. There was no statically significant difference in the percentage scores on the WOOS and KOOS between the retired rugby players and the control group.
Conclusion: Our study highlights that each shoulder and knee surgery doubles rugby players' risk of developing OA in that joint. Our study also found rugby players' shoulder and knee functioning are not worse than matched controls', possibly indicating that retired rugby players have learned how to manage any shoulder and knee difficulties and persist despite experiencing pain. The findings emphasise the need for further research on shoulder and knee health of retired rugby players as well as specific after-career support for the challenges faced by retired rugby players.

287: PLAYING YOUR CARDS RIGHT WITH HEAD ACCELERATION EVENTS IN RUGBY LEAGUE, GOING HIGHER OR LOWER IN THE TACKLE

Cameron Owen[1], James Tooby[2], Thomas Sawczuk[3], Greg Roe[4], Gemma Phillips[5], Sean Scantlebury[6], Dane Vishnubala[7], Steve Rowson[8], Ben Jones[9]
Leeds Beckett University, Leeds, United Kingdom[1], Leeds Beckett University, Leeds, United Kingdom[2], Leeds Beckett University, Leeds, United Kingdom[3], Leeds Beckett University, Leeds, United Kingdom[4], Rugby Football League, Manchester, United Kingdom[5], Leeds Beckett University, Leeds, United Kingdom[6], Rugby Football League, Manchester, United Kingdom[7], Virginia Tech, Virginia, United States[8], Leeds Beckett University, Leeds, United Kingdom[9]
cameron.owen@leedsbeckett.ac.uk

Background: Head acceleration events (HAEs) are a source of concern across sport due to potential negative long-term brain health in athletes exposed to them. Tackle height is highlighted as a possible factor for risk mitigation in rugby codes. This study aimed to identify the probability of the ball-carrier and tackler receiving a HAE for a given tackle height and estimate the potential impact of changes in tackle height.
Methodology: A prospective observational cohort study was conducted during the men's elite rugby league Super League 2023 season (12 teams, 94 players, 702 player matches). HAEs recorded from instrumented mouthguards were linked to ball-carries and tackles confirmed via video. Events were then labelled by tackle height (i.e., contact on ball-carrier; head/neck, shoulder, upper torso, abdomen, shorts, upper leg and lower leg). Only initial collision HAEs were analysed. Ordinal mixed-effects regression models provided exceedance probabilities for peak linear acceleration (recorded, >10g, >25g, >40g, >55g and >70g) and peak angular acceleration (recorded, >1000rads/s2, >2000 rads/s2, >3000 rads/s2, >4000 rads/s2, and >5000 rads/s2). Differences in initial HAEs were simulated across a range of tackle height distributions using the probabilities and the total number of tackles across the season.
Results: The probability of a ball-carrier and tackler recording an initial HAE were 13.4% and 24.2%. The greatest exceedance probabilities for the ball-carrier were initial impact to the head/neck: 35.5% recorded, 4.0% >25g, 13.6% >2000 rads/s2. For other impact locations, ball-carrier HAE probability was 20% at all tackle heights except impact to the ball-carriers head/neck (12.2%). The highest probability for the tackler was contact with the shorts (recorded; 30.9%, >25g; 3.0%, >2000 rads/s2; 11.7%). When

40% of tackles were redistributed from the shoulder to lower parts of the body evenly, the estimated number of HAEs reduced from 40,292 to 35,358.
Conclusion: The probability of receiving a HAE for the tackler and ball-carrier differs by overall probability and tackle height. Consequently, simulating the redistribution of tackles below the line of the shoulder suggests there could be a lower number of initial HAE observed across a season.

301: MOVING BEYOND THE AVERAGE: SIMULATION AS A TOOL TO UNDERSTAND REFERENCE RANGES OF HAE EXPOSURES IN RUGBY UNION

Cameron Owen[1], Greg Roe[2], James Tooby[3], Mark S. Gilthorpe[4], Ben Jones[5], Lindsay Starling[6], Éanna Falvey[7], Simon Kemp[8], Keith Stokes[9], Ross Tucker[10], Thomas Sawczuk[11]
Carnegie Applied Rugby Research Centre (CARR), Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[1], Carnegie Applied Rugby Research Centre (CARR), Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[2], Carnegie Applied Rugby Research Centre (CARR), Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[3], Obesity Institute, Leeds Beckett University, Leeds, United Kingdom[4], Carnegie Applied Rugby Research Centre (CARR), Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[5], World Rugby, Dublin, Ireland[6], World Rugby, Dublin, Ireland[7], Rugby Football Union, Twickenham, UK[8], Rugby Football Union, Twickenham, UK[9], World Rugby, Dublin, Ireland[10], Carnegie Applied Rugby Research Centre (CARR), Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[11]
cameron.owen@leedsbeckett.ac.uk

Background: In collision sports, like rugby union, there is a growing interest in the long-term effects of head acceleration events (HAEs) on brain health. Current methods for understanding HAE exposure have focused on using “inferential variability” as opposed to “outcome variability”. This study aims to use simulation to evaluate outcome variability and provide expected HAE reference ranges in men’s and women’s rugby union across a micro- (weekly), meso- (monthly) and macro- (annual) cycle.
Methodology: A prospective observational study was conducted in rugby union players from two professional men’s and two semi-professional women’s competitions. A total of 982 players were included across 132 training weeks and 365 matches. Generalised linear mixed models were used to estimate the count of HAEs, HAEs >25g and >2,000 rads/s2 across training contact types and match-play. Simulations of model estimates, accounting for player and weekly variation, were used to provide reference ranges of expected HAE counts, using current world rugby contact guidelines. Meso-cycles were simulated for players in three categories; high (30 matches), moderate (20 matches) and low (10 matches) match exposure.
Results: For both sexes within a micro- and meso-cycle, the reference ranges between positions overlap despite differences in the median expected HAE exposures (e.g., >25g HAEs: male forwards 4 [0-10] vs. male backs 2 [0-8]). Where differences are present, forwards have greater expected HAE counts and variation (indicated by a wider distribution). Meso-cycles simulations identified a clear differentiation in distributions of expected HAEs between all match exposure levels. Generally, more matches played resulted in higher reference ranges of HAEs, but some low match exposure simulations had a higher HAE count than some high match exposure simulations.
Conclusion: The results show wide variability in “normal” weekly, monthly and annual HAE exposures. These reference ranges can be used by practitioners to identify individual players that are exposed to a

large number of HAEs and serve as a baseline for future policy change regarding match and training exposure limits.

289: INSTRUMENTED MOUTHGUARDS IN WOMEN'S RUGBY LEAGUE: QUANTIFYING HEAD ACCELERATION EVENTS DURING MATCHES

James Tooby[1], Sean Scantlebury[2], Cameron Owen[3], Mily Spiegelhalter[4], Kevin Till[5], Steve Rowson[6], Gemma Phillips[7], Dane Vishnubala[8], Ben Jones[9]
Leeds Beckett University[1], Leeds Beckett University[2], Leeds Beckett University[3], Leeds Beckett University[4], Leeds Beckett University[5], Virginia Tech University[6], The Rugby Football League[7], The University of Leeds[8], Leeds Beckett University[9]
tooby.james@gmail.com

Background: There is growing concern that exposure to head acceleration events may be associated with potential long-term health consequences. Rugby league is a contact sport involving a high number of collisions, and therefore has a high risk of head accelerations. It is therefore important to quantify head acceleration exposure in rugby league. Instrumented mouthguards (iMGs) are a validated means for quantifying head acceleration events (HAEs) and have been implemented within men's rugby league, however HAEs are yet to be quantified within women's rugby league. Accordingly, this study implemented iMGs across teams participating in the Women's Super League competition, with the aim of describing HAEs during matches.
Methodology: Seven elite women's rugby league teams were provided with iMGs, resulting in the collection of iMG data from 84 players, across 116 player matches. In-vivo HAEs were approximated using linear and angular kinematics measured by accelerometers and gyroscopes embedded within iMGs. Peak linear acceleration (PLA; g) and peak angular acceleration (PAA; rad/s2) were calculated to approximate the magnitude of each HAE. Validated machine learning classification algorithms were used to remove false positive events from the dataset.
Results: Across 116 player matches, 1389 HAEs were recorded. The median (IQR) number of HAEs per player match was 7 (3 to 18) HAEs per player match. The median (IQR) HAE magnitude was 12 (8.6 to 18.1) g and 982 (657 to 1,723) rad/s2, for PLA and PAA, respectively. Towards the higher end of magnitudes, the 95th percentile magnitude was 36.8 g and 3,740 rad/s2.
Conclusion: For the first time, HAEs have been quantified in women's rugby league matches. Overall, the number of head accelerations per player match is lower than previously reported in men's rugby league, while the distribution of HAE magnitudes also seems lower.

133: COMPARISON OF WOMEN'S AND MEN'S INJURY EPIDEMIOLOGY IN AMATEUR COMMUNITY RUGBY UNION

Giles Warrington[1], Eoin McGrath[2], Tom Comyns[3], Roisin Cahalan[4], Caithriona Yeomans[5], Ian Kenny[6]
Sport and Human Performance Research Centre, University of Limerick, Ireland.[1], Sport and Human Performance Research Centre, University of Limerick, Ireland.[2], Sport and Human Performance Research Centre, University of Limerick, Ireland.[3], School of Allied Health, University of Limerick, Ireland.[4], Irish Rugby Football Union, Ireland.[5], Sport and Human Performance Research Centre, University of Limerick, Ireland.[6]
giles.warrington@ul.ie

Background: Rugby union is a high intensity intermittent contact team sport which carries a high injury risk for both male and female players when compared to other team sports. Despite its international popularity, due to the current lack of longitudinal research, uncertainty remains about the injury epidemiology in both male and female amateur community rugby players. The aim of this study therefore was to determine and compare the injury epidemiology differences between male and female amateur community adult rugby players in Ireland using data collected over a 3-year period, 2017-2020.
Methodology: Data were collected prospectively over three seasons, from 27 male clubs (1750 players) and 10 female clubs (212 players) participating in the highest level of amateur community rugby in Ireland. Participating clubs reported details for each match injury that occurred using a 24-hour time loss injury definition for both match play and training sessions. Each team registered their players on an online secure portal (IRISweb) and designated an injury recorder to report injuries.
Results: Time-loss injury incidence rates for male and female rugby players were 48.7/1000 and 44.8/1000 player hours respectively. Strains and sprains were the most common diagnosis for both male (14.5/1000 and 13.7/1000 player hours respectively) and female rugby players (7.6/1000 and 8.2/1000 player hours respectively). Across the three seasons the tackle accounted for 58.5% off all injuries. Forwards sustained the majority of injuries with 58.1% and 54.7%, in males and females reported respectively. Injury rate was the highest for both male and females during the third and fourth quarters of match play.
Conclusion: Strains and sprains were the most common injury type in both male and female rugby players over the three seasons. In male rugby players the high rate of injuries occurring during tackling opposition players highlights a need to revise tackling technique and review the current tackle laws in an effort to reduce injury risk. Based on these findings protocols and educations programmes should be introduced to promote injury reduction. These may include the development of guidelines for half time recovery and warm-up strategies to potentially reduce injury incidence rate during the second half.

72: ENVIRONMENTAL CONDITIONS IN AN ULTRAMARATHON HAVE IMPLICATIONS FOR ILLNESS PREVENTION STRATEGIES

Esme Jordaan[1], Martin Schwellnus[2], Henno Havenga[3]
Biostatistics Research Unit, South African Medical Research Council, Tygerberg, South Africa and Statistics and Population Studies Department, University of the Western Cape, South Africa.[1], Sport, Exercise Medicine, and Lifestyle Institute (SEMLI), Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa and International Olympic Committee (IOC) Research Centre, Pretoria, South Africa.[2], Environmental Science, North-West University Potchefstroom campus, North West, South Africa[3]
esme.jordaan@mrc.ac.za

Background: Investigating the influence of environmental conditions on athletes' health in endurance events like the Comrades Marathon has been a challenge due to insufficient weather data coverage throughout the race. Medical encounters were significant in Comrades 2014-2019, affecting 1 in 52 starters.
Methodology: The study design was retrospective, cross-sectional. The setting was a community-based mass participation running of the Comrades 2022 event. The participants were 11 870 finishers of the 2022 Comrades Marathon. The Wet-bulb globe temperature (WBGT) was measured at each time mat in

the race, taking temperature, humidity, wind speed and solar radiation into account. The equipment failed at one of the stations. Medical encounters of at least a moderate severity were measured according to the Schwellnus et al. consensus 2019. The impact of the cumulative environmental exposure on the medical encounters of the athletes, reporting the incidence (% and 95%CI) of MEs in 4 increasing categories of exposure.
Results: WBGT in the 4 increasing categories, adjusted for sex and age, significantly impacted the incidence of medical events (p=0.0001). The u-shaped curve, with the lowest (3.6: 95%CI: 3.3-4.0) and highest (2.1; 95%CI:1.9-2.4) categories having the strongest positive relationship and the middle two categories (1.6; 95%CI:1.4-1.8 and 1.4; 95%CI:1.2-1.5) having the weakest relationship with MEs. For runners older than 50 years the 2nd leg of the u-shape curve increased sooner than for the other age groups.
Conclusion: Our findings underscore the significant impact of WBGT on medical events during endurance races. Adherence to the American College of Sports Medicine's guidelines for activity management under varying WBGT ranges is vital, especially for older athletes.

391: SOUTH AFRICAN INSTITUTE OF DRUG-FREE SPORT POSITION STATEMENT ON CBD (CANNABIDIOL) AND THC (TETRAHYDROCANNABINOL)

L Pillay[1,2,6,8]; C Thompson[1,2,4]; C Tabane[1,2]; J Kirby[1,2,4]; S Hendricks[2,5]; J Swart[1,2,3,5]; DC Janse van Rensburg[2,3,6]; P Zondi[1,2]; A Rotunno[2,5]; D Bayever[1,7]
South African Institute for Drug-free Sport (SAIDS), Sport Science Institute of South Africa, 4th Floor, Newlands, Cape Town, South Africa[1], South African Sports Medicine Association (SASMA), 668 Corelli Street, Les Marais Pretoria, South Africa[2], International Federation of Sports Medicine (FIMS), Maison du Sport International, Av. de Rhodanie 54, Lausanne, Switzerland[3], Institute of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine of Health Sciences, Stellenbosch University, South Africa[4], HPALS Research Center, Division of Physiological Sciences, Department of Human Biology, University of Cape Town, Cape Town, South Africa[5], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[6], Faculty of Health, University of Witwatersrand, Johannesburg, South Africa[7], International Tennis Integrity Agency, Boeh Lane, Roehampton, London, United Kingdom[8]
drpillay@absamail.co.za

Background: Due to various health concerns, CBD and THC are prohibited in most sporting codes (World Anti-Doping Code classified as S8) and are considered illegitimate recreational substances in many countries.
Rationale: A National Anti-Doping Organisation view is vital for athletes. Experts in Sports and Exercise Medicine, Pharmacology and knowledge and involvement in the regulatory framework surrounding cannabis, were asked by SAIDS to develop a position statement relating to THC and CBD, its current use in the medical environment and guidance for athletes.
Discussion: CBD (unlike THC) does not possess the euphoric and addictive side effects. These products are available in various forms ranging from tablets to transdermal patches. Legislation from 2018 allows pharmacies in SA to sell CBD at regulated concentrations over the counter. Few pharmacies have SAHPRA approval to resell THC products under prescription from a healthcare provider. Research mostly cites the mental and general health consequences of the use of cannabis (as with other substances of abuse and addiction). The WADA List Expert Advisory Group iterates that a substance is placed on the prohibited

list if it has: (a) the potential to enhance performance, (b) has health risks, and (c) violates the spirit of fair play. Research relating to the efficacy of CBD and THC in managing medical conditions mostly consists of low-level evidence. It is commonly used to manage pain, insomnia, side effects of chemotherapy and anxiety. SAHPRA allows CBD (non-prohibited) a certain maximum percentage of THC – chronic use may produce an adverse analytical finding. Single use of cannabis can be detected in urine 2-14 days, daily use 14-30 days and heavy use up to 6 weeks. The strict liability concept for athletes applies when using CBD and THC. If a healthcare practitioner prescribes it, they must apply and satisfy the ISTUE rule 4.2. to obtain an approved TUE.

Conclusion Inadvertent use of CBD and THC products may lead to abnormal analytical findings resulting in an athlete's sanction. Strict liability of use must be remembered and a TUE should be applied for if there is justified use under the ISTUE 4.2. rule.

313: BREAKING BARRIERS: INCLUSIVE HIGH-PERFORMANCE STRATEGIES FOR ALL LEVELS OF SPORT

Simphiwe Alpheus Nkosi[1], Heather Morris Eyton[2], Andrew Green[3]
Department of Sport and Movement Studies, Faculty of Health Science, University of Johannesburg[1,2,3]
simphiwenkosi23@outlook.com

Background: High-performance (HP) models in sports encompass strategic planning processes crucial for successful sport development systems (De Bosscher & Sotiriadou, 2019). These models delineate how organisations formulate and execute performance strategies grounded in key success factors essential for achieving a competitive edge at the highest echelons of competition. The study aims to address this gap by evaluating best practices across sport organisations and developing an inclusive HP toolbox applicable across all levels of sport.

Methodology: This qualitative study utilised semi-structured interviews with eight (n= 8) participants, each representing different levels of sport organizations, including professional, university, club, and school settings. The interview data were transcribed and systematically coded using manual coding methods as described by Saldana (2016). Themes and sub-themes were identified through an inductive coding process, and a codebook was developed to maintain consistency and reliability in the analysis. Thematic analysis was employed to identify common patterns and themes emerging from the interview data, providing a comprehensive understanding of high-performance practices.

Results: The analysis identified ten (n=10) main themes: comprehensive definition of high performance; resource allocation and equity; inclusivity strategies; support systems and governance; continuous monitoring and feedback; culture of excellence; barriers and solutions; cross-domain integration; holistic development; and role modelling and mentorship. Participants emphasised the importance of integrating mental, physical, tactical, and technical aspects in HP sport. Equitable resource distribution and the development of inclusive programs were highlighted as critical for integrating non-elite groups. Effective support systems, clear governance structures, and continuous performance monitoring were identified as key components of successful HP practices. Additionally, promoting a culture of excellence and fostering holistic development were seen as essential for achieving optimal performance outcomes.

Conclusion: The findings underscore the necessity of a comprehensive and inclusive approach to high-performance sport. By addressing the limitations of elite-focused perspectives and emphasising resource equity and inclusivity, sport organisations can enhance performance across all levels. The development of an inclusive HP toolbox, informed by these findings, holds the potential to foster a more holistic understanding of high-performance sport, benefiting both elite and non-elite athletes.

135: THE SOUTH GOES NORTH - A CASE STUDY OF A SOUTH AFRICAN PARA ATHLETE LIVING AND PLAYING WHEELCHAIR BASKETBALL IN EUROPE

Phoebe Runciman[1]
Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Stellenbosch University[1]
para@sun.ac.za

Background: Para sport structures in the Global North and Global South are different and will give athletes in each setting a different experience. The purpose of the study was to hear what these differences are from an athlete who has experienced it for themselves. This study aimed to identify shared themes from the athlete's experiences which will indicate the areas of difference between a Global North as well as a Global South setting.
Methodology: A descriptive, single case study design was used. Primary data was collected through four semi-structured interviews looking at the participant's experience in South Africa and later in France. Secondary data was collected from the participant's social media. Thematic analysis was performed on the data to identify shared themes between the two different experiences. Furthermore, policies from South Africa and France were collected to understand the differences in the sport structures of both countries.
Results: The themes that were identified were (1) Difference between the environments, (2) Opportunities and Challenges, (3) Hope and Doubt, (4) Accessibility, and (5) Support systems in the two countries. The accessibility experienced in both countries refers to participating in wheelchair basketball as well as living with a disability in general.
Conclusion: There is still a need for government support and funding to develop wheelchair basketball as well as other Para sports in South Africa. This study gives an understanding of the experiences Para athletes face in a Global South setting and a Global North setting.

136: THE INCIDENCE OF INJURIES AND ILLNESSES SUSTAINED BY ATHLETES WITH SHORT STATURE PARTICIPATING AT THE LONDON 2012, RIO 2016 AND TOKYO 2020 PARALYMPIC GAMES

Phoebe Runciman[1], Kerry Walton[2], Faatima Adam[3], Wayne Derman[4]
Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Stellenbosch University[1], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Stellenbosch University[2], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Stellenbosch University[3], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Stellenbosch University; International Olympic Committee Research Centre, South Africa[4]
para@sun.ac.za

Background: Injury and illness surveillance has become standard practice in elite sports competitions for athletes with and without disabilities. Whilst the injury and illness surveillance studies at the Paralympics have presented comprehensive epidemiological data, data regarding athletes with specific impairments is still understudied. Particularly, relatively little is known about the injury and illness profiles of athletes with short stature. This study aimed to describe the incidence of injuries and illnesses

in the athletes with short stature competing at the London 2012, Rio 2016, and Tokyo 2020 Paralympic Games.
Methodology: This study comprises a descriptive analysis of epidemiological data collected during the London 2012, Rio 2016 and Tokyo 2020 Paralympic Games regarding injuries and illnesses reported for athletes with short stature. Incidence is presented as injuries/illnesses per 1000 athlete days and proportion of athletes presented as a percentage athletes with an injury/illness.
Results: A total of 246 athletes (134 female, 112 male) with short stature competed at the Games. The incidence of injuries was 9.3 per 1000 athlete days (95% CI 6.1 to 12.4) and illnesses was 9.0 per 1000 athlete days (95% CI 5.9 to 12.1). Athletics reported the highest incidence of injuries (11.8) and illnesses (12.5). Female athletes had a higher incidence of both injuries and illnesses (10.9). Repetitive (gradual onset) and acute (sudden onset) injuries of the upper limb (3.9) both had the highest incidence (3.7). The genitourinary and dermatological systems both had the highest incidence of illnesses (2.0).
Conclusion: This study is the first study to report on the incidence of injuries and illnesses in athletes with short stature competing at the Paralympic Games. The results can contribute towards baseline data on the incidence of injuries and illnesses in athletes with short stature, as well as inform injury and illness prevention interventions at future Games and sport outside of the Games environment.

253: PRE-RACE MEDICAL SCREENING AND TARGETED MEDICAL EDUCATION - THE EFFECT ON ALL AND SERIOUS/LIFE-THREATENING MEDICAL ENCOUNTERS IN THE 90KM COMRADES ULTRA-MARATHON

Gavin Shang[1,2], Nicola Sewry[1,3], Mats Borjesson[4,5], Jeremy Boulter[6], Carolette Snyders[1,3], Martin Schwellnus[1,3]
Sport, Exercise Medicine and Lifestyle Institute (SEMLI), University of Pretoria[1], Section Sports Medicine, University of Pretoria[2], IOC Research Centre (South Africa)[3], Goteborg University[4], Sahlgrenska University Hospital[5], Comrades Marathon[6]
drgavinshang@gmail.com

Background: The Comrades Ultra-Marathon (90km road-race) has a high incidence of medical encounters (MEs) and specifically serious/life-threatening MEs (SLMEs) compared to other endurance running events.
Aim: To investigate if a two-year pre-race medical screening and targeted medical education program decreased the incidence of all MEs and SLMEs during the Comrades Ultra-Marathon compared to a pre-intervention period.
Methodology: A pre-race medical screening and educational intervention program, based on international guidelines, was implemented as part of the registration process for the Comrades Ultra-Marathon in 2022-2023. This pre-race medical screening questionnaire (and targeted medical education) utilised the answers provided by each participant to identify at-risk individuals. On race day, ME data were captured by medical doctors in the medical tent at the end of the race utilising a standardised medical encounter form for injury and illness at mass community-based endurance sports events. Data on incidence (per 1000 starters; 95%CIs) of all MEs, and a sub-group of SLMEs, in this intervention period (2022-2023) were compared to data from a pre-intervention control period 2014-2019 (no intervention nor screening). Comparisons where 95%CIs that did not overlap, were considered statistically significant.
Results: In the pre-intervention period (2014-2019), there were 103 131 starters with a total of 1 971 MEs (189 being SLMEs) compared to the post-intervention period (2022-2023), where there were 29 286

starters with a total of 471 MEs (31 being SLMEs). The incidence of all MEs was significantly lower in the post-intervention period (2022-2023) (16.1; 95%CI=14.6-17.5) when compared to the pre-intervention period (2014-2019) (19.1; 95%CI=18.3-20.0). The incidence of all SLMEs was also significantly lower in the post-intervention period (2022-2023) (0.7; 95%CI=0.4-1.0) when compared to the pre-intervention period (2014-2019) (1.8; 95%CI=1.6-2.1).

Conclusion: These preliminary data indicate that a pre-race medical screening and targeted medical education have the potential to decrease the incidence of all MEs and SLMEs during ultra-marathon road running events.

99: THE PREVALENCE OF HEAVY METALS AND TRACE ELEMENTS IN SELECTED COMMERCIAL WHEY PROTEIN PRODUCTS IN THE SOUTH AFRICAN MARKET

Mandisi Sithole[1], Gary Gabriels[2]
Department of Pharmacy and Pharmacology, Faculty of Health Sciences, University of the Witwatersrand[1], Department of Pharmacy and Pharmacology, Faculty of Health Sciences, University of the Witwatersrand[2]
mandisi.sithole1@students.wits.ac.za

Background: Protein supplements have become a common choice among athletes because of their physiological advantages, resulting in their widespread consumption and availability. However, recent studies have raised concerns regarding the presence of harmful compounds in these products owing to the lack of regulations in the supplement industry. These compounds can lead to several adverse health effects in consumers without knowing the origin of their afflictions. Several nutrition sources have been found to contain heavy metals and trace elements, which may lead to various health issues. This study assessed the prevalence of heavy metals and trace elements in commercially available protein supplements
Methodology: The study utilized inductively coupled plasma-mass spectrometry (ICP-MS) to investigate 21 whey protein supplement products for levels of heavy metals and trace elements, including Li, Na, Mg, Ca, Cr, Mn, Fe, Co, Ni, Cu, Zn, Sr, Hg, and Pb.
Results: The results demonstrated that the majority of the products contained the investigated heavy metals and trace elements, with Hg detected in 10 products. However, the Hg levels in these products were below the recommended tolerable intake. The hazard quotient (HQ) and hazard index (HI) were below one, indicating no risk to human health
Conclusion: The presence of heavy metals and trace elements in protein supplements is concerning because the label information of the products investigated does not reflect the presence of these elements. While the results suggest no immediate health risks, long-term consumption of these products could lead to adverse effects owing to the accumulation of trace elements and heavy metals over time

140: THE INCIDENCE OF INJURIES SUSTAINED BY ATHLETES WITH VISUAL IMPAIRMENT AT THE LONDON 2012, RIO 2016 AND TOKYO 2020 PARALYMPIC SUMMER GAMES

Johannes Lodewikus van Zyl[1], Eirik Halvorsen Wik[2], Wayne Derman[3], Pieter-Henk Boer[4], Phoebe Runciman[5]

Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[1], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[2], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[3], Department of Human Movement Science, Cape Peninsula University of Technology, South Africa.[4], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[5]
hannovanzyl@yahoo.com
Background: Injury surveillance programmes during the Paralympic Games have highlighted that athletes with visual impairment (VI) have the highest injury incidence among impairment types. This study aims to provide more in-depth information on injury patterns within this group, including sub-analyses of severity of visual impairment (blind vs. low vision).
Methodology: We analysed injuries sustained by athletes with VI at the London 2012, Rio 2016 and Tokyo 2020 Paralympic Summer Games. Data were collected using the Web-Based Injury and Illness Surveillance System and local polyclinic facilities. Injuries were analysed and described in blind athletes (class B1) and athletes with low vision (classes B2-3). Results are reported as injury incidence (injuries per 1000 athlete days) with 95%CI (confidence intervals). Data were analysed using SAS statistical software (v9.4) using Poisson regression models. A repeated statement was included to account for the exchangeable correlation structure as one athlete could report more than one injury.
Results: Data from 2096 athletes with VI were included (782 blind, 1314 low vision), accumulating 30093 athlete days over the three Games. In total, 354 injuries were recorded, resulting in an overall incidence of 11.6 (95%CI: 10.3-13.1). Injury incidence did not differ between blind athletes (13.0, 10.9-15.4) and athletes with low vision (10.9, 9.3-12.8). Among both sub-groups, injuries with an acute mechanism (blind: 9.3, 7.7-11.2; low vision: 7.1, 5.9-8.5) were most common in terms of onset. Lower limb injuries (blind: 6.6, 5.2-8.5; low vision: 5.0, 4.0-6.2) occurred more frequently than injuries to the upper limb (blind: 2.1, 1.4-3.3; low vision: 2.6, 1.9-3.5), trunk (blind: 1.5, 0.9-2.5; low vision: 2.1, 1.5-3.0) and head/face/neck (blind: 1.7, 1.1-2.8; low vision: 0.7, 0.4-1.3). Injury incidence was significantly higher in football 5-a-side (23.0, 17.8-29.8) compared to other sports for blind athletes; for athletes with low vision, swimming had a significantly lower incidence (3.1, 1.6-6.0) than other sports except cycling.
Conclusion: This study provides novel insights into the injury patterns of athletes with visual impairments participating in Paralympic Summer Games. Overall injury incidence did not significantly differ between blind/low-vision athletes. Football 5-a-side, lower-limb injuries and acute onset injuries should be targeted for injury risk reduction programmes.

117: CROSS-CULTURAL ADAPTATION OF THE OSLO SPORTS TRAUMA RESEARCH CENTER QUESTIONNAIRE ON HEALTH PROBLEMS (OSTRC-H2) FOR SOUTH AFRICAN ADOLESCENT ATHLETES

Eirik Halvorsen Wik[1], Deborah Skinstad[2], Merete Møller[3], Shaundré Jacobs[4], Karen Schwabe[5], Ranel Venter[6], Wayne Derman[7]
Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[1], Division of Movement Science and Exercise Therapy, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and

Health Sciences, Stellenbosch University, South Africa.[2], Research Unit for Musculoskeletal Function and Physiotherapy, Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Denmark.[3], Division of Sport Science, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[4], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[5], Division of Sport Science, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[6], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[7]
ewik@sun.ac.za

Background: Keeping adolescent athletes healthy is essential for their development and enjoyment. Health problem surveillance is a fundamental step when identifying focus areas for risk-mitigation strategies. An athlete self-report tool – the Oslo Sports Trauma Research Center Questionnaire on Health Problems v2 (OSTRC-H2) – is widely used for this purpose; however, it is not validated in adolescents. We aimed to cross-culturally adapt the English OSTRC-H2 questionnaire for South African adolescent athletes and provide an additional translated version in the most widely spoken language in the Western Cape (Afrikaans).
Methodology: Guidelines for cross-cultural adaptation of self-report measures informed our study design, including translation, synthesis of translations, back translation, expert committee review and pretesting. Pretesting involved cognitive interviews of ten athletes (7 boys and 3 girls, age 10-18 years), using a combination of think-aloud and verbal probing techniques. All interviews were conducted in English; however, five participants were bilingual (Afrikaans first language) and were given the translated version. Interviews aimed to evaluate four aspects of the question-answer process: comprehension, retrieval, judgement/decision and response.
Results: Concepts of “injury” and “illness” were well understood after reading the definitions in the adapted questionnaire introduction, but participants differed in their opinion of what constituted a “health problem”. Mental health problems were often overlooked and should be explicitly mentioned. “Participation” and “performance” were well comprehended, while “changes in training/competition” required the addition of specific examples. “Health complaint” was misinterpreted and consequently removed from final versions. Examples of sensations and symptoms relating to injuries, illnesses and mental health problems, based on participants’ own descriptions (e.g., discomfort, pain, feeling depressed), were added to improve comprehension. Remembering health problems that happened up to seven days ago may be challenging for younger athletes, who often judged their responses based on current symptoms. Participants could differentiate between response options and were able to explain why a specific answer was selected.
Conclusion: Two adapted versions of the OSTRC-H2 questionnaire (English & Afrikaans) were developed for monitoring health problems in athletes aged 10-19 years. Supervision by coaches/teachers/researchers is recommended, especially with younger athletes. Additional translation to other spoken South African languages is advised.

348: EFFECTS OF RESISTANCE TRAINING ON PHYSIOLOGICAL AND BIOMECHANICAL FACTORS IN MARATHON RUNNERS: REACTIVE STRENGTH VS. HEAVY WEIGHT TRAINING

Muhammed Rizaan Behardien[1], Andrew Bosch[2]

University of Cape Town, Department of Human Biology, Division of Physiological Sciences[1], University of Cape Town, Department of Human Biology, Division of Physiological Sciences[2]
bhrmuh003@myuct.ac.za

Background: Concurrent training combines resistance and endurance exercises in a single program and has been linked to improvements in running economy (RE), running muscle power factors, and time trial performance. However, the mechanisms underpinning these improvements remain unclear. This study compared concurrent heavy-weight training (HWT) and reactive-strength (RST) to determine which leads to better running performance improvements and to investigate the underlying mechanisms and adaptation time-course.
Methodology: This blocked, randomised controlled study tested participants (HWT = 8, RST = 8) three times over 12 weeks interspersed with two four-week resistance training blocks. Body composition, 1-rep-max (RM) Smith machine back squat, countermovement jump, squat jump, drop jump, running biomechanics, aerobic treadmill test, maximal anaerobic running test (MART), and 5km time trial (5kmTT) were measured. Mixed-effects analysis models assessed the group-by-time interaction for each variable. Post-hoc multiple comparison analyses were run when applicable. Additionally, Pearson's correlation coefficient tested for significant relationships between all variables.
Results: Concurrent training does not affect body composition and VO2max running biomechanics and RE. A main effect of time was evident for absolute ($p < 0.001$) and relative 1RM back squat ($p = 0.034$), modified reactive strength index during the countermovement jump (RSImod) ($p = 0.004$), peak treadmill speed ($p = 0.003$), maximum velocity ($p = 0.032$) and maximum oxygen demand ($p = 0.031$) during the MART. There was a significant group-by-time interaction in the 5kmTT ($p = 0.012$), with the RST group only showing a significant 59.2-second improvement from pre- to mid-testing ($p = 0.039$. Due to participant dropout post-intervention, the sample size was reduced and the pre- to post-testing results were not statistically significant. Only Δrelative 1RM and ΔO2Deficiet significantly correlated with Δ5kmTT over the pre- to mid-testing period ($p < 0.05$).
Conclusion: Overall, RST was superior to HWT in improving 5kmTT performance, and specifically with RST, factors that may underpin these improvements include maximal strength and running muscle power factors. A significant proportion of the 5kmTT improvements were evident after just four weeks of training. These findings provide athletes, coaches, and conditioning professionals with an RST concurrent training program that can more effectively improve performance in recreational long-distance runners.

178: UNDERSTANDING THE DIETARY BEHAVIOURS OF MALE ACADEMY FOOTBALL PLAYERS: USING THE NOMINAL GROUP TECHNIQUE TO SELECT AND SPECIFY TARGET BEHAVIOUR(S)

Dr Nessan Costello[1], Miss Steph Roe[2], Professor Susan Backhouse[3], Mr Luke Dopson[4], Mr Paul Bower[5], Dr Meghan Bentley[6]
Leeds Beckett University[1], Leeds Beckett University[2], Leeds Beckett University[3], Huddersfield Town Association Football Club[4], Huddersfield Town Association Football Club[5], Leeds Beckett University[6]
n.costello@leedsbeckett.ac.uk

Background: An integral role of a sports nutritionist is to design and deliver effective dietary interventions. However, many male academy players fail to meet energy and carbohydrate recommendations, thus potentially limiting their growth, development, health, and performance. Guided by the Behaviour Change Wheel, this case study utilised the Nominal Group Technique (NGT) to

select and specify the dietary behaviours that nutrition practitioners should target in sports nutrition interventions to enable male academy football players to achieve their dietary requirements.
Methodology: Two NGT workshops (mean duration = 2 hour 20 minutes) were conducted with four sports nutritionists (male = 3, female = 1) who were currently working at an English Football League Championship Football Club (n = 3), or who had previously worked at the club within two years (n = 1). A purposeful sampling approach was used to capture context specific perspectives from sports nutritionists who were familiar with the dietary behaviours of male academy football players and had experience of the club environment.
Results: The workshops co-produced a list of 27 behaviours that enable male academy footballers to achieve nutritional recommendations. This candidate list of behaviours was then reduced to the top-10 behaviours identified by nutritionists. Players consume at least three meals and two snacks per day was the highest ranked behaviour, with all participants ranking this as the most important behaviour during both workshops. Key reflections from the workshops include: practitioners were unfamiliar with, and challenged by, the definition of a "behaviour" (Reflection 1); prioritising behaviours (i.e., steps 5-6) required thoughtful consideration (Reflection 2); the NGT approach offered a useful prioritisation tool to guide sports nutrition practitioners who work within time-restricted roles (Reflection 3); and having a gap between the two workshops gave participants valuable time to reflect (Reflection 4).
Conclusion: This project highlights the benefit of using NGT within a high-performance environment for reaching consensus on the dietary behaviours to be enabled within male academy football players. Future application of this technique could consider involving stakeholder voice (e.g., director of football or head of performance) to promote a collaborative approach across the sport science, medicine, and coaching team.

95: THE IMPACT OF MATCH WORKLOAD AND INTERNATIONAL TRAVEL ON INJURIES IN PROFESSIONAL MEN'S FOOTBALL

Dr Steve den Hollander[1], Prof Dr Gino Kerkhoffs[2], Prof Dr Vincent Gouttebarge[3]
University of Cape Town; FIFPRO[1], Amsterdam UMC[2], Amsterdam UMC; University of Pretoria; FIFPRO[3]
steve_dh1989@hotmail.com

Background: There are concerns over the impact of the international match calendar congestion on professional footballers' physical and mental well-being, and injury susceptibility. This study aimed to compare the match workload and international travel between injured (all injuries and hamstring injuries) and non-injured male football players over two seasons of elite competition
Methodology: An observational, retrospective, case-control study was used over two football seasons (2021/2022 and 2022/2023). It included five top-tier European men's football leagues. The inclusion criteria for the participants were that they competed in one of the five leagues and were embedded within the Federation Internationale des Associations de Footballer's Professionals (FIFPRO) Player Workload Monitoring platform. Of the 860 players who met the inclusion criteria, 585 players received an injury, with 1488 injuries between them (299 hamstring injuries). Each injury was matched with players who met the inclusion criteria but did not receive an injury in the respective season (1:2 injury to control ratio). For each injury, cumulative match workload and international travel variables were calculated over a 28-day period preceding an injury, for both the injured player and the controls. An independent t-test was performed to determine differences between the injured and non-injured players.

Results: There were significant differences in the match workload and international travel variables between the injured group (all injuries and hamstring injuries) and the control group. The match workload variables (minutes played, appearances, appearances in starting eleven, less than 3 days between matches, less than 5 days between matches, critical zone matches) were higher ($p<0.01$), the recovery variables (rest, unused substitute) lower ($p<0.01$), and the international travel variables (distance, time, time zones crossed) higher ($p<0.01$).
Conclusion: The results of this study suggest that an overload of acute and chronic match workload and international travel contribute to increased injury susceptibility in professional men's football. The findings emphasize the need to address concerns regarding the international match calendar, including the number of games in a season, the frequency of back-to-back games, and international travel requirements. Additionally, they highlight the importance of closely monitoring player match workloads and implementing squad rotations and tailored training programs to mitigate injury risk.

333: ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND HEALTH-RELATED QUALITY OF LIFE AMONGST UNIVERSITY STUDENTS

Liske Kotze-Horstmann[1], Jake Popperwell[2], Wayne Derman[3]
Department of Exercise, Sport and Lifestyle Medicine , Stellenbosch University[1], Department of Exercise, Sport and Lifestyle Medicine , Stellenbosch University[2], Department of Exercise, Sport and Lifestyle Medicine , Stellenbosch University[3]
lmkotze@sun.ac.za

Background: Physical activity (PA) is associated with multi-domain health benefits within physical, psychological, and social facets. This study aimed to explore the relationship between PA domains of health-related quality of life (HRQoL) in a university student cohort, and to compare differences between men and women.
Methodology: This cross-sectional study sampled 1168 students from a Stellenbosch University in South Africa (n=483 men and n=685 women) who completed a self-report questionnaire entitled the MaRooN Health Passport. PA and sedentary behaviour were assessed using the International Physical Activity Questionnaire Short Form to quantify time spent in vigorous, moderate, and light PA (MET-min/week) and sitting time (h/day). PA data were categorised into low, moderate, or high PA categories. The HRQoL scores were assessed using the Short Form Health Related Quality of Life 36 question scale.
Results: Only 60.4% of students met the recommended PA guidelines. Men reported significantly higher total weekly PA than women (4266 vs. 2679 MET-min/week). Men reported significantly higher total HRQoL compared to women (78.4 vs. 76.8 units) and the highest scoring HRQoL domain was the role of physical limitations for men (95.9) and women (95.1). PA intensity positively correlated with total HRQoL score for both men and women ($p<0.001$). No correlation was found between sedentary behaviour and HRQoL. A high level of PA significantly predicted total HRQoL when performing separate gender analysis for men (Odds Ratio [95% CI]; 1.03 [1.00-1.05], $p<0.05$) and women (Odds Ratio [95% CI]; 1.03 [1.01-1.05], $p<0.01$).
Conclusion: South African university students present with high levels of PA and perceived HRQoL compared to previous literature. The relationship between PA and HRQoL is a dose-dependent response, with students participating in higher levels of PA presenting with the highest HRQoL score. Yet, 39.6% of students did not meet PA guidelines, and 28.5% spent 10 or more hours sitting. The university health

services should strive to promote higher levels of PA and reduce sitting time to benefit students' health and well-being, particularly in the current cohort.

126: BREAKING THE GLASS CEILING: A CASE OF FEMALE FOOTBALL COACHES AT VARSITY LEVEL

Thembisile Mbatha[1], Dr Natasha Janse van Rensburg[2]
University of Johannesburg, Department of Sport and Movement Studies[1], University of Johannesburg, Department of Sport and Movement Studies[2]
mbathathembi95@gmail.com

Background: While the number of female football spectators, teams and coaching staff is growing, it appears that the societal concept of women breaking the glass ceiling in football is gaining traction and making progress. Although the glass ceiling is portrayed as invisible, there are evident forces or barriers that hinder female coaches from progressing up the coaching ladder in sport. The commercialisation of Varsity Football forces universities to put more thought behind player recruitment and team management. Breaking the glass ceiling for female football coaches at the university level requires acknowledging and addressing the multifaceted barriers that exist. Such research could provide valuable insights into the strategies needed to support female coaches and promote gender equality at university-level sports coaching.
Methodology: This study made use of an exploratory case study design, utilising semi structured interviews to gather the personal experiences of five female coaching staff involved with male football teams during Varsity Football. Due to the small number of females working with male teams at university level as snowball sampling technique was deployed. Interviews were transcribed and analysed using a thematic process.
Results: The results included various challenges identified by the female coaching staff which included both professional (competition) and gender-specific (harassment). These challenges are viewed as barriers to career advancement. Furthermore, some results included personal experiences of females regarding their individual circumstances and some have access to a mentor while others felt isolated. Team dynamics especially those who only had male colleagues were also mentioned.
Conclusion: This case study contributed to the existing body of knowledge by providing valuable insight into the experiences of female football coaching staff working in male-dominated sport. Aspects such as lack of support, structured mentorship programmes and poor career guidance are factors which can assist with females breaking the glass ceiling in South African football. The women's right to choose which team, regardless of the teams' gender, should not be a limiting factor in career advancement, especially in football.

132: PHYSIOLOGICAL, PERFORMANCE AND PERCEPTUAL EFFECTS OF AN L-ARGININE AND L-CITRULLINE BEVERAGE PRIOR TO A REPEATED BOUT OF INTENSIVE RUNNING AMONG UNIVERSITY SOCCER PLAYERS

Siphamandla Nyawose[1], Rowena Naidoo[2], Nenad Naumovski[3], Andrew J. McKune[4]
Discipline of Biokinetics, Exercise, and Leisure Sciences, School of Health Sciences, University of KwaZulu Natal, Durban 4000, South Africa[1], Discipline of Biokinetics, Exercise, and Leisure Sciences, School of Health Sciences, University of KwaZulu Natal, Durban 4000, South Africa[2], Discipline of Nutrition and Dietetics, Faculty of Health, University of Canberra, Canberra, ACT 2601, Australia.

Functional Foods and Nutrition Research (FFNR) Laboratory, University of Canberra, Ngunnawal Country, ACT 2617, Australia. Department of Nutrition and Dietetics, Harokopio University, 17671 Athens, Greece. Research Institute for Sport and Exercise, University of Canberra, Canberra, ACT 2601, Australia[3], Discipline of Biokinetics, Exercise, and Leisure Sciences, School of Health Sciences, University of KwaZulu Natal, Durban 4000, South Africa. Functional Foods and Nutrition Research (FFNR) Laboratory, University of Canberra, Ngunnawal Country, ACT 2617, Australia. Discipline of Sport and Exercise Science, Faculty of Health, University of Canberra, Canberra, ACT 2601, Australia. Research Institute for Sport and Exercise, University of Canberra, Canberra, ACT 2601, Australia[4], nyawoses2@ukzn.ac.za

Background: L-arginine (L-Arg) and L-citrulline (L-Cit) are believed to enhance nitric oxide (NO) production, potentially boosting physical performance. Some studies reported L-Arg/L-Cit supplements improve time-trial performance in endurance runners and swimmers, reduce exercise-induced fatigue in taekwondo athletes, and increase cycling power in soccer players. However, results are inconsistent, with some studies reporting no performance benefits, likely due to endothelial nitric oxide synthase (eNOS) saturation at normal L-Arg levels. The efficacy of supplementing with L-Arg pathway under eNOS saturation conditions is documented, yet there remains a gap in understanding how L-Arg and L-Cit supplementation affects NO markers and exercise performance following an intense bout of exercise. This study aimed to determine the impact of a single equimolar dose of L-Arg and L-Cit in a beverage on total nitric oxide (NOx), physiological responses, performance, and perceived exertion during repeated high-intensity exercise in university soccer players.
Methodology: Thirty male soccer players participated in a randomised double-blind, placebo-controlled, parallel study. Participants performed two bouts of high-intensity running two hours apart. Forty minutes before the second bout, participants consumed a 500 mL beverage containing 6 g L-Arg and 6 g L-Cit (n=15) or placebo (n=15). Blood samples, about 5 mL were taken immediately before and after both bouts to measure NOx concentration.to determine NOx concentration.
Results: The L-Arg/L-Cit group showed a marginal 3.6% increase in NOx concentration, while placebo the placebo group decreased by 8.8%. There were no significant differences in physiological, performance, or perceptual variables between the groups. However, the peak oxygen uptake volume in the L-Arg/L-Cit group was significantly higher in the second bout compared to the first (54.92 ± 4.81 vs. 50.54 ± 9.22 mL/kg/min; p=0.01). Additionally, the time to exhaustion in the second bout increased by 8.5% (~60 seconds) for the L-Arg/L-Cit group.
Conclusion: Acute consumption of a beverage containing equimolar L-Arg and L-Cit did not significantly increase NOx levels but appeared to enhance aerobic metabolism during repeated high-intensity running in university soccer players

122: INJURY INCIDENCE AND BURDEN DURING SENIOR INTER-PROVINCIAL FIELD HOCKEY TOURNAMENTS

Mr. Nick Pereira[1], Professor Theresa Burgess[2], Dr. Lieselotte Corten[3]
Division of Physiotherapy, Faculty of Health Sciences, University of Cape Town, South Africa[1], Division of Physiotherapy, Faculty of Health Sciences, University of Cape Town, South Africa.Centre for Medical Ethics and Law, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa.[2], Division of Physiotherapy, School of Health Sciences, University of Brighton, United Kingdom[3]
nick@enhancedphysio.co.za

Background: Field hockey is an Olympic sport played internationally, with its own world cup in which South Africa is a participating nation. Few injury studies have been published on South African field hockey. Research efforts should increase within the sport to ensure safe participation and mitigate the inherent injury risks. The objective of the study was to attend the male and female inter-provincial field hockey tournaments in South Africa and determine: the incidence of injury and burden of acquired sport injuries (time loss and medical attention).
Methodology: A quantitative, descriptive, longitudinal study, including 133 females and 139 males, was conducted. Participants completed baseline questionnaires prior to the tournament and post-match questionnaires detailing injuries during the tournament.
Results: The recorded injuries were 77.9 (females) and 99.5 (males) per 1000 player match hours. Medical attention was 51.9 (females) and 70.3 (males) injuries per 1000 player match hours. Time loss injuries was 4.3 (females) and 7.5 (males) injuries per 1000 player match hours.
Conclusion: This was the largest observational study conducted in South Africa to date (at time of study). The international sporting body should establish a consensus for future research and the South African Hockey Association explore long term surveillance in South Africa to mimic similar national codes.

39: ACTIVE PROFESSIONAL MALE FOOTBALLERS DO NOT HAVE SIGNIFICANT NEUROCOGNITIVE FUNCTION DOMAINS AFFECTED, BUT ATTENTION DEFICITS AND IMPAIRMENTS ARE ASSOCIATED WITH CONCUSSION/S

Lervasen Pillay[1], Dina C. Janse van Rensburg[2], Steve den Hollander[3], Gopika Ramkilawon[4], Gino Kerkhoffs[5], Vincent Gouttebarge[6]
1. Amsterdam UMC location University of Amsterdam, Department of Orthopedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, The Netherlands[1]; Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[1, 2]; Football Players Worldwide (FIFPRO), Hoofddorp, the Netherlands[3]; Department of Statistics; University of Pretoria, Pretoria, South Africa[4]; Academic Center for Evidence-based Sports Medicine (ACES), Amsterdam, the Netherlands[5]; Amsterdam Collaboration on Health & Safety in Sports (ACHSS), IOC Research Center of Excellence, Amsterdam, the Netherlands[6]; Amsterdam Movement Sciences, Aging & Vitality, Musculoskeletal Health, Sports, Amsterdam, the Netherlands[5,6]
drpillay@absamail.co.za

Background: The literature fails to adequately report on (1) the neurocognitive function scores of active professional male footballers compared to the general population and (2) whether neurocognitive function domain deficits and impairment exist in the active professional male footballer. Most research on neurocognitive function in football focuses on its association with concussion or sub-concussive trauma in active and retired players. Our first objective was to determine neurocognitive function in active professional male footballers and whether deficits or impairments exist. Our second objective was to investigate the association between previous concussion(s) and neurocognitive function.
Methodology: An observational cross-sectional study was conducted via electronic questionnaires and distributed to consenting participants. The CNS Vital Signs online testing system was used to evaluate neurocognitive function. We collected demographic information and a history of concussion/s.
Results: Of the 101 participants (mean age of 26,5 years), 91 completed the neurocognitive function testing. Valid tests ranged between 77,2% - 90,1%. Neurocognitive function domain deficits or

impairments were Unlikely in 54,5% - 89,1%, Slight in 5,9% - 21,8%, Moderate in 1,0% - 9,9% and Likely in 4,0% - 14,9% of participants. A history of zero concussions found a significant association between the neurocognitive index (Odds Ratio [OR] 0,6; 95% CI 0,2-0,4) and complex attention domain (OR 0,3; 95% CI 0,1-0,9) with 40% and 70% less odds, respectively, of deficit or impairment. Amongst the 54,5% who reported any number of concussions, a significant association with the odds of neurocognitive domain deficits and impairments for complex attention (CA) [3,4 times more (OR 3,4; 95% CI 1,1-10,1)] and simple attention (SA) [3,1 times more (OR 3,1; 95% CI 1,0-9,3)]. There were no statistically significant associations between any of the number of concussions and neurocognitive function domain deficits or impairments (albeit increased in some).
Conclusion: In the active professional male footballer, most neurocognitive functions do not have significant deficits or impairments. The odds of neurocognitive function deficit or impairment were significantly increased threefold for CA and SA in those that reported a history of any concussion/s. The clinical impact on the increased odds in the likelihood of neurocognitive deficit or impairment should always be considered.

274: ANALYSING SOCCER PLAYERS' JUMPING DURING A DYNAMIC HEADING TASK

Itumeleng Rammusa[1], Darren-Lee Kwong[2], Andrew Green[3]
Sport and Movement Studies, University of Johannesburg[1], Sport and Movement Studies, University of Johannesburg[2], Sport and Movement Studies, University of Johannesburg[3]
itumelengrammusa@gmail.com

Background: Soccer players are prone to developing inter-limb strength imbalances in their lower extremities resulting from single-limb force production demands during cutting, pivoting, and dribbling manoeuvres. However, the presence of strength discrepancies in youth soccer players has not been extensively researched, with possible implications for force production limitations in jump performance during heading tasks. The aim of the study is to compare bilateral differences in jumping performance during standardised and task-dependent jumps in football players.
Methodology: A quantitative cross-sectional research study comprising a sample of 27 (height:172.8±5.1 cm, weight:64.5±5.2 kg, age:19.5±2.5 years) youth soccer players performed various jump tests. Specifically, countermovement jumps (CMJs) and a header task were performed. The CMJs were performed on dual force plates (1000Hz). Participants positioned each foot on a plate, squatted into approximately 90° of knee flexion, and then promptly attempted to jump for maximum height (full extension of the hip, knee, and ankle joints). Participants performed a 5.5-meter run-up (self-regulated speed) in an attempt to head a tripod-suspended soccer ball (1 meter above their standing height). The two force plates were placed in parallel (anterior and posterior to the tripod), at a pre-determined distance obtained from individualised pilot jump attempts. Participants were instructed to execute a maximal single leg take-off, landing bilaterally on a second force plate (3 trials per limb). Kinetic measures of peak concentric force (CMJ) and peak take-off force (heading task) were respectively analysed for inter-limb differences using paired t-test comparisons computed in SPSS ($p<.05$).
Results: No statistically significant differences were noted for the CMJ concentric peak force in the right (713.4± 66.1 N) and left (710.9±68.5 N) limbs. Similarly, the heading task take-off force showed no notable differences in right (2260.1± 378.9 N) and left (2356.5± 502.1.N) limbs.

Conclusion: The absence of discrepancies between the right and left legs may be due to athletes' insufficient soccer experience or proper training, resulting in effective neuromuscular coordination and muscle adaptations, resulting in constant force output throughout movement phases.

249: MENTAL HEALTH ASSESSMENT AND MONITORING TOOLS USED IN ELITE ATHLETES WITH AND WITHOUT DISABILITIES: A SYSTEMATIC REVIEW

Helene van der Hoven[1], Phoebe Runciman[2], Kristina Fagher[3], Wayne Derman[4], Maaike Eken[5]
Institute of Sport and Exercise Medicine, Department of Sport Science, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa[1], Institute of Sport and Exercise Medicine, Department of Sport Science, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa[2], Rehabilitation Medicine Research Group, Lund University, Sweden [3], Institute of Sport and Exercise Medicine, Department of Sport Science, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa; South Africa IOC Research Centre[4], Institute of Sport and Exercise Medicine, Department of Sport Science, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa[5]
helene@capeboneandjoint.com

Background: Background: Protecting the mental health of elite athletes is important. Mental health and physical health both influence athletes' well-being, performance, injury-risk and recovery and therefore should be assessed collectively. Recent International Olympic Committee (IOC) recommendations towards comprehensive illness surveillance in elite athletes include mental health assessment.
Methodology: Objective: The aim of this study is to systematically review existing literature on measurement tools, including their measurement properties, used to assess mental health in elite athletes with and without disability.
Design: A systematic review was conducted in two phases. In phase one literature was reviewed to identify measurement tools used to assess mental health in elite athletes. Subsequently, in phase two measurement properties of these identified tools were systematically reviewed.
Data sources: PubMed, EbscoHost-CINAHL, EbscoHost-Academic Search Premier, Web of Science, PsycINFO and SCOPUS.
Eligibility criteria: Articles that report on 1) the use, development and/or evaluation of mental health tools in elite sport, 2) mental health screening, assessment done at any point during an athletic career, and 3) self-reported and/or physician diagnosed (ICD10,11 and DSM-III, IV, V) mental health concerns in elite athletes, were included.
Results: Screening identified 34 studies, of which 40% were conducted among collegiate athletes (n = 13; 39%). Most studies included athletes without disability (n = 16; 48%) and/or did not specify athlete ability (n = 14; 42%). Less than half of studies reported on the 1) assessment (n = 11; 33%), development (n = 3; 9%) and 3) measurement properties (n = 14; 42%), including reliability (n = 9; 27%); validity (n = 11; 33%); feasibility (n = 1; 3%) of mental health measurement tools used in elite athletes.
Discussion: The findings of this study indicate that evidence regarding the assessment, development and measurement properties of mental health measurement tools used in elite athletes is limited, especially among non-collegiate elite athletes and athletes with disability. Further research is required to optimize choices, development, translation and adaptation of measurement tools used when looking after the mental health of elite athletes.

Keywords: Elite athletes, measurement properties, mental health assessment tools, Review
PROSPERO registration number CRD42023468178

251: ANALYSING THE SPORTS SCIENCE CURRICULUM IN SOUTH AFRICAN UNIVERSITIES: A SAQA DOCUMENT REVIEW

Cheryl-Ann Volkwyn[1], Prof Andrew Green[2], Dr Lynn Smith[3]
University of Johannesburg[1, 2, 3]
cherylv@uj.ac.za

Background: Though pivotal for athlete performance, South Africa lacks a regulatory body for sports science. This gap poses risks to athletes and the integrity of sports science, confusing sports science qualifications' identities and jurisdiction. Establishing core study components can help form standards nationally and internationally as regulatory bodies ensure training consistency and quality control.
Methodology: The study's first phase begins with a thorough document content analysis, employing inductive and deductive approaches, presented as preliminary findings. Inductive analysis involves categorising regulatory policies and governing systems within the sports science domain and identifying themes and subthemes among documents. The deductive analysis follows, aligning themes with research aims and questions and creating an overarching framework.
Results: In this study, twelve South African universities offering sports science qualifications were included, and inductive content analysis examined 20 SAQA documents, providing insights into the standard of sports science qualifications. The inclusion criteria consisted of currently registered sports science qualifications governed by the National Qualifications Framework (NQF), establishing educational quality and consistency. The various SAQA documents served as the primary sources for analysis. From the documents analysed (n = 20), there are two diploma courses, seven Bachelor of Science and Bachelor of Arts qualifications, one Bachelor of Health Science, and ten honours qualifications. Through inductive analysis, common recurring themes such as teaching and learning, academic objectives and standards, professional development and employability, multifaceted collaboration, scientific practices, and assessment methods were identified in the registered qualifications' design, structure, and content. The subthemes showed similarities in learning outcomes, curriculum components, and assessment methods.
Conclusion: While these findings are preliminary, they allow for the development of a control sheet consisting of all coded themes and subthemes for deductive analysis. This control sheet would serve as a reference for creating a framework to define the standard of sports science qualifications in South Africa.

102: POSITIONAL COMPARISONS IN ANTHROPOMETRY AND PHYSICAL FITNESS CHARACTERISTICS OF ETHIOPIAN UNDER 17 MALE SOCCER PLAYERS: A NATIONWIDE CROSS-SECTIONAL STUDY

Leyekun Tadesse[1], Johan van Heerden[2]
PhD in Sport Science School of Health Science, University of Kwazulu-Natal, Durban, Republic of South Africa[1], School Academic Leader: Research School of Health Sciences Department of Biokinetics, Exercise and Leisure Sciences (Sport Science) School of Health Science, University of Kwazulu-Natal, Durban, Republic of South Africa[2]
leyetad@gmail.com

Background: Profiling of soccer players for the youth development program in Ethiopia has been left to coaches subjective and preconceived judgement of the players. This has resulted stagnation of talent development. The purpose of the study was to determine the anthropometric and physical fitness characteristics of young players (N=400; 15–17 years) in the Ethiopian male youth soccer development program, according to their playing positions.
Methodology: The purpose of the study was to determine the anthropometric and physical fitness characteristics of young players (N=400; 15–17 years) in the Ethiopian male youth soccer development program, according to their playing positions.
Results: There is a significant difference in their anthropometric and fitness results among the different players' position. However, the major difference came from the goalkeepers as they were found to be the tallest (mean=1.69 SD=0.09) and heaviest (mean=55.31, SD=9.74), presenting the highest percentage of muscle (mean=48.84, SD=9.17) and lower value of fat mass (mean=3.66,SD=0.89). They were the best performers in agility test (mean=17.47, SD=0.86) and vertical jump test (mean=46.69, SD=9.04), but their aerobic capacity (mean=46.03, SD=4.01) and spirting test was the lowest (mean=6.50, SD=0.57).
Conclusion: The study concluded that football coaches should be given specific training to each position in some training sessions to enhance their performance as well as perform regular anthropometric measures and physical fitness tests for players as part of an integrated system of the coaching process to identify and assign player positions.

91: THE DEVELOPMENT OF A QUESTIONNAIRE TO ASSESS TRAINING AND MATCH DEMAND IN ADOLESCENT CRICKETERS

Nico Grobler[1], Benita Olivier[2], Sean Kaplan[3]
Wits Cricket Research Hub for Science, Medicine and Rehabilitation, Department of Physiotherapy, School of Therapeutic Sciences, Faculty of Health Sciences, University of the Witwatersrand,[1], Wits Cricket Research Hub for Science, Medicine and Rehabilitation, Department of Physiotherapy, School of Therapeutic Sciences, Faculty of Health Sciences, University of the Witwatersrand,[2], Wits Cricket Research Hub for Science, Medicine and Rehabilitation, Department of Physiotherapy, School of Therapeutic Sciences, Faculty of Health Sciences, University of the Witwatersrand,[3]
nicogrobler23@gmail.com

Background: Recording training and match demand in adolescent sports is essential in preventing overtraining and injuries while ensuring optimal performance and well-being. The study aimed to develop a valid and reliable questionnaire that would measure the training and match the demands of adolescent cricketers.
Methodology: In Study 1, the content validity of the training and match demand questionnaire was measured using the content validity index, while the reliability was measured using Kendall's coefficient of concordance (Kendall' W). In Study 2, a pilot study was performed using the questionnaire developed in Study 1. Daily training and match demand for all activities done in cricket (i.e., bowling, batting, fielding, strength and conditioning) and any other sport or activities were recorded in 17 adolescent cricketers. Acute: Chronic workload ratios (ACWR) were determined for all activities.
Results: The developed questionnaire was deemed valid (I-CVI score of 0.83) and reliable (Kendall's W score of 0.63). Over the 7-week period, some spikes in the acute training and match demand were observed. However, the overall ACWR was within the norms (0.8-1.3). Bowling reported an average

ACWR of 0.91; other sports reported the highest average of 1.08, while the average for all activities combined was 0.92.
Conclusion: The questionnaire measured the training and match demand of the cricketer over time and can be used as a valuable tool in future research and practice in adolescent cricket

157: A PRELIMINARY INVESTIGATION COMPARING INJURIES IN PADEL, TENNIS AND SQUASH PLAYERS

Caeleigh King[1], Lynn Smith[2], Heather Morris-Eyton[3]
University of Johannesburg[1], University of Johannesburg[2], University of Johannesburg[3]
cking@uj.ac.za

Background: Paddle tennis (referred to as padel) originated in Mexico in the 1960's, is played in over 90 countries, has a professional circuit (The World Padel Tour) and is regulated by the International Padel Federation (FIP). In comparison tennis and squash are traced back to the 12th and 16th century in France, respectively. All three sports involve repeated changes of direction, rapid acceleration, deceleration (increased eccentric load) over short distances requiring speed, agility, and power utilising both the aerobic and anaerobic metabolic pathways. These sports are asymmetrical and involve repetitive manoeuvres resulting in muscle imbalances, strength and flexibility differences which increase the risk of injury. Padel emerged in South Africa during 2020, and as such the injury prevalence and injury risks are unknown. The purpose of this study is to determine the injury prevalence, risk, and differences in amateur padel, tennis, and squash players.
Methodology: The preliminary study was a quantitative, descriptive, and cross-sectional design. An online Google Forms questionnaire collected data from padel, tennis, and squash athletes to determine injury prevalence, risk, and differences between these sports.
Results: Preliminary results from 123 respondents (39 females, 84 males), reported one injury (24,4%), two injuries (14,6%) and three or more injuries (13%) in the past year (2023). The area of the body most injured was the knee (34.4%), followed by the elbow (25%), calf (18.8%), ankle and shoulder (both 15.6%). Most respondents play padel, tennis or squash two days a week and for more than four hours. The most common types of injuries reported were muscular injuries (56.3%), ligament injuries (37.5%) and tendon injuries (34.4%) with 78.1% of all injuries caused by non-impact events.
Conclusion: The preliminary results indicate that 52% of athletes that play padel, tennis or squash reported one or more injuries during 2023. Due to the popularity of padel, investigating the prevalence and injury risk factors compared to tennis and squash, could assist health care practitioners in responding to padel injuries and their prevention.

112: HEALTH CONDITIONS AMONG RETIRED ELITE RUGBY PLAYERS: A SCOPING REVIEW

Johan le Roux[1], Flo Anema[2], Dina Christa Janse van Rensburg[3], Gino Kerkhoffs[4], Vincent Gouttebarge[5]
Amsterdam UMC location University of Amsterdam, Department of Orthopedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, Netherlands[1], Amsterdam UMC location University of Amsterdam, Department of Orthopedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, Netherlands[2], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[3], Amsterdam UMC location University of Amsterdam, Department of Orthopedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, Netherlands[4], Amsterdam UMC location University

of Amsterdam, Department of Orthopedic Surgery and Sports Medicine, Meibergdreef 9, Amsterdam, Netherlands[5]
johanler13@gmail.com

Background: Rugby players experience various physical and psychological problems during their playing days and after retiring. Identifying the nature and extent of available research evidence on the prevalence of health conditions in retired elite male and female rugby players is essential in understanding their health challenges and needs related to post sport care. This scoping review presents an overview of the existing epidemiological evidence in retired male and female elite rugby players regarding the prevalence rates of musculoskeletal, cardiovascular, neurocognitive, psychological and gynaecological health conditions.
Methodology: A systematic search was carried out across MEDLINE, SPORTDiscus, PsycINFO, and EMBASE for musculoskeletal, cardiovascular, neurocognitive, and psychological health conditions in retired elite male and female rugby players and gynaecological health conditions in retired female rugby players. Primary research studies describing the prevalence rates of health conditions in retired elite male and female rugby players written in English, Dutch or French and with full text available online were included.
Results: Five hundred and seventy-three citations were originally identified and 16 studies were ultimately included in our review. No studies on health conditions in retired elite female rugby players were found. Four individual studies showed there was a significant higher prevalence rate of osteoarthritis in retired elite male rugby players compared with control groups. Various neurocognitive health conditions were investigated and showed, among others, a prevalence rate of 57% for mild cognitive disorder. The prevalence of self-reported depression and hazardous alcohol use in retired elite male rugby players was significantly higher than in control groups matched for age and education.
Conclusion: This was the first scoping review to present the prevalence of health conditions in retired elite rugby players. No studies on health conditions in elite female retired rugby players were found. Our review found relatively high prevalence rates of musculoskeletal health conditions such as OA and psychological health conditions such as depression and hazardous alcohol use in retired elite male rugby players. More research needs to be conducted to understand better the health conditions of retired elite rugby players, especially among retired female players. More support should also be made available to this population.

296: BRAINWAVE ACTIVITY LOCALISATION, MOOD SYMPTOMS AND BALANCE IMPAIRMENT IN A MALE SOUTH AFRICAN RUGBY PLAYER WITH PERSISTING SYMPTOMS AFTER CONCUSSION: A CASE REPORT

Michael Lumb[1], Nadja Snegireva[2], Andre Coetzee[3], Karen Welman[4]
Division of Movement Science & Exercise Therapy, The Movement Laboratory, Department of Exercise, Sport & Lifestyle Medicine, Faculty of Medicine and Health Sciences, University of Stellenbosch[1, 2, 3, 4]
michaeljameslumb@gmail.com

Background: Persisting symptoms after concussion (PSaC) pose a challenge in clinical management, often indicating underlying pathophysiological changes/sequalae. This case report explores brainwave activity localisation in a rugby player with PSaC and mood symptoms during motor tasks by utilising novel mobile electroencephalography (EEG) and quantitative EEG (qEEG) analysis.

Methodology: A professional (3 years professional) male rugby player (21 years-old) who plays in the position of flank presented with PSaC, mood symptoms (depressive moods and anxiety-like symptoms) as well as fatigue symptoms after suffering multiple (four diagnosed) sports-related concussions (SRC) with the most recent occurring approximately 13 months prior to the date of testing. Mobile EEG testing and qEEG analysis were conducted to identify regions of significant neuronal activity during balance tasks in the form of the Balance Error Scoring System (BESS).
Results: Notable neuronal activity in the frontal, parietal, and occipital brain regions during balance tasks were revealed. Mood and fatigue symptoms were still present, despite substantial time having elapsed since the most recent concussion.
Conclusion: A potential need exists for more thorough communication and testing procedures that screen for mood symptoms and provide an opportunity for male athletes to discuss their mental health after suffering with an SRC. qEEG techniques display potential in providing better understanding of brain activity in athletes experiencing PSaC with mood symptoms.

288: THE BATTING BACKLIFT TECHNIQUE AMONG PROFESSIONAL FEMALE CRICKET PLAYERS

Ammaarah Patel[1], Habib Noorbhai[2]
BEAHT Research Centre, Faculty of Health Sciences, University of Johannesburg, South Africa[1], BEAHT Research Centre, Faculty of Health Sciences, University of Johannesburg, South Africa[2]
habibn@uj.ac.za
Background: Studies on the cricket batting technique have been established in detail among male players. There is currently a knowledge gap regarding the batting backlift technique (BBT) among professional female cricket players. This study aimed to investigate and obtain an understanding of the BBT among female cricket players.
Methodology: This study employed a cross-sectional study design comprising professional South African players (PP; n = 18) as well as successful international players (IP; n = 34). Successful IP were identified based on their highest batting averages. Video analysis of PP was captured using high speed video cameras (JVC GC-PX100 measured at 250-255 fps), whereas existing (public) video footage was utilised for IP video analysis. Video analysis of the PP was conducted using Kinovea (Kinovea (Version 0.8.15, 2023.1). Additionally, relevant data from the StanceBeam Bat Sensor (StanceBeam Performance Analytics Solutions, 2017) was obtained for the PP group. This data includes maximum and average values of bat speed, impact speed and power; as well as additional average values of time to impact, downswing angles and follow-through angles. Descriptive and inferential statistical analysis were computed for these variables using SPSS (Version 27, IBM). Level of significance was set at $p<0.05$.
Results: The main finding of this study demonstrated that most of the female PP used the lateral batting back lift technique (LBBT) (63.4% n =33). From the PP group, 55.5% (n = 10) had a high back lift angle during their vertical shots, and 94.4% (n = 17) had a bat face angle that was open towards the offside. In the IP group, LBBT batters (80%) that had a high batting average of 45 or more, whereas highest average runs scored above 3500 (n = 12) consisted of 58% of the LBBT batters.
Conclusion: This was the first research study to determine the BBT among female cricket players using a marker-less motion capture tool (i.e. StanceBeam). The findings from this study suggest key LBBT components attributing to potential batting success among female cricket batters. Due to the limited sample size and the limitations of two-dimensional (2D) video capture and analysis (for the IP group), future research, integrating marker-based motion capture is required.

252: IS A NEUROMUSCULAR TRAINING WARM-UP ENOUGH FOR HIGH SCHOOL FEMALE RUGBY PLAYERS? A MULTIFACETED APPROACH TO INJURY PREVENTION MAY BE NEEDED

Isla J. Shill, MSc[1-4], Carla van den Berg, MSc[1,5], Stephen W. West, PhD[1,6,7], Jean-Michel Galarneau[1], Kristina Fraser[1], Kathryn J. Schneider[1,2,4,8], Kati Pasanen[1,2,5,9], Ian Pike[10,11], Debbie Palmer[7,12], Keith A. Stokes[6,7,13], Brent E. Hagel[1-3,14,15], Carolyn A. Emery[1-4,14,15].
Sport Injury Prevention Research Centre, Faculty of Kinesiology, University of Calgary, Calgary, Alberta, Canada[1]; Alberta Children's Hospital Research Institute, University of Calgary, Calgary, Alberta, Canada[2]; O'Brien Institute for Public Health, University of Calgary, Calgary, Alberta, Canada[3]; Hotchkiss Brain Institute, University of Calgary, Calgary, Alberta, Canada[4]; Human Performance Laboratory, Faculty of Kinesiology, University of Calgary, Calgary, Canada[5]; Centre for Health, and Injury & Illness Prevention in Sport, Department of Health, University of Bath, Bath, UK[6]; UK Collaborating Centre on Injury and Illness Prevention in Sport, UK[7]; Sport Medicine Centre, Faculty of Kinesiology, University of Calgary, Calgary, Alberta, Canada[8]; Integrative Neuromuscular Sport Performance Laboratory, Faculty of Kinesiology, University of Calgary, Canada[9]; Department of Pediatrics, Faculty of Medicine, The University of British Columbia, Canada[10]; BC Injury Research and Prevention Unit, BC Children's Hospital Research Institute, Canada[11]; Edinburgh Sports Medicine Research Network, Institute for Sport, PE and Health Sciences, University of Edinburgh, UK[12]; Rugby Football Union, UK[13]; Department of Community Health Sciences, Cumming School of Medicine, University of Calgary, Canada[14]; Department of Pediatrics, Cumming School of Medicine, University of Calgary, Canada[15]

Background: Concussion rates of 37.5 concussions/1000 match-hours was estimated in a female high school rugby union ("rugby"), which is reported to be the highest concussion rate reported in youth rugby to date. A rugby-specific neuromuscular training (NMT) warm-up reduced match-concussion 59% when used ≥3 times per week in English schoolboy rugby, making it a potential concussion prevention solution for girls.
Objectives: To evaluate the effectiveness of a rugby-specific NMT warm-up aimed at reducing injury rates in Canadian high school female rugby.
Methods: A quasi-experimental study was used to compare concussions across two Calgary, Canada high school female rugby cohorts (control seasons 2018, 2019; intervention seasons 2022, 2023) using validated injury surveillance methodology. Coaches attended a rugby-specific NMT warm-up workshop before the 2022 and 2023 high school rugby seasons and tracked program use throughout the season. The primary outcome was match injury and suspected concussion. A secondary outcome included match injury burden (# day time-loss/1000 match-hours). Multilevel Poisson regression was used to estimate incidence rate ratios (IRRs) with 95% confidence intervals (95% CI) comparing intervention cohorts with control cohorts, adjusted for injury history and previous rugby playing experience, offset by match-hours and random effects (team and individual level).
Results: Participants included 892 female high school rugby player-seasons from 30 teams (control seasons: 13 teams 409 player-season; intervention seasons: 9 teams 483 player-seasons). Three-hundred-seventy-six match injuries were reported. Concussions accounted for 41% (62/150) of match-injuries in control seasons and 31% (70/226) of match-injuries in intervention seasons. An intention-to-treat analysis comparing intervention with control seasons for match injury produced an adjusted IRR of 0.97 (95% CI 0.74-1.29) and an adjusted IRR of 0.76 (95% CI 0.50-1.15) for match concussion. The mean difference in burden between control and intervention cohorts for all match injury was -36 (95% CI -56, -7; p-value=0.010) day time-loss/1000 match-hours. There was a significant reduction in match-related

burden of head injuries (head burden mean difference: -194, 95% CI -222, -166, p-value=0.000) between control and intervention cohorts.
Conclusion: While no significant difference in match injury or concussion rates in the intervention and control seasons, there was a clinically relevant 26% lower match-concussion and a suggested reduction in match injury burden with an NMT warm-up intervention. The current NMT warm-up shows promise, but should be considered through a multifaceted approach, which could include tackle-training and/or law variations (*e.g.*, lowering the tackle height) in female youth rugby.

62: CRICKET INJURY PREVENTION STRATEGIES IMPLEMENTED AT HIGH SCHOOL LEVEL IN MAKHANDA, EASTERN CAPE PROVINCE, SOUTH AFRICA

Mohammed Sonday[1]
Physiotherapist[1]
info@msondayphysio.co.za
Background: Cricket players continue to experience a wide range of injuries associated with this sport, which implicates their performance abilities and affects their professional careers. A lot of research has been conducted and implemented on elite cricket players with less attention on adolescent cricketers. This study investigated cricket-related injuries and prevention strategies for them, amongst adolescent cricketers in South Africa.
Methodology: The study was conducted across four high schools in the Eastern Cape, South Africa. Participants sampled in the study were players and coaches involved in cricket between grades eight to twelve. Forty four players and thirteen coaches participated in the study. Quantitative research design method was used and data collection process was done online. The questionnaires got information of the participants' injury prevention strategies, awareness and experiences of common injuries in cricket.
Results: Amongst forty four cricket players in this study, 77.3% of players had experienced cricket-related injuries. The most common affected sites of injuries were the lower back (31.8%), hip/groin (18.2%), ankle/calf (13.6%) and knee (13.6%). Amongst thirteen coaches in this study, 76.9% are implementing pre-season programs with 69.2% further implementing strength and conditioning training programs. Both core strength and upper limb strength training programs are being implemented by 60.5% of players, while flexibility/stretching training was implemented by 69.8% of players.
Conclusion: The most common injuries sustained in adolescent cricketers was found to be the lower back and lower limb regions. Coaches were found to be involved in the implementation of basic prevention strategies for their players throughout the season. Players who implemented weekly flexibility/stretching training had a reduced incidence of lower limb injuries. While the players who had implemented a regular core/abdominal strength program, showed a reduction in incidence of low back pain injuries.

125: RUGBY UNION AND STRENGTH AND CONDITIONING COACHES' PERSPECTIVES AND PRACTICES ON VISUAL AND AUDITORY SKILLS TRAINING

Michael Turner[1], Matthew Bonnesse[2], Aayesha Kholvadia[3]
Health Science, Nelson Mandela University[1], Health Science, Nelson Mandela University[2], Health Science, Nelson Mandela Univeristy[3]
s217295800@mandela.ac.za

Background: Rugby Union (RU) is a high intensity contact sport, popular around the world, incorporating running, passing, physical collisions, and prompt decisions, designed to outscore opponents. Visual (VS) and auditory skills (AS) in RU are vital for players to make correct decisions based on what they see and hear to perform to the best of their ability but there has been limited research on these perceptual skills in sport.
Methodology: This study aimed to explore and describe RU and SC coaches' visual and auditory training perspectives and practices. This was a quantitative and explorative research method which used a descriptive survey design. The study employed purposive and snowball sampling. The sample included male RU and SC coaches, who have at least two years minimum experience within the field and are still actively coaching. The survey was posted on the national SC coaches WhatsApp group and consisted of 6 sections and 24 questions. The survey was piloted on subjects within the same field.
Results: The survey a significant responses consisted of strength and conditioning coaches ($p<0.05$), where 50% were national strength and conditioning coaches. Furthermore, half of the responses the participant was accredited with World Rugby Level 3 Strength and Conditioning. The results indicated that the participants assess players visual and auditory skills regularly ($p<0.05$), however, for both training of visual and auditory skills, participants had different opinions on how to train these skills, 25% did not train the two skills, 25% trained the skills through team based training, 25% trained the skills through specialized training and lastly 25% trained the skills through individual training.
Conclusion: This study has shown that rugby union and strength and conditioning coaches, regularly assess visual and auditory skills of players. Khanal (2015) discussed that elite athletes process perceptual information far better than their ordinary counterparts. However, coaches and strength and conditioning coaches do not share similar thoughts on how to train these skills, particularly auditory skill. This study has shown the gap of training perceptual skills in rugby union and therefore future studies could consider how to effectively train these skills within a strength and conditioning environment.

166: EXPLORING PREHABILITATION AS A TREATMENT MODALITY FOR BIOKINETICISTS IN THE ORTHOPAEDIC LANDSCAPE

Jhana Barnard[1], Ranel Venter[2], Deborah Skinstad[3], Elbé De Villiers[4]
Division of Sport Science, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa[1], Division of Sport Science, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[2], Division of Movement Science and Exercise Therapy, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa.[3], Registered Biokineticist, Sharks Rugby[4]
jhana.barnard2@gmail.com

Background: Biokinetics is a nationally recognized South African Health Profession, with movement and exercise as primary treatment modalities. Biokineticists treat patients with chronic diseases and musculoskeletal injuries through therapeutic exercise prescription and promote exercise as a modality to improve quality of life and overall well-being. The scope of the profession is broad. However, the perceptions of the scope of practice are narrow, specifically among medical health care professionals in the area of orthopaedics and prehabilitation. There is a gap in literature and current clinical practice regarding prehabilitation as a treatment modality for patients presenting with orthopaedic

impairments. It is therefore understood that the profession of Biokinetics is underutilized, as medical professionals are not referring patients with orthopaedic impairments to biokineticists for prehabilitation. The emphasis of the current Biokinetics scope within the orthopaedic referral network is rehabilitation, known as the final phase focus.
Methodology: This qualitative research study explores the perceptions of prehabilitation as a treatment modality in patients with orthopaedic impairments among health care practitioners, specifically orthopaedic surgeons and biokineticists. A basic qualitative research approach is employed to generate overarching themes related to the research questions. Semi-structured interviews are used as the primary instrument of data collection. A purposive sampling strategy is used to identify participants for the study. Maximum variation sampling, a strategy within purposive sampling, is applied to ensure sufficient variance is present in the sample size. Through this strategy two groups of participants are identified and selected, namely orthopaedic surgeons and biokineticists. This sampling strategy helps to broaden the understanding of the perceptions of prehabilitation as a treatment modality in patients with orthopaedic impairments. The study aims to determine if prehabilitation is presented as a treatment modality for orthopaedic patients and to explore the reasons behind the current emphasis on rehabilitation over prehabilitation within the orthopaedic referral network.
Results: In process of data collection. Some preliminary results could be presented.
Conclusion: Through the findings of this study, we hope to add gravity to the broader capacity of the Biokinetics scope in facilitating the prehabilitation process in the current orthopaedic landscape.

150: ATTITUDES AND PERCEPTIONS OF SCHOOL-RELATED PHYSICAL ACTIVITY AND PHYSICAL EDUCATION

Maria Vittoria Caporossi Cugildi[1], Candice J Christie[2]
Department of Human Kinetics and Ergonomics, Rhodes University[1], Department of Human Kinetics and Ergonomics, Rhodes University[2]
mariavcaporossi48@gmail.com

Background: Physical Activity is widely recognized for its numerous benefits. Despite this knowledge, approximately one in ten children globally are overweight, and many are obese. A physically active lifestyle, essential in combating obesity, can be effectively promoted through well-designed physical education programmes. Physical education has the potential to provide students with positive experiences of physical activity. Research indicates that students' perceptions of physical education are mixed, with negative experiences increasing with age. Various factors contribute to physical inactivity, ranging from the individual to broader global factors. The Eastern Cape, South Africa, is a region previously characterized by low physical activity participation. Studies on high school students' perspectives of school-related physical activity in the Eastern Cape are scarce. This study aims to determine the scholars' perceptions and attitudes toward school-related physical activity and the physical education curriculum.
Methodology: This study used a cross-sectional design to investigate factors influencing the attitudes and perceptions toward physical activity in high school students. A quantitative research design was adopted and used adapted questionnaires. The adapted questionnaires investigated individual factors (demographic, intrapersonal, and biological factors), microsystem factors (environment and interpersonal factors), mesosystem factors (communication and coordination), and exosystemic factors (external influences). Additionally, information regarding the macrosystem (regional/national policies)

and chronosystem were included. The adapted questionnaires were based on, and influenced by, Bronfenbrenner's Socio-Ecological Model, the International Physical Activity Questionnaire and the Questionnaire Assessing School Physical Activity Environment (Robertson-Wilson, Lévesque, and Holden, 2007).
Results: The data collection stage is currently underway. The questionnaires close at the end of June 2024, whereafter, the data will be analysed and interpreted. The full abstract, including the findings, will be presented at the congress. The findings provide insight into the current state of the Physical Education curriculum and physical activity levels in an Eastern Cape adolescent population. Furthermore, the findings of this study can potentially aid in improvements in curriculum and policy to foster a more active and healthier youth population.
Conclusion: The full abstract, including the conclusion, will be presented at the congress.

177: AN AUDIT OF SPORT NUTRITION SERVICES WITHIN MALE AND FEMALE INTERNATIONAL RUGBY UNION: IMPLICATIONS FOR RESEARCH AND PRACTICE

Dr Nessan Costello[1], Mrs Lara Wilson[2], Professor Susan Backhouse[3], Professor Ben Jones[4]
Leeds Beckett University[1], Leeds Beckett University[2], Leeds Beckett University[3], Leeds Beckett University[4]
n.costello@leedsbeckett.ac.uk

Background: Sports nutrition practitioners in international rugby are crucial for athlete health and performance by providing high-quality nutrition services. Despite the recognized importance of nutrition in rugby, detailed research on the services provided to players is lacking. Further understanding into the roles, responsibilities, and challenges of nutrition practitioners is essential to enhance support for these professionals and the athletes they serve. Therefore, this study aimed to evaluate the sports nutrition services available to international rugby players and explore disparities in nutritional support provided to male versus female players.
Methodology: In a cross-sectional research design, sixteen international rugby unions, including seven female and five male top 10 world-ranked teams, were purposefully recruited to complete a closed survey between December 1, 2020, and February 2, 2022.
Results: Twelve unions employed accredited nutrition practitioners with significant experience (over five years: n=5; over ten years: n=4) and advanced qualifications (master's degrees: n=8; doctorates: n=2). Three unions did not employ a qualified nutrition practitioner (female: n=2; male: n=1). Full-time employment was more common among practitioners serving male unions (n=4/5) than female unions (n=3/6). Practitioners dedicated more hours per week to male unions (42 ± 28) compared to female unions (24 ± 20). They were involved in sport science meetings (n=14/15), anti-doping education, menu design, strategy development (n=13/15), body composition assessments, and individual consultations (n=12/15), focusing on fuelling, recovery, and injury rehabilitation (n=14/15). Participants were "moderately confident" (n=8/15) in using behaviour change techniques. Most agreed on the lack of female-specific nutrition guidance (n=14/15), often relying on male player guidance due to limited evidence (n=7/9).
Conclusion: This study provides the first critical reflection of sports nutrition service delivery within international rugby. The findings highlight gender disparities for female players, with reduced applied support and a lack of female-specific guidelines. Recommendations include enhancing practitioner

training in behaviour change, hiring qualified nutritionists, deemphasizing body composition assessments, and conducting more research to improve nutrition services, especially for women.

180: SOUTH AFRICAN COACHES AND SPORT MANAGERS' VIEWS OF SPORTS PARTICIPATION IN ATHLETES WITH DISABILITIES DURING COVID-19

Khulekani Pacificus Dlamini[1], Rowena Naidoo[2], Verusia Chetty[3]
Discipline of Biokinetics, Exercise, and Leisure Sciences, University of KwaZulu-Natal, Westville, South Africa[1], Discipline of Biokinetics, Exercise, and Leisure Sciences, University of KwaZulu-Natal, Westville, South Africa[2], Discipline of Physiotherapy, University of KwaZulu-Natal, Westville, South Africa[3]
dlaminik3@ukzn.ac.za

Background: There is a critical knowledge gap concerning the state of sports participation among athletes with disabilities in KwaZulu-Natal (KZN) during the COVID-19 pandemic. The objective of this study was to explore the experiences of South African coaches and managers in guiding sports participation in athletes with disabilities during the COVID-19 pandemic and could be implemented in future pandemics.
Methodology: A qualitative approach in the form of semi-structured interviews was used to explore the attitudes and opinions of four coaches and three managers (n=7) in the preceding context. Data were analyzed using themes, sub-themes and illustrative quotes reflective of what participants would like policymakers to be aware of concerning sports participation and its optimization, among athletes with disabilities, during the global pandemic. Ethical clearance was obtained for this study from the University committee (HSSREC/00002884/2021).
Results: The main extrinsic barriers were related to social limitations; coaching; sports participation; lockdown; and sponsorship. Intrinsic barriers highlight adversity; frustration; attitude; mortality; and inadequate knowledge. Coaches and managers optimized sports participation in athletes with disabilities during the COVID-19 pandemic by using six facilitatory factors namely, optimization plans; sports participation; passion for sport; experience; motivation; and family support.
Conclusion: Several factors emanated from interviews with coaches and managers, and these were economic; sports interests; special needs; policies; perceptions; coaches' networks; and health experts. These factors impacted directedly on disabled athletes directly during COVID-19, and their impact should be considered for future pandemics.

307: A BIOKINETICS SPORTS INJURY PREVENTION MODEL: LESSONS LEARNED FROM LONG-DISTANCE RUNNING AND RUGBY

Simone Ferreira[1], Leon Lategan[2], Evert Verhagen[3]
University of Johannesburg, Department of Sport and Movement Studies[1], University of Johannesburg, Department of Sport and Movement Studies[2], Amsterdam UMC, Department of Public and Occupational Health[3]
simonef@uj.ac.za

Background: Participation in physical activity is crucial for maintaining health and wellness. However, all activities carry an inherent risk of injury, which can result in temporary injury, permanent disability, or even death. The physical and mental challenges associated with sports often lead to injuries when the

physical load on the body exceeds its threshold. Although preventing all sports injuries is impossible, reducing the risk and severity of these injuries is crucial for athletes, teams, coaches, and society. Biokinetics employs exercise as a therapeutic modality within orthopaedics, chronic disease management, and injury prevention. This study aimed to develop a biokinetics model for sports injury prevention.

Methodology: The study employed a sequential qualitative design comprising six phases. Rugby and long-distance running were selected due to their distinct physical demands. Participants included provincial rugby players, long-distance runners, coaches, biokineticists, and physical therapists. Phase 1 involved a scoping review in determining injuries' prevalence and risk factors in rugby and long-distance running alongside existing injury prevention programmes. Phase 2 used three rounds of the Delphi process with 22 participants to identify injury prevention strategies. Results from Phase 2 informed the initial injury prevention model in Phase 3. This model underwent scrutiny during the fourth Delphi round (Phase 4), leading to amendments based on participant feedback. Phase 5 involved presenting the refined model to athletes, coaches, and healthcare practitioners in semi-structured focus groups for practical implementation feedback. The final model was then refined based on this feedback in Phase 6.

Results: The developed model is not a rigid set of rules, but a flexible framework that can be tailored to individual needs. It includes dimensions of injury prevention such as pre-participation screening, athlete and coach education, and intervention strategies. These strategies are presented as a customizable menu, empowering stakeholders to adapt and tailor their prevention efforts to their specific contexts.

Conclusion: The developed biokinetics sports injury prevention model can be applied in biokinetics, sports science, and sports coaching across team and individual sports. The model serves as a guideline for developing programmes to prevent or reduce sports injuries, which can be applied in an interdisciplinary environment.

168: STICKING THE LANDING: ASSESSING THE EFFECTIVENESS OF ANKLE TAPING.

Andrew Green[1], Kendra Szeles[2]
Department of Sport and Movement Studies, Faculty of Health Science, University of Johannesburg[1],[2]
andrewg@uj.ac.za

Background: Controlled landings are paramount in all sports that require jumping tasks. While most landings are safe and effective, numerous lower limb injuries still persist. External ankle support strategies, like prophylactic braces, high-top shoes, and supportive taping are often utilized in an attempt to protect the ankle or prevent further injuries (Vanwanseele et al., 2014). However, athletes commonly favour ankle tape over ankle braces because of comfort and psychological aspects. Furthermore, clinicians can customize ankle tape according to an athlete's individual anatomy and requirements (Henderson et al., 2017). The aim of this study was to assess the effectiveness of ankle strapping on drop landing kinetics and kinematics.

Methodology: Nineteen female netball players (age: 23.4±2.9 years, height: 1.68±0.80 m, mass:63.3±10.2 kg) performed 40cm drop landings under two conditions: Rigid Tape (RT) supporting the right ankle or No Tape (NT). Kinetic data were obtained from 2 force plates (1000Hz) and kinematic data from a 10-camera system (200Hz) Continuous biomechanical data were time normalised and analysed using spm1d paired t-tests ($p<0.05$).

Results: Overall, no differences were noted in ground reaction forces or kinematic variables ($p>0.05$) across the landing attempts. Only right ankle flexion was different between the two conditions ($p=0.015$)

Specifically, strapped ankles remained closer to a neutral position during the stabilization phases from 89-100% of the landing cycle.
Conclusion: The study evaluated drop kinetics and kinematics using continuous spm1d analysis and failed to show any major differences between RT and NT of the ankle. Only the right ankle during the stabilized phase showed a lower dorsiflexed position. These results may indicate that RT on the ankle may offer limited or no support during drop landings.

246: REFINEMENT OF A PHYSICAL ACTIVITY KNOWLEDGE QUESTIONNAIRE FOR SOUTH AFRICAN ADULTS

Martin J. Grove[1], Sarah J. Moss[2]
Physical Activity, Sports, and Recreation (PhASRec)Faculty of Health Sciences. North-West University, South Africa.[1], Physical Activity, Sports, and Recreation (PhASRec)Faculty of Health Sciences. North-West University, South Africa.[2]
32453418@mynwu.ac.za

Background: Physical activity is crucial for preventing and mitigating non-commutable diseases (NCDs) in South Africa, where death rates have increased by 58.7% over the past 20 years. With the lowest mental health index and high NCD rates, uptake in physical activities is essential. However, lack of knowledge about benefits, duration, frequency, and intensity can hinder participation. This study aims to investigate the structure and functioning of a physical activity knowledge questionnaire among a South African sample for further validation.
Methodology: The study analysed secondary quantitative data from a larger research project involving 101 South Africans, using exploratory factor analysis to determine the psychometric properties of the PAK and item response theory to assess its functioning and characteristics.
Results: A four-factor model best fit the data [$\chi 2$ (11,179) = 3.793, p = .976]. Items 1, 3, 4, 5, and 7 had factor loadings of $\lambda > .3$ and accounted for 41.4% variance. However, remaining factors did not have enough loadings for them to be unique (<3). A 2 PL model IRT analyses indicated that item 7 did not adhere to monotone homogeneity. Item infit statistics indicated no misfitted or underfitted items. Threshold parameters scores (b) of items, except items 1 and 4, indicated that majority of the items endorse lower θ level individuals to have a .50 probability of answering the items correctly. With items 3 and 5 being most problematic (b = -25.84 and -4.01). Item slopes indicated varying degrees of relationships among items and the latent traits. Item information curves indicated that all items provided little to no information at narrow ranges of ability levels, with items 1, 3, 4, 5, 6, and 7 providing close to no information.
Conclusion: Researchers concluded that, although the PAK has potential, it does not accurately represent nor measure South Africans knowledge of physical activity. Refinements to item wording and content of items 2, 6, 8, 9, 10 should be considered. Most items were catered towards individuals with low ability levels with items 3 and 9 not being able to differentiate between θ levels of individuals. Refinements to items discriminatory ability and difficulty should be considered.

106: WHAT WE DON'T KNOW CAN HURT US: THE UNDER-REPORTING OF COACH EDUCATION CHARACTERISTICS IN SPORTS INJURY PREVENTION RESEARCH

Lauren Guilfoyle[1], Ian C. Kenny[2], Kieran O'Sullivan[3], Tom Comyns[4]
Sport and Human Performance Research Centre, University of Limerick, Limerick, Ireland.[1], Sport and Human Performance Research Centre, University of Limerick, Limerick, Ireland.[2], Health Research Institute, University of Limerick, Limerick, Ireland.[3], Sport and Human Performance Research Centre, University of Limerick, Limerick, Ireland.[4]
lauren.guilfoyle@ul.ie

Background: Injury prevention programmes (IPP) are an effective strategy to reduce injury incidence in field sports. A dose response relationship exists whereby the efficacy of the IPP is enhanced with more frequent weekly player exposures to the IPP – however, adherence to the suggested optimal weekly dosage is often not reached. Little is known about effective implementation strategies to support coaches as delivery agents of these IPPs. The aim of this scoping review was to evaluate the level of coach education details reported in injury prevention programme research.
Methodology: A scoping review protocol was registered on the Open Science Framework. Studies were eligible for inclusion where coaches of youth field sport athletes (aged 8-19 years) are primary delivery agents of an IPP and were in receipt of a 'train-the-trainer' coach education intervention. A literature search was conducted across 6 databases. A 14-item modified Template for Intervention Description and Replication (TIDieR) checklist was used to evaluate the completeness of reporting of the coach education intervention only. Descriptive and correlational analysis will be used.
Results: Twenty studies were eligible for inclusion (soccer/football n=17; Rugby Union n=3). The mean TIDieR score of studies was 47% completeness (range 0-79%). Rugby Union coach education was more comprehensively reported than soccer/football coach education (69% v 42%). The name of the IPP (80%), the actual adherence (76%) and the volume of coach education sessions for each participant (75%) were the most frequently reported items. Consideration of coach education tailoring (7%), modifications (10%) and rationale for the coach education (20%) were the least reported TIDieR items. Logistics such as coach education procedures (25%), course facilitators (35%) and venue (30%) were all under-reported despite their relevance in research application and hampering future analysis of effective implementation strategies. The year of publication, however, was positively correlated with greater reporting ($r = .51$, $p = .02$) which reflects a growing focus on components of implementation over programme efficacy in isolation.
Conclusion: Incomplete reporting of coach education details for both replication and meta-analysis was evident across all included studies. Authors should consider using the TIDieR checklist when reporting their findings to aid in identifying effective implementation strategies.

129: CAN ONLY THE WEALTHY AFFORD TO HAVE A SPORTS-RELATED CONCUSSION IN SOUTH AFRICA? HEALTHCARE PRACTITIONERS' INVOLVEMENT IN THE MANAGEMENT OF THIS CONDITION

Faye Jackson[1], Tania Rauch van der Merwe[2], Dominic Malcolm[3]
Department of Occupational Therapy, School of Therapeutic Sciences, Faculty of Health Sciences University of the Witwatersrand, Johannesburg, South Africa[1], Department of Occupational Therapy, School of Therapeutic Sciences, Faculty of Health Sciences University of the Witwatersrand, Johannesburg, South Africa[2], School of Sport, Exercise and Health Sciences, Loughborough University, Loughborough, England[3]
faye.jackson@wits.ac.za

Background: Sports-related concussion is a growing health concern globally, requiring medical intervention to ensure the correct management, prevent further additional injuries and facilitate return to play and learning. A range of healthcare practitioners in different settings should be involved in the management of sport-related concussion. However, access to intervention is influenced by multiple factors. These factors include public awareness of the condition, the availability of trained healthcare practitioners within a specific geographical area and the prohibitive cost associated with treatment. Globally, a unified multi-disciplinary team approach for the implementation of best practice is limited. Therefore, this research explored South African healthcare practitioners' involvement and challenges associated with the management of sports-related concussion.
Methodology: This qualitative explorative study utilised semi-structured interviews with healthcare practitioners in South Africa. Purposive and snowball sampling was used. All participants were practising healthcare practitioners, actively providing concussion-based interventions, including sports-related concussion at the time. The transcribed data was analysed through invivo coding and using Braun and Clarke's Reflexive Thematic Analysis.
Results: Thirteen (n=13) participants included sports physicians (n=4), occupational therapists (n=4), physiotherapists (n=2), neuropsychologists (n=2) and a behavioural optometrist (n=1). Ten of the 13 participants had concussion-specific training whereas 11 of the participants had concussion training in their undergraduate or postgraduate university training. Five themes with associated categories and sub-categories emerged from the analysis*. The main themes include Education and awareness, Multi-disciplinary approach, Complexity of the condition, Cost of care, and Contextual challenges in practice.
Conclusion: Besides the fact that the South African data emulates the same challenges in treating sports-related concussion as put forward internationally, the involvement of healthcare practitioners is vast. Therefore, a multi-faceted, flexible, and affordable model of care should be developed in South Africa for South Africans. This model of care should be built on the premise of accessibility for all, and contextual responsiveness given South Africa's endeavour towards the implementation of National Health Care.

79: THE EFFECTIVENESS OF ELITE SPORT POLICY IN SOUTH AFRICA: A MULTI-DIMENSIONAL APPROACH APPLIED TO THE CASE OF THE WESTERN CAPE

Shaundre Jacobs[1], Veerle De Bosscher[2], Ranel Venter[3]
Stellenbosch University[1], Vrije Universiteit Brussel in Belgium[2], Stellenbosch University[3]
shaundrej@gmail.com

Background: Assessments on (elite) sport policy are critically important during the policy evaluation phase. Currently, elite sport policy effectiveness is measured by governmental target indicators or the number of medals won internationally at Olympic Games. This, however, is a one-sided approach, as evaluations on effectiveness of sport policies requires multiple measurements due to the multi-faceted nature.
Methodology: This study evaluated the effectiveness of the national elite sport policy in the case of the Western Cape (South Africa), as was perceived by its stakeholders with the useage of a convergent parallel mixed method design. Quantitative and qualitative data were collected on the effectiveness of the elite sport policy in the case of the Western Cape. Data were collected at multiple points of the input-throughput-output and feedback cycles as per the multi-dimensional model which was used as the theoretical underpinning of the evaluation.

Results: This study revealed that the Western Cape were effective in terms of the outputs over time at the Olympic Games, however, challenges were identified in the input (Funding) and throughput (Support services to athletes, coaches and administrators) effectiveness of the elite sport system. Athletes were achieving success despite the system that has been created, not because of it.
Conclusion: This study recommends that policymakers review and update the elite sports policies to ensure that effectiveness is attained. In this way sustainable sport performances can be achieved.

198: FROM SETBACK TO COMEBACK: FIRST STEPS IN A GYMNAST'S REHABILITATION JOURNEY FOLLOWING A SPINAL CORD INJURY

Candace Vermaak[1], Vuyelwa Radebe[2]
Division of Movement Science and Exercise Therapy, Stellenbosch University[1], Division of Movement Science and Exercise Therapy, Stellenbosch University[2]
cvermaak@sun.ac.za

History: Sandra is an 18-year-old ex-semi-professional gymnast who sustained a C5/6 incomplete spinal cord injury in January 2023 whilst jumping on a trampoline.
Physical Findings: Standard biokinetics assessments were conducted, encompassing posture analysis, gait analysis, range of motion (ROM) evaluation, functional movement assessment, and balance testing. Key findings included deficiencies in both static and dynamic balance, scoliosis, forward trunk lean, and insufficient lumbo-pelvic hip stability. Additionally, active strength assessments revealed limited muscle contraction in the lower extremities, particularly more pronounced on the left side.
Differential Diagnosis / Hypothesis: Spinal cord injury results from a direct or indirect damage to the spinal cord nerves. An injury at the C5-C6 level is classified as tetraplegia and is characterized by the loss of motor and sensory function below the lesion. Individuals may require assistance with mobility and activities of daily living due to impaired wrist extension and paralysis affecting the hands, trunk, and lower limbs. In Sandra's case, specific deficits included restricted hip extension and flexion, limited knee flexion and extension, diminished ankle dorsiflexion, excessive plantar flexion, and poor foot contact.
Test and Results: There were slight increases in all measured variables of the gait cycle. Statistically significant results were observed in the ground reaction forces, which improved by 11% on the left side and by 23% on the right side. Practically significant differences included Sandra's improved ability to stand, balance, perform sit-to-stand movements, and execute squats independently. Additionally, she exhibited a more upright posture, improved muscle tone, and reduced reliance on her mother for activities of daily living.
Final / Working Diagnosis: Based on Sandra’s goals of improving her gait, the following areas needed to be addressed namely, balance, improved function of the left leg, less reliance on the right leg, increased tibialis anterior activation and improved knee drive mechanics.
Treatment and Outcomes: The intervention consisted of 11 weeks of rehabilitation. Sandra’s therapy consisted of a combination of Biokinetics, Physiotherapy, Aqua therapy, Lokomat, Transcranial magnetic stimulation (TMS), and Cross fit. She completed 24 hours of therapy per week. The case study demonstrates the complexity of the human nervous system and more specifically neural regeneration and although

146: RUNNING ON EMPTY: UNVEILING THE PREVALENCE OF AND RISK FACTORS ASSOCIATED WITH LOW ENERGY AVAILABILITY IN FEMALE ATHLETES - A SYSTEMATIC REVIEW AND META-ANALYSIS

Mia Adendorff[1], Liske Kotze-Horstmann[2], Wayne Derman[3]

Stellenbosch University[1], Stellenbosch University[2], Stellenbosch University[3]
22815511@sun.ac.za

Background: The aim of this systematic review and meta-analysis was to identify the prevalence of Low Energy Availability (LEA)in female athletic populations, and to review the associated risk factors.
Methodology: A systematic search was conducted across five (5) academic databases using the review parameters identified in the PICO framework. Retrieved articles were imported into CADIMA for eligibility screening. Comprehensive Meta-Analysis (V4) was used to generate statistics for the current review.
Results: Fifty-one (51) studies were assessed for inclusion, of which 18 were excluded, thus 36 studies were included. The pooled prevalence of LEA for these studies was 45.6%. Sub-group analysis revealed that the combined sport type and participation group with the highest pooled LEA prevalence was professional endurance runners (68%). The lowest pooled prevalence was observed in competitive individual sport athletes, such as swimming, skiing and kayaking (23%). Associated risk factors investigated in these studies were divided into three (3) categories, namely nutrition factors, training factors, and psychological/ mental health factors. Data relating to nutrition was collected in 31% (n=12) of studies, data regarding training factors was collected in 59% (n=23) of studies, and data regarding psychological and mental health factors was collected in15% (n=12) of studies.
Conclusion: The current meta-analysis suggests 1) that the prevalence of LEA in female athletic populations is high at 45,6 % and; 2) that some groups of female athletes may be at an increased risk of developing LEA compared to others based on sport type and participation group. It is therefore crucial for coaches, athletes, and physicians to be aware of the associated risk factors of LEA, and to take appropriate measures to mitigate the risk of LEA.

109: AN INTERNATIONAL INVESTIGATION ON EXERCISE INDUCED BREAST PAIN AND CONTACT BREAST INJURIES AMONG FEMALE RUGBY UNION PLAYERS

Kilian Bibby[1], Tom M. Comyns[2], Roisin Cahalan[3], Helen Purtill[4], Caithriona Yeomans[5], Ian C. Kenny[6]
Sport and Human Performance Research Centre, University of Limerick, Ireland[1], Sport and Human Performance Research Centre, University of Limerick, Ireland[2], School of Allied Health, University of Limerick, Ireland[3], Department of Mathematics and Statistics, University of Limerick, Ireland[4], Irish Rugby Football Union, Dublin, Ireland[5], Sport and Human Performance Research Centre, University of Limerick, Ireland[6]
kilian.bibby@ul.ie

Background: Background: This international cross-sectional study aimed to investigate if and how female Rugby Union players are affected by contact breast injuries (CBI) and exercise induced breast pain (EIBP).
Methodology: Methodology: A survey targeting currently playing adult female Rugby Union players (15s and 7s) was internationally disseminated. Expert groups, including medical professionals, researchers, and players, were consulted during survey development and piloted the survey multiple times for

refinement. Qualtrics was used for response collection and analyses were carried out using Microsoft PowerBI and SPSS.
Results: Results: Three hundred and fifty-one female Rugby players responded to the survey, with 169 (48.2%) stating that they had never experienced either a CBI or EIBP. Of the remaining 182 respondents (age 27.3±6.5 years, height 168.6±7.0 cm, mass 76.6±14.8 kg) from 25 different countries, 100 (28.4%) had experienced a CBI, 34 (9.7%) had experienced EIBP, while 48 had (13.7%) experienced both. The reported frequency of incurring one or multiple CBIs within the past 12 months was similar for 7s and 15s (7s median = 2.5, 15s median = 2). EIBP frequency, during the same period, was notably low for 7s and 15s, with 60%, or more, reporting to never or rarely suffer from EIBP. Sprinting, jumping, and running were the most frequent activities precipitating the most severe EIBP. Being tackled or tackling were activities that most frequently caused a CBI. A high percentage of respondents who were affected by either CBI (57.3%) or EIPB (51.3%) reported always continuing to play during matches despite their pain or injury. The leading problem which impacted performance during match play was the inability to run comfortably due to EIBP (33.6%) or CBI (28.5%). Between 19.4% and 32.1% of respondents who previously experienced a CBI or EIBP did not have a strategy to prevent subsequent pain or injury.
Conclusion: Conclusion: The study found that it was common to experience breast pain and injury which affected sport performance. Existing research indicates a paucity on prevention strategies, and further a need for education addressing breast pain and injury among players. Furthermore, prospective injury surveillance collecting data on and causes leading to CBI and EIBP is recommended.

101: INJURY TOLL: A QUALITATIVE STUDY OF ELITE LADIES GAELIC FOOTBALL AND CAMOGIE PLAYERS' UNDERSTANDING AND EXPERIENCE OF INJURY

Roisin Cahalan[1], Kieran O'Sullivan[2], Catherine Norton[3], Marese Gilhooly[4]
School of Allied Health, University of Limerick, Limerick, Ireland[1], School of Allied Health, University of Limerick, Limerick, Ireland[2], Department of Physical Education and Sport Sciences, University of Limerick, Limerick, Ireland[3], Technological University of the Shannon, Athlone, Ireland[4]
roisin.cahalan@ul.ie

Background: Ladies Gaelic football and camogie, indigenous Irish sports, are played both in Ireland and across the world. Despite the amateur status, players can train and have match schedules that approach professional standards with injury rates comparable to professional athletes. Elite level in these sports is defined as intercounty, the highest competitive level nationally. At the elite level of sport, performance is a priority and many athletes train and compete with some degree of injury such that definitions and concepts of injury can vary. This study aimed to explore the understanding and experience of injury in elite ladies Gaelic football and camogie players.
Methodology: This qualitative descriptive study involved focus groups (n=6) conducted with elite ladies Gaelic football (n=11) and camogie (n=10) players from different intercounty teams. Participants were asked to describe their understanding of injury and to describe their experience of injury in the context of their participation in elite ladies Gaelic football and camogie. Focus groups were audio recorded, transcribed verbatim and analysed using reflexive thematic analysis.
Results: Participants described injury in terms of its physical affects including impaired performance and the level and duration of physical symptoms. Participants differentiated between "niggles", which were largely innocuous events and more severe injuries, which were considered noxious and major events. Furthermore, participants discussed injury in terms of psychological impact (including feelings of

frustration, anger and guilt) and cost implications. These included direct and indirect economic costs and the time involved in facilitating recovery and return to play.
Conclusion: Understanding and experience of injury is complex. This research suggests that athletes distinguish between 'performance pain' which is perceived to be normal and habitual, and 'injury pain' which is more impactful, and appraise whether the pain or injury is worthy of reporting or not. Injury surveillance systems and injury prevention strategies that align with the athletes' perception of injury by capturing performance deficits and monitoring the physical and far-ranging psychological, financial and time-related impacts of injury would improve the playing and injury experience of athletes.

176: THE ROLE OF THE CHEF IN PROFESSIONAL FOOTBALL: A SURVEY OF CURRENT PRACTICE IN THE ENGLISH PREMIER AND FOOTBALL LEAGUES

Dr Nessan Costello[1], Mr Albert Arrieta[2], Professor Susan Backhouse[3], Mr Paul Bower[4], Dr Meghan Bentley[5]
Leeds Beckett University[1], Leeds Beckett University[2], Leeds Beckett University[3], Leeds Beckett University[4], Leeds Beckett University[5]
n.costello@leedsbeckett.ac.uk

Background: Chefs in professional football must implement personalized nutrition strategies to meet players' needs, requiring knowledge of nutrition science, food composition, preparation, recipe development, menu planning, and safety standards. These skills ensure practical and culturally acceptable meals that accommodate players' preferences, allergies, and special diets. Expertise is needed across training grounds, hotels, stadiums, training camps, and travel. Therefore, this study explores the roles of chefs in the top four divisions of English professional football and describes the catering services provided.
Methodology: Using a cross-sectional research design, chefs occupying roles within the English Premier League, English Football League Championship, English League One, and English League Two were purposefully recruited to complete an open survey.
Results: Participants were predominantly male, aged 35-44, and employed full-time under permanent contracts. Sixteen had 'performance' in their job title. Participants averaged 24 years' work experience as a chef, 8 years football-specific experience, and 45 weekly working hours. Their primary role was to provide nutritionally balanced and palatable food to support players' performance, recovery, and individual nutritional needs. Catering services mostly operated year-round, seven days a week, with declining operation, food costs, and staffing towards lower divisions. Only 15 and 7 clubs covered female senior and academy teams, respectively. Fifty participants rated their sports nutrition knowledge as 'good' to 'excellent,' but only 18 had sports nutrition training. Nine participants did not work with a nutritionist, while 29 were responsible for providing nutrition advice. Fifty-one participants adhered to a periodized nutrition approach, though 32 lacked defined nutrient targets. Tasks in the Premier League frequently included traveling to home and away fixtures, hotel menu planning, and away hotel food provision.
Conclusion: We propose the establishment of quality assured accreditation to integrate chefs more closely within the performance department, advocating for objective performance assessments, and the title 'sport' over 'performance' chef. Our study identified instances of misalignment with 'best' practices in sport nutrition and revealed league and gender disparities, potentially compromising nutrition

strategy standards. The findings offer valuable insights for enhancing the practical delivery of evidence-based nutrition strategies in football, from an often-overlooked group in applied research and practice.

247: EVALUATION OF SINGLE RATER RELIABILITY OF AN OCULOMOTOR FUNCTION DEVICE FOR DIAGNOSING CONCUSSIONS

Charles Deacon[1], James Brown[2], Wayne Derman[3], Wilbur Kraak[4], Maaike Eken[5]
Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Stellenbosch, South Africa[1], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Stellenbosch, South Africa AND Carnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK AND Division of Physiological Sciences and Health through Physical Activity, Lifestyle and Sport Research Centre, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa[2], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Stellenbosch, South Africa AND International Olympic Committee (IOC) Research Centre, South Africa[3], Department of Sport, Recreation, and Exercise Science, University of the Western Cape, South Africa AND Department of Exercise and Sport Science, Faculty of Health Sciences, University of the Free State, South Africa[4], Division of Sport and Exercise Medicine, Department of Exercise, Sport and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, Stellenbosch, South Africa AND Institute of Orthopaedics and Rheumatology, Winelands Mediclinic Orthopaedic Hospital, Stellenbosch, South Africa[5]
chdeacon@gmail.com

Background: Sport-related concussion (SRC) is a common injury in rugby. The latest consensus statement on SRC recommends that oculomotor function is considered as a supplementary factor in the management of this injury. The iTremor One device measures ocular microtremor (OMT), a high frequency involuntary fixational eye movement which is a component of oculomotor function. The aim of this study is to investigate single rater reliability of repeated measurements of OMT taken with the iTremor One device, in non-professional rugby players.
Methodology: Collegiate (non-professional) rugby players (men: n = 78; women: n = 21) with a mean age of 20.3 years (SD 1.6 years) participated in the study. Three OMT measurements were taken from each eye, for all players during pre-season ('baseline'). This same protocol was performed in 39 men and 9 women players who were not suspected of having an SRC ('match-control'), either immediately after tactical substitution or after completion of the match. Single intra-rater reliability of the three OMT measurements for baseline and match controls was assessed with an intraclass correlation coefficient (ICC) for each eye individually.
Results: The ICC showed moderate single rater reliability for single measurements of each eye (baseline/pre-season: Right=0.67 (95%CI 0.58-0.75); Left=0.72 (95%CI 0.63-0.80); match-control: Right=0.63 (95%CI 0.48-0.77); Left=0.67 (95%CI 0.51-0.80), while ICC showed good reliability when the average over three measurements was taken (baseline/pre-season: R=0.86 (95%CI 0.80-0.90); L=0.89 (95%CI 0.84-0.92); match-control: Right=0.83 (95%CI 0.73-0.91); Left=0.86 (95%CI 0.76-0.92). No differences were observed between men and women cohorts at baseline or for match-controls.

Conclusion: Acceptable single intra-rater reliability of this device was achieved by taking the average of three measurements during baseline and after participating in a rugby match. These positive reliability implications now permit the assessment of the validity of this tool for diagnosing SRC by comparing OMT measurements in concussed and not concussed players. Further research is needed to investigate whether OMT measurements change after a period of high-intensity collision sport (such as rugby) and in players suspected of having an SRC.

21: RELATIONSHIPS BETWEEN QUADRICEPS: HAMSTRING STRENGTH RATIO AND LOWER EXTREMITY INJURIES IN NETBALL PLAYERS

Henriette Hammill[1]
North West University (NWU) - Physical Activity, Sport and Recreation (PhASRec)[1]
12782211@nwu.ac.za

Background: Netball is a popular sport. Due to high impact and quick movement, there is an enormous load on the lower extremities which increases the risk for injury. The aim of this study was to investigate the relationship between the quadricep and hamstring strength and the prevalence of lower extremity injuries in netball players.
Setting: Twenty-five female netball players (age: 20.8 ± 1.4 years) voluntarily participated.
Methodology: The Cybex Isokinetic dynamometer was used to determine concentric knee torques. Quadriceps: hamstring strength ratio was determined. Occurrence of lower extremity injuries was documented bi-weekly.
Results: Medium effect sizes were noted for flexion torque: work for the left leg and for the quadriceps: hamstring ratio (≥ 60%) for the right leg. All the other measured variables have a small effect size. 18.75% of lower extremity injuries and ConQ: ConH of <60% was present. No association between lower extremity injuries and ConQ: ConH. Injuries may not be accurately predicted by this ratio.
Conclusion: Injuries to the ankle and knee are especially common among netball players. Hamstring and quadriceps muscle asymmetry (>10%) were found to be a potential indicator of lower extremity injury. This study highlights awareness on lower extremity injuries and the strength ratio between the quadriceps and hamstrings. This can aid coaches and netball players to lower the risk for injuries and thus improve individual- and team performance.

303: ACUTE FATIGUE IN INDOOR COURT-BASED TEAM SPORTS: A SYSTEMATIC REVIEW

Omar Heyward[1], Anthony Clark[2], Lara Paul[3], Ben Jones[4], Sarah Whitehead[5]
Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[1], Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[2], Division of Physiological Sciences and Health through Physical Activity, Lifestyle and Sport Research Centre, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa[3], Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[4], Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom[5]
o.heyward@leedsbeckett.ac.uk

Background: Indoor court-based team-sport are characterised by small playing fields, and hard surfaces therefore understanding the acute fatigue response (i.e., within 48-hours) is important from a performance and injury perspective. This study aimed to conduct a systematic review on acute fatigue in indoor court-based team-sport, identify methods and markers used to measure acute fatigue, and describe the acute fatigue responses.
Methodology: A systematic search of databases PubMed and EBSCO host (SPORTDiscus, MEDLINE and CINHAL) was performed from the earliest record to June 2023. Studies were included when they were: 1) original research investigating an acute fatigue response (within 48-hours of participation) in an indoor team sport, and 2) include either a physical, technical, perceptual, or physiological marker of fatigue taken before and after participation in training, match, or tournament play.
Results: One-hundred and eight studies were included, measuring 142 markers of fatigue. Large variability in methods, fatigue markers and timeline of measurements were present. Cortisol (n = 43), creatine kinase (n = 28), countermovement jump (n = 26) and testosterone (n = 23) were the most frequently examined markers of fatigue. Creatine kinase displayed the most consistent trend, increasing 10-204% at 24-hours across all sports.
Conclusion: Large variability in methods and markers used to determine acute fatigue responses exists. Future researchers should focus on markers that display high levels of reliability and transfer to practice. The robustness of studies may be increased by ensuring the appropriate methods and timescale of fatigue marker measurement are used. Further research is still required to determine which combination of markers bests describe a given fatigue response.

147: INJURY PATTERNS AND ILLNESS OCCURRENCE IN ELITE FEMALE NETBALL PLAYERS: PRELIMINARY DATA FROM THE 2023 NETBALL WORLD CUP

Audrey Jansen van Rensburg[1], Laura Lallenec[2], Sharon Kearney[3], Janet Young[4], Grace Bryant[5], Karen Schwabe[6], Arnold Devos[7], Gopika Ramkilawon[8], Dina C (Christa) Janse van Rensburg[9], Acknowledgement:[10]
Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[1], Chief Medical Officer Netball Australia[2], Netball Smart Programme Manager Netball New Zealand /Vice President Sports Medicine New Zealand[3], Anti-Doping Lead Netball Scotland /Medical Lead Netball Europe /Medical Advisory Panel, World Netball, Manchester, U.K.[4], Sports Medicine at Sydney University, University of Sydney, Australia[5], Netball South Africa /Department of Exercise, Sport and Lifestyle Medicine, Stellenbosch University, South Africa[6], Principal Consultant, Background Signal P/L, Australia[7], Department of Statistics, University of Pretoria, Pretoria, South Africa[8], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa /Medical Advisory Panel, World Netball, Manchester, U.K.[9], All primary medical personnel of all teams who logged data.[10]
audrey.jansenvanrensburg@up.ac.za

Background: The international Netball World Cup (NWC) is contested every four years, and 16 teams qualify to participate based on their world ranking. However, injury and illness research in netball, particularly during major tournaments, is limited. This research aims to determine the epidemiology and severity of injuries and illnesses sustained by elite female netball players during the 2023 NWC in Cape Town, South Africa.
Methodology: A prospective cross-sectional analysis of 192 elite players from 16 contesting teams at the 2023 NWC. Each team's medical staff recorded all injuries and illnesses in training and match-play

during the 10-day tournament. We report injury and illness frequency (%) and severity (% day time-loss ≥1day).
Results: In total, 68 independent injuries were recorded (56 during match-play, 12 during training), resulting in a prevalence of 35.4%. Injuries were mainly to the lower limb (75%), head/neck/face (8.8%), upper limb (7.4%) and groin (4.4%). In the lower limb, injuries were predominantly to the knee (35.3%), ankle (14.7%), thigh (8.8%), lower leg (7.4%), groin (4.4%) and foot/toe (4.4%). Injury types included sprains (16.2%), strains (16.2%), contusions (10.3%) and lacerations (8.8%). Most injuries occurred in non-contact situations (51.5%) with another athlete or object, and 27.9% were ≥1day time-loss injuries. Injuries by player position were: Goal Attack (17.8%), Wing Attack (16.2%), Centre (16.2%), Goal Defence (11.8%), Goal Shooter (11.8%), and Wing Defence (11.8%). In total, 21 illnesses were recorded, with a prevalence of 10.9%. The respiratory system was mostly affected (33.3%), followed by the ears, nose, and throat (27.8%). Illnesses were primarily non-infective (61.9%). A total of 41.2% of all illnesses caused ≥1day time-loss from tournament play. Players mainly reported illness on a day without a match or training session (>77.8%).
Conclusion: Lower limb injuries occurred predominantly during match-play. Most injuries resulted in time-loss from training and competition. Illnesses mainly affected the respiratory system, and illness severity caused time-loss in nearly half of the cases. These findings emphasise the need for evidence-based injury prevention programs and medical support to optimise elite female netball players' safety and performance in major tournaments.

98: FIVE YEAR ANALYSIS OF PLAYING SURFACE INJURIES IN FEMALE AND MALE ADULT AMATEUR COMMUNITY RUGBY UNION

Ian Kenny[1], Tabitha Billingham[2], Roisin Cahalan[3], Giles Warrington[4], Kieran O'Sullivan[5], Caithriona Yeomans[6], Liam Glynn[7], Mark Lyons[8], Helen Purtill[9], Kilian Bibby[10], Thomas Comyns[11]
Sport and Human Performance Research Centre, University of Limerick, Ireland[1], Sport and Human Performance Research Centre, University of Limerick, Ireland[2], School of Allied Health, University of Limerick, Ireland[3], Sport and Human Performance Research Centre, University of Limerick, Ireland[4], School of Allied Health, University of Limerick, Ireland[5], Irish Rugby Football Union, Ireland[6], School of Medicine, University of Limerick, Ireland[7], Sport and Human Performance Research Centre, University of Limerick, Ireland[8], Department of Mathematics and Statistics, University of Limerick, Ireland[9], Sport and Human Performance Research Centre, University of Limerick, Ireland[10], Sport and Human Performance Research Centre, University of Limerick, Ireland[11]
ian.kenny@ul.ie

Background: Longitudinal data on the characteristics of injuries in Rugby Union on different playing surfaces on a large scale is lacking. Use of artificial pitch playing surfaces is common, especially considering weather changes and use tolerance. This longitudinal study aimed to compare artificial and natural grass playing surface match injuries in female and male amateur Rugby Union players in Ireland.
Methodology: Analysis was conducted on five years of data on 1,986 amateur community Rugby players in 38 clubs in Ireland competing at the highest club level; 1,542 male and 444 female. Each team registered their players on an online secure portal (IRISweb) and designated an injury recorder to report injuries. A 24-hour time-loss injury definition was used. Measures included injury type, body location and severity.

Results: 3,414 match injuries were recorded. 11% of clubs predominantly trained on an artificial surface, 55% predominantly on natural grass, and 34% on both. A higher percentage of injuries reports on artificial surfaces occurred in the lower body (55%; 95% CI 0.49-0.64) compared to injuries reported on natural grass (45%; 95% CI 0.41-0.52) ($p<0.05$). Injury location findings differed ($p<0.05$) based on playing surface with a higher proportion of the reported injuries occurring in the lower body on artificial surfaces (knee 17%, ankle 15%, thigh 12%, shoulder 11%, head 10%) than natural grass surfaces (knee 11%, ankle 12%, thigh 14%, shoulder 13%, head 15%). The most commonly reported injuries for artificial surface versus natural grass were sprain (26% Vs 25%), strain (24% Vs 26%), haematoma/contusion (14% Vs 11%), concussion (9% Vs 14%), dislocation (5% Vs 5%), laceration (5% Vs 4%) and fracture (5% Vs 7%). There was no statistically significant gender difference or difference in injury severity (days lost) for artificial compared to grass (48 Vs 51 average day's absence).
Conclusion: A relatively higher percentage of lower body injury was reported on artificial surfaces versus natural grass. Surveillance of abrasion injury is also required which often does not present under the 24-hour time loss definition. Findings can help inform decision making within club and Rugby governing structures for playing surface integration, and evidence-based welfare strategies.

114: MUSCULOSKELETAL INJURIES IN AMATEUR POLE SPORT ATHLETES: PREVALENCE AND IMPACT

Julian David Pillay[1], Kim Worth[2]
Durban University of Technology[1], Durban University of Technology[2]
pillayjd@dut.ac.za

Background: Pole sport has gained increased popularity in recent years. Due to the sport's specific movements and stresses, injuries sustained by athletes may have subtle variations compared to that of other sports. The study investigated prevalence, risk factors and injury-type sustained by female amateur pole sport athletes, and medical care sought.
Methodology: An online survey was conducted in five pole studios in the eThekwini municipality of KwaZulu-Natal, South Africa. The questionnaire sought information on demographics, training history, musculoskeletal injuries and risk factors, impact of injury on performance and quality of life and management approaches sought. The data were analysed using the IBM SPSS version 28 and included univariate and multiple logistic regression model analyses, where relevant.
Results: Fifty-nine adult female participants participated in this study. A lifetime prevalence of 49.2% (n=29) and12-month period prevalence of 40.7% (n=24) was noted. The most commonly reported location of injuries was the shoulder (64.3%, n=18) with strain type injuries (48.1%, n=14) the most common type. Significant risk factors included high skill level (p=0.005), increased strength (p=0.010), warm-ups longer than 10-minutes (p=0.053) and performing static stretching cool-downs (p=0.005). The impact of injuries on quality of life was significant, particularly affecting ability to perform daily activities and decreasing sleep. Self-medication and home remedies were most commonly utilised.
Conclusion: Musculoskeletal injuries are largely prevalent in pole sport athletes, with varied impact on performance and quality of life. The uniqueness of this sport provides an interesting platform for new research, particularly with regards to prevention and treatment approaches.

128: INJURY HAS A LOWER INCIDENCE BUT HIGHER SEVERITY BURDEN THAN ILLNESS IN ELITE SOUTH AFRICAN NETBALL PLAYERS: A PROSPECTIVE COHORT STUDY

Danielle Pistorius[1], Audrey Jansen van Rensburg[2], Dina C Janse van Rensburg[3], Dimakatso Ramagole[4], Gopika Ramkilawon[5]
Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, South Africa[1], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, South Africa[2], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, South Africa; Medical Advisory Panel, World Netball, Manchester, UK[3], Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, South Africa[4], Department of Statistics, Faculty of Natural and Agricultural Sciences, University of Pretoria, South Africa[5]
danpistorius@gmail.com

Background: Netball poses significant injury risks with explosive movements, sudden stops, and restricted court areas. Team sports with frequent physical contact predispose players to illness. Injury and illness surveillance plays a pivotal role in prevention. We investigated the prevalence, incidence, clinical characteristics, and severity of injuries and illnesses in elite South African netball players over six months in preparation for the 2023 Netball World Cup (NWC).
Methodology: A prospective cohort study followed 24 elite female South African netball players selected to the national team over six months in preparation for the 2023 NWC. Injury and illness data were self-reported via a two-weekly online survey. Main injury and illness outcome variables included period prevalence (PP), incidence (I) (injury/1000 player-hours; illness/1000 player-days), severity (time-loss in days and player perception), and injury and illness burden (InjB, IllB).
Results: Across six months, 26 injuries were reported (PP=8.9%; I=5.4). Lower limb injuries (83.3%), specifically the knee (44.4%), and mostly involving joint sprains/ligament tears (27.8%), mainly occurred. Most injuries (55.2%) were sustained during match play (55.6%) and due to player contact (38.9%). Goal defenders suffered most injuries (22.2%). Injuries resulted in mild time-loss (1-7 days), with an InjB of 3.5 days lost/1000 player exposure-hours. In total 33 illnesses were reported (PP=10.9%, I=6.9), mainly involving the upper respiratory tract (56.0%). Illness severity was mostly minimal, with no time-loss (51.5%), resulting in an IllB of 17.3 days lost/1000 player exposure-days.
Conclusion: This study provides important descriptive information on injury and illnesses in elite netball players. Injury burden translates to 14.9, and illness burden to 3.1 days lost during the 6 months Lower limb injuries and upper respiratory tract illnesses are common and an important focus for preventative strategies.

312: Establishing the prevalence and risk factors of shoulder injuries amongst CrossFit members in Johannesburg Metropolitan Municipality, South Africa

Joni Rice[1], Simonè Ferreira[2]

University of Johannesburg, Faculty of Health Sciences, Department of Sport and Movement Studies[1,2]
jrice@uj.ac.za

Background: CrossFit is defined as high-intensity functional movements comprising of gymnastics, Olympic weightlifting, and interval training. Contrary to popular belief, CrossFit is not inherently more injury-prone compared to other sports. However, shoulder injuries are the most common musculoskeletal injury in CrossFit, attributed to various risk factors. Due to contradictory findings

regarding these risk factors, this study aims to identify the prevalence and risk factors associated with shoulder injuries among CrossFit members in Johannesburg.
Methodology: The study's data collection occurred in two phases. In the first phase, 117 participants completed a self-administered questionnaire that gathered information on their training habits and injury history. In the second phase, 10 participants who had experienced a shoulder injury due to CrossFit participation between 2021 and 2022 underwent shoulder range of motion and muscle strength tests. Participants were selected for phase two based on their injury history. Descriptive and inferential statistics, including Pearson Chi-square tests, were used to analyse participant demographics and compare injury incidence between genders.
Results: The shoulder emerged as the most frequently injured joint, accounting for 29.4% of all injuries. Injuries predominantly occurred during Workouts of the Day (WODs) (40.7%) and strength training sessions (34.1%), with fatigue (28.5%), improper form (26.9%), and too heavy a weight (20%) identified as primary risk factors. No significant difference in injury prevalence was found between male and female participants. However, males had a higher incidence of multiple injuries within the last 12 months (22.2%) and before the previous 12 months (27.8%). In phase two, participants demonstrated below-norm performance in internal and external shoulder rotators, and stabilizing shoulder muscles also scored lower than expected.
Conclusion: Some participants exhibited tightness in the infraspinatus, subscapularis, pectoralis major, and teres major and minor. Muscle weakness was also observed in the supraspinatus, infraspinatus, and both anterior and posterior deltoids. The unexplored risk factors for shoulder injuries in CrossFit athletes are the flexibility and strength of specific shoulder muscles. These findings are crucial for biokineticists and CrossFit trainers aiming to implement injury prevention strategies and mitigate the sport's injury-prone reputation. Professionals can work towards enhancing athlete safety and performance by focusing on these factors.

298: EVALUATION OF THE IMPACT OF A 20 WEEK EXERCISE REFERRAL SCHEME ON MAURITIAN ADULTS DIAGNOSED WITH NON-COMMUNICABLE DISEASES

Adisha Bholah[1], Jhoti Somanah[2], Manish Putteeraj[3], Dan Garnett[4], Ritish Lutchumun[5], Christa Janse van Rensburg[6], Robert Copeland[7], Siobhan Strike[8]
Mauritius Sports Council[1], School of Health Sciences, University of Technology Mauritius[2], School of Health Sciences, University of Technology Mauritius[3], Department of Sport, Health Sciences and Social Work, Faculty of Health and Life Sciences, Oxford Brookes University, Oxford, UK.[4], Ministry of Health & Wellness, Mauritius[5], 6 Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[6], Advanced Wellbeing Research Centre and National Centre for Sport and Exercise Medicine, Sheffield Hallam University, Sheffield, United Kingdom.[7], School of Life and Health Sciences, University of Roehampton, London, UK[8]
adishabholah@gmail.com

Background: The escalating prevalence of non-communicable diseases (NCD) presents a concern in Mauritius. These diseases, caused by many factors, reflect the social, economic, and environmental conditions within which people live and work. Type 2 diabetes mellitus, hypertension and obesity are the most prevalent among Mauritian adults. Within the framework of a comprehensive systems approach aiming at addressing the social determinants of health, there is a need for customised strategies for both management and prevention of non-communicable diseases. One such example is

exercise referral. Exercise Referral Schemes (ERS) represent an emerging tool for helping people become more physically active and healthier. Evidence of their effectiveness is equivocal and lacks contextual insight into their value in a Mauritian context. Hence, this study serves to bridge this gap.
Methodology: We report the outcomes of a 20-week ERS. 260 consenting adults recruited from Area Health Centres (AHC) and Mediclinic's around Mauritius were assigned to one of two groups: intervention group (ERS + guidance and support by exercise referral consultant) or control group (exercise 'advice' from a general practitioner). Body Mass Index (BMI), grip strength, waist circumference, fasting blood sugar (FBS), HbA1c, lipid profile and blood pressure were measured at week 0, 10 and 20.
Results: This quasi-experimental longitudinal study successfully demonstrated improvements in parameters associated with risk factors for coronary heart disease, particularly among females of the intervention group. Significant reductions in weight, waist circumference, FBS, and BMI at week 10 and 20 were noted. A less pronounced decline in parameters was observed in males, except for waist circumference, which reached near significance ($p = 0.076$).
Conclusion: Using female participants as a primary focal point, this study supports the notion of exercise referral as part of a holistic treatment plan to control NCDs. We advocate future ERS initiatives prioritise a patient-centred comprehensive approach in design and implementation to ensure successful outcomes.

265: DOES THE PREVALENCE OF HEALTH BEHAVIOURS CHANGE DURING THE FIRST FOUR YEARS OF A MEDICAL STUDENTS' DEGREE?

Jill Borresen[1]
Sport, exercise medicine and lifestyle institute, University of Pretoria[1]
Jill.Borresen@up.ac.za
Background: Research suggests that the personal health behaviours of doctors influence their counselling practices, perceived credibility and success in changing patient behaviours. There is limited research on the health behaviours of future healthcare professionals and how they may change during their degree. This study explores the prevalence of physical inactivity, poor diet and sleep quality, tobacco and alcohol use, in medical students during the first four years of their degree.
Methodology: A longitudinal, observational study in 253 consenting 1st-year MBChB students in 2019 (83 male, 170 female, mean age 20(±2.7) years). Self-reported data were collected via online questionnaires and the prevalence (%) of low-to-moderate physical activity (PA), low-to-moderate diet quality, current/past smoking, unsafe alcohol use and low sleep quality was reported for 2019, followed up in 2020 (2nd-year, n≈215) and 2022 (4th-year, n≈163). Generalized linear models analyzed categorical Kasari-, REAP-S-, PSQI- and AUDIT-scores over 3 time points, incorporating repeated measures from the same students. Estimated prevalence, differences between years, 95%CIs and p-values are reported.
Results: In a group of MBChB students 64.46% reported engaging in low-to-moderate levels of PA in 2019, improving to 53.76% in 2020 (10.75% decrease (CI:4.44%; 17.06%, p=0.0008)) and then to 43.54% in 2022 – a further 10.14% decrease (CI:2.51%; 17.77%, p=0.0092). 66.28% reported low-to-moderate diet quality in 2019 and 58.36% in 2020, a 7.93% decrease (1.39%; 14.46%; p=0.0174). The prevalence of poor sleep quality improved from 63.30% in 2019 to 52.54% in 2022, a 10.75% decrease (CI:2.14%; 19.36%; p=0.0144). Alcohol use score improved from 11.46% in 2019 to 3.70% in 2020, a 7.76% decrease (CI:3.44%; 12.07%, p=0.0004); and showed a decrease of 8.64% (CI:4.39%; 12.89%) from 2019 to 2.82% in 2022 (p<0.0001).

Conclusion: Self-reported physical activity, alcohol use and sleep quality improved during the first 4 years of study, with diet quality improving from 1st- to 2nd-year only. These results are promising and may indicate an improvement in awareness and application of acquired knowledge. The prevalence of poor PA, diet and sleep was still high in their 4th-year (range 43%-57%) which remains concerning in this population, who experience high levels of stress and academic work-load, and would benefit from healthier lifestyle choices.

300: COMPARING THE SENSORIMOTOR NEURAL CORRELATES OF FORWARD AND BACKWARD GAIT IN INDIVIDUALS WITH MILD TO MODERATE PARKINSON'S DISEASE

André Matthew Coetzee[1], Elizabeth Maria Atterbury[2], Samuel Stuart[3], Karen Estelle Welman[4]
Division of Movement Science & Exercise Therapy, Department of Exercise, Sport & Lifestyle Medicine, Stellenbosch University, South Africa[1], Division of Movement Science & Exercise Therapy, Department of Exercise, Sport & Lifestyle Medicine, Stellenbosch University, South Africa[2], Northumbria University, Newcastle-Upon-Tyne, United Kingdom[3], Division of Movement Science & Exercise Therapy, Department of Exercise, Sport & Lifestyle Medicine, Stellenbosch University, South Africa[4]
andrecoetzee@sun.ac.za

Background: Backwards walking (BW) is a complex gait task which may lead to increased gait impairment and gait variability compared to forward walking (FW). Mobile electroencephalography (EEG) has been used to investigate neural correlates of FW gait in individuals with Parkinson's Disease (IwPD), however cortical activity during BW has not been investigated. The primary aim of this exploratory study was to investigate and compare the effect that FW and BW would have on sensorimotor neural correlates and gait parameters in individuals with mild to moderate PD
Methodology: Mobile EEG (64-channel ActiCap Snap, LiveAmp 64, Brain Products GmbH) measured cortical activity of 10 IwPD (H&Y: 2.6 ± 0.7) during an instrumented (APDM® Mobility Lab v2) 6-minute walk test (6MWT) in FW and BW directions. Outcome measures included gait speed and gait variability, as well as power spectral density (PSD) within the delta, theta, alpha (mu), beta, and gamma EEG frequency bands in the sensorimotor cortex. Statistical analyses of EEG data were conducted using the EEGLAB toolbox v2023.1 to evaluate differences in PSD using paired permutation t-tests. Repeated measures mixed-model ANOVA was used to analyse the gait data.
Results: Gait was altered during BW, compared to FW, with decreases in gait speed (FW: 1.06 ± 0.16; BW: 0.50 ± 0.24) and increased gait speed variability found (FW: 6.58 ± 2.71; BW: 20.27 ± 7.55) ($p < 0.01$). Sensorimotor cortical activity differed between conditions, with BW resulting in reductions in beta and gamma power compared to FW ($p < 0.05$). Suppressed sensorimotor beta power is associated with increased sensorimotor cortical activity, attributable to increased task difficulty with BW, while suppressed gamma power may be related to the pathology of PD.
Conclusion: BW leads to different changes in neural correlates and gait performance compared to FW within the sensorimotor cortex. Altered cortical activity during backward walking appears to be frequency band-specific and may reflect differences in neuromotor patterns, proprioceptive demands, and cognitive processes involved. Knowledge of these differences in neural patterns between walking conditions may help guide EEG research as a potential biomarker in IwPD and assist in the development of better rehabilitation interventions, devices, and assessments.

314: EFFECT OF THE KAZIBANTU SCHOOL-BASED HEALTH INTERVENTION ON NON-COMMUNICABLE DISEASE RISK FACTORS OF CHILDREN FROM LOW-INCOME SCHOOLS IN GQEBERHA, SOUTH AFRICA

Danielle Dolley[1], Rosa du Randt[2], Markus Gerber[3], Uwe Pühse[4], Larissa Adams[5], Patricia Arnaiz[6], Nandi Joubert[7], Ivan Müller[8], Siphesihle Nqweniso[9], Jürg Utzinger[10], Cheryl Walter[11]
Nelson Mandela University[1], Nelson Mandela University[2], University of Basel[3], University of Basel[4], Nelson Mandela University[5], University of Basel[6], Swiss Tropical and Public Health Institute[7], University of Basel[8], Nelson Mandela University[9], Swiss Tropical and Public Health Institute[10], Nelson Mandela University[11]
danielle.dolley@mandela.ac.za

Background: This study aimed to determine the effects of a 20-week school-based intervention programme on non-communicable disease (NCD) risk factors of children from low-income schools in Gqeberha, South Africa.
Methodology: A cluster randomised control trial was used to test the intervention, which included three components, namely the [1] KaziKidz toolkit, [2] a physical education (PE) coach and [3] two 90-min KaziKidz training workshops. The intervention was staggered across four schools differentiated by the level of intervention support, while another four schools formed the control group. A total of 961 children (491 boys, 10.88+-1.19 years) from grades 4 to 6 were recruited from eight low-income schools. Measures included waist circumference, blood pressure, glycated haemoglobin, total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol and accelerometer-based moderate to vigorous physical activity (MVPA). Analysis of covariance (ANCOVA) was used to test the effects of the intervention conditions, controlling for the children's pre-intervention results, age, height, and gender.
Results: The post-intervention comparison of the NCD risk factors of children who received interventions with external support showed positive outcomes. Improvements in children's NCD risk factors and MVPA levels were associated with the interventions, which included training workshops and, in some cases, a PE coach. The KaziKidz toolkit (on its own) showed little to no improvements in NCD risk factors and MVPA levels.
Conclusion: School-based interventions providing teacher support may have a positive impact on NCD risk factors and PA behaviours of children attending under-resourced schools. These findings add to our understanding of implementing interventions in resource-scarce schools where teachers are inadequately trained to teach PE.

159: THE EFFECT OF A 3-DAY MOUNTAIN BIKE RACE ON SLEEP AND MOOD

Louise Engelbrecht[1], Elmarie Terblanche[2]
Stellenbosch University[1], Stellenbosch University[2]
louisee@sun.ac.za

Background: Sleep quality and quantity can have a major impact on ultra-endurance performance, especially during multi-day events wherein optimal recovery is key, but sleeping arrangements may be less ideal. Furthermore, sleep disruptions are common following long hours of exercise, and when vigorous exercise ends close to bedtime (1). Lack of sleep increases the susceptibility to negative mood disturbances (2). Decreased vigour and increased fatigue are often reported following ultra-endurance

events, while anger, depression and vigour moderately correlate with sleep quality (3,4). The aim of this study is the assess the effect of a 3-day mountain bike event on sleep quality and quantity and mood.
Methodology: 15 healthy cyclists (20-56 years of age) participated in a 3-day mountain bike event (205km distance, 4000m climbing). Each rider received a LifeQ-enabled smartwatch which was used to measure their sleep. Before the start of each stage the riders completed an activity readiness questionnaire, to assess their perceived mental alertness, muscle soreness and recovery state. After the completion of each stage riders completed the BRUMS mood state questionnaire.
Results: Total sleep duration significantly declined from stage 1 to stage 2 ($p = 0.04$). No negative effects were observed for wakefulness and percentage REM sleep, however, between baseline and stage 1 there was a small negative effect (ES = 0.21) on slow wave sleep. The perceived recovery was significantly less for each stage compared to stage 1 ($p < 0.05$), while perceived mental alertness declined significantly by stage 3 ($p = 0.02$). Vigour was significantly lower after stage 3 ($p = 0.001$).
Conclusion: The 3-day mountain bike event significantly reduced sleep quantity but had no impact on sleep quality. This finding suggests the riders were still able to get restorative sleep. Although the effect of prolonged exercise was small for fatigue (ES = 0.41), riders perceived their recovery to be worse following each stage. Mental alertness and vigour were significantly reduced by stage 3, which may increase the riders' chances of suffering an injury during the final stage as these events are competed in tough terrain, including steep climbs and technical descends.
References: 1. Smith A, Buadze A, Colangelo J, Liebrenz M. Jounral of Sports and Exercise Psychiartry. 2023;2(1):31–6; 2. Scott JPR, McNaughton LR, Polman RCJ. Physiology & Behavior. 2006 Feb 28;87(2):396–408; 3. Graham SM, McKinley M, Chris CC, Westbury T, Baker JS, Kilgore L, et al. Clinical Journal of Sport Medicine. 2012 Nov;22(6):462; 4. Graham SM, Martindale RJJ, McKinley M, Connaboy C, Andronikos G, Susmarski A.. European Journal of Sport Science. 2021 Jan 2;21(1):100–6.

383: THE EFFECT OF PILATES REFORMER-BASED EXERCISES COMPARED TO PILATES MAT-BASED EXERCISES ON PAIN AND FUNCTION IN INDIVIDUALS SUFFERING FROM CHRONIC NON-SPECIFIC LOWER BACK PAIN

Natalia Ferreira[1], Avinesh Pursad[2], Jacolene Kroff [3]
[1,3] Division of Physiological Sciences, Department of Human Biology & Health through Physical Activity, Lifestyle and Sport Research Centre, Faculty of Health Sciences, University of Cape Town, SSISA, Newlands, 7700.[2] Avinesh Pursad Biokineticists, Sports Science Institute of South Africa, Boundary Rd, Newlands, Cape Town, 7725
frrnat008@myuct.ac.za

Background: Chronic non-specific lower back pain (CNSLBP) is a debilitating condition affecting approximately 85% of adults worldwide. Pilates has been increasingly utilised to treat CNSLBP and been modified to allow diverse age groups to use it as a rehabilitative tool. This study aims to compare the effectiveness of Pilates Reformer-based exercises and Pilates mat-based exercises in alleviating pain and improving mobility, stability and disability in individuals afflicted with CNSLBP.
Methodology: Twenty-nine participants with CNSLBP, aged between 25-60 years old, were randomly assigned to one of the six- week interventions, either reformer-based or mat-based. During the first consultation, the following assessments were completed: anthropometry measurements, flexibility, mobility, stability, pain, and disability ratings. Following the six-week interventions, all measurements

were repeated. The data underwent comprehensive analysis using Shapiro-Wilk for normality, Chi-squares and Fisher-Exact Statistic for categorical variables, independent t-tests, McNemar tests, two-way mixed ANOVA for repeated measures, binomial regression, Mann-Whitney U tests, and the Friedman test for non-parametric data.
Results: At baseline, Pilates mat-based (50%) and reformer-based (53.3%) groups showed similar disability outcomes (p=0.858) according to the Roland-Morris Disability Questionnaire (p=0.858). Numerical pain-rating scale scores indicated higher baseline pain in 85.7% of the mat-based group versus 66.7% in the reformer-based group (p=0.858). Baseline stability, assessed with Trendelenburg and bridge-with-leg-extension (BwLE) tests, was significantly better in the reformer-based group (66.7%) compared to the mat-based group (28.6%)(p=0.04). No significant associations were found between pain and disability ratings (p>0.05). There were no significant changes over time (p=0.088) or group x time interaction (p=0.487) for mobility measured by the Sit-and-Reach test. The reformer-based group significantly improved in the Active Straight-Leg-Raise scores (p=0.033), unlike the mat-based group (p=0.111) however there was no group x time interaction. No significant changes were found in BwLE or Trendelenburg tests in either group.
Conclusion: No intervention modality showed significantly greater improvements in disability, mobility, and stability outcomes after the six-week Pilates interventions; both led to improved mobility, stability, and reduced pain and disability. However, Pilates reformer-based intervention proved effective for managing CNSLBP, particularly in terms of disability, stability, mobility, and pain. These results may help clinicians in treating individuals with CNSLBP.

355: RESTRICTED TRAINING AND COMPETING DURING LOCKDOWN INCREASED TRIATHLETE'S RISK FOR DEPRESSION

Hanlie Pittendrigh[1], Janetta Harbron[2], Esmè Jordaan[3]
Health Through Physical Activity and lifestyle (HPALS) research centre, Department of Human Biology, Faculty of Health Sciences, University of Cape Town[1], Health Through Physical Activity and lifestyle (HPALS) research centre, Department of Human Biology, Faculty of Health Sciences, University of Cape Town[2], Medical Research Council, Tygerberg, W. Cape, South Africa[3]
hanliejdn@gmail.com

Background: The global rise in triathlon participation requires triathletes to follow rigorous training and diet regimes. South Africa's stringent lockdown confined training to home settings, posing unique challenges. This study examines the lockdown's impact on training, diet, and mental well-being, particularly depression prevalence and risk factors among South African triathletes.
Methodology: A cross-sectional study was conducted in two phases. Triathletes aged 18-70 in South Africa completed an online Redcap questionnaire in phase one (n=441) and phase two (n=357) during 2021-2022, including questions about lockdown level 1. Phase one included socio-demographic, lockdown-specific, training, and triathlon-specific questions. Phase two used the Centre for Epidemiological Studies Depression Inventory (CES-D) to measure depression risk. The log-Binomial model identified factors associated with depression according to the CES-D.
Results: The average age of participants was 39 years, with a male-to-female ratio of 3:1. Of the participants, 53.5% were recreational triathletes and 46.5% were competitive. The CES-D results showed that 26.3% exhibited symptoms of depression. The risk for depression doubled for triathletes who did not train or compete during the lockdown (2021-2022) compared to those who did (PR = 2.0; 95% CI;

1.4-2.8; p = 0.0002). During the lockdown, some triathletes became depressed (PR = 2.7; 95% CI; 1.7-4.2; p = 0.0001) while others felt more motivated (PR=2.7; 95% CI; 1.5-5.0; p = 0.0012) compared to those who maintained their usual routines. Participants with a higher risk for depression were females (p = 0.011) and those who changed their diet (p = 0.001), lost weight (p = 0.025), weighed themselves more often (p = 0.012), became more aware of their appearance (p = 0.0001), and had mood changes (p = 0.0001) during lockdown.
Conclusion: The average age of participants was 39 years, with a male-to-female ratio of 3:1. Of the participants, 53.5% were recreational triathletes and 46.5% were competitive. The CES-D results showed that 26.3% exhibited symptoms of depression. The risk for depression doubled for triathletes who did not train or compete during the lockdown (2021-2022) compared to those who did (PR = 2.0; 95% CI; 1.4-2.8; p = 0.0002). During the lockdown, some triathletes became depressed (PR = 2.7; 95% CI; 1.7-4.2; p = 0.0001) while others felt more motivated (PR=2.7; 95% CI; 1.5-5.0; p = 0.0012) compared to those who maintained their usual routines. Participants with a higher risk for depression were females (p = 0.011) and those who changed their diet (p = 0.001), lost weight (p = 0.025), weighed themselves more often (p = 0.012), became more aware of their appearance (p = 0.0001), and had mood changes (p = 0.0001) during lockdown.

330: FEASIBILITY AND IMPLEMENTATION OF THE MAROON HEALTH PASSPORT AS A HEALTH SURVEILLANCE SYSTEM AT A TERTIARY EDUCATIONAL INSTITUTION

Liske Kotze-Horstmann[1], Susan Crumpton[2], Maya van Gent[3], Wayne Derman[4]
Department of Exercise, Sport and Lifestyle Medicine , Stellenbosch University[1], Department of Exercise, Sport and Lifestyle Medicine , Stellenbosch University[2], Department of Human Movement Science, University of Fort Hare[3], Department of Exercise, Sport and Lifestyle Medicine , Stellenbosch University[4]
lmkotze@sun.ac.za

Background: The MaRooN Health Passport (MHP) was developed to monitor the health and wellbeing profiles of the staff and students at the University of Stellenbosch, and to identify individuals at risk of adverse health outcomes. The purpose of the current project is to describe the feasibility, acceptability, and implementation of the MHP at the University of Stellenbosch and based on these findings, evaluate an appropriate framework for the implementation of the MHP at a second tertiary institution.
Methodology: The MHP pilot phase was conducted from 2017-2019. Data on current and past health and lifestyle-related risk behaviours were collected in staff and students. In a subsample of the participants, user acceptance, survey appeal and completion time was also collected. The MRC framework for complicated interventions was evaluated for its applicability as a conceptual framework for the implementation of MHP at the second tertiary institution.
Results: A total of 405 participants completed the pilot survey (60% females and 40% males). The majority were students 323 (78%) compared to staff 82 (21%). The mean (SD) age was 28 ± 10 years. Of these, 234 (58%) participants answered the user acceptance (78% moderate to high), clarity (97% moderate to high) and completion time (avg. 25min) questions. Lifestyle-related risk behaviours were identified in 54% of participants with significant differences between staff and student cohorts. Four key elements were identified in the conceptual framework relating to feasibility and development of the MHP in a low-resourced rural setting.

Conclusion: MHP demonstrated clinical and research value in its ability to integrate into existing infrastructure at the institutional level, and through its flagging system, connect with existing health support structures to provide real-time healthcare on an individual level.

332: HOW HEALTHY ARE OUR STUDENTS REALLY? LIFESTYLE-RELATED HEALTH RISK BEHAVIOUR PATTERNS IN STUDENT-ATHLETES AND NON-ATHLETE STUDENTS

Liske Kotze-Horstmann[1], Gabriella Florence[2], Wayne Derman[3]
Department of Exercise, Sport and Lifestyle Medicine , Stellenbosch University[1], Department of Exercise, Sport and Lifestyle Medicine , Stellenbosch University[2], Department of Exercise, Sport and Lifestyle Medicine , Stellenbosch University[3]
lmkotze@sun.ac.za

Background: Previous research has demonstrated a high prevalence of engagement in lifestyle-related risk behaviours among university students, but differentiations between athletic status is lacking. This study aimed to investigate lifestyle-related risk behaviours in South African student-athletes (St-A) compared to a matched control group of non-athlete students (NAS).
Methodology: This cross-sectional study assessed the prevalence of alcohol consumption, cigarette smoking, inadequate fruit and vegetable intake, and physical inactivity using a screening questionnaire. Differences between gender and athletic status were analysed using the two-sample test of proportions with significance determined as $p<0.05$. A separate cluster analysis was included to identify links between risk behaviours.
Results: One hundred and forty-five St-A (n=91 male, n=54 female) and 143 NAS (n=90 male, n=53 female) were included. Less than one-fifth of both groups were non-alcohol consumers. More male St-A (80.2%) than NAS (62.2%) never smoked ($p=0.008$) while more male NAS (15.6%) than St-A (4.4%) smoked daily ($p=0.012$). Similar smoking habits were observed among females. Twice as many NAS than St-A did not meet the recommended levels of vigorous ($p<0.001$) and moderate physical activity ($p<0.001$). Less than 10% of both groups consumed ≥5 fruit and vegetable servings/day. In the cluster analysis, inadequate vigorous physical activity was the most significant predictor of cluster membership, followed by smoking status, inadequate moderate physical activity, fruit and vegetable consumption, regardless of athletic status.
Conclusion: St-A and NAS engage in lifestyle-related risk behaviours. Further investigation relating to the interconnections of these behaviours and the implementation of university-based interventions is warranted.

163: DIABETES RELATED KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS EXERCISE AND ITS BENEFITS AMONG INDIVIDUALS WITH TYPE-2 DIABETES MELLITUS

Nokutula Mstali[1], Takshita Sookan-Kassie[2]
Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu-Natal, South Africa[1], Discipline of Biokinetics, Exercise and Leisure Sciences, School of Health Sciences, University of KwaZulu-Natal, South Africa[2]
asename22@gmail.com

Background: Regular exercise has shown to have a significant positive effect in the health outcomes of individuals with Type-2 diabetes mellitus (T2DM), however it is underutilised in developing countries. This study investigated diabetes-related knowledge, attitudes and practice towards exercise and its benefits among individuals with T2DM.
Methodology: A total of one hundred and ninety-nine participants (male= 21.6% and female= 78.4%) with T2DM, aged between 18- 75 (43.77 ±14.78) years participated in the study. A validated diabetes related knowledge, attitude and practice questionnaire, consisting of closed ended questions, evaluated by true/false or unsure was utilised in the study. The most selected responses determined if the study participants had satisfactory/unsatisfactory diabetes related knowledge, attitude and practice. Descriptive and inferential statistics analysis was used to analyse data with the significance set at $p<0.05$.
Results: The study results demonstrated significantly poor diabetes related knowledge towards exercise ($p<0.001$). The majority of the study participants 163 (81.90%) with T2DM did not know that physical activity and exercise are different, followed by 138(69.3%) of the study participants that indicated a person with T2DM cannot do strenuous exercise like weightlifting and running. Regarding attitude of the individuals with T2DM, 158 (70.40%) of the study participants felt that their regular work is an adequate substitution to exercise and the other 139 (69.8%) indicated the use of mild pain or fatigue as an excuse to keep them away from exercising. More than 50% of the study participants demonstrated a positive practice towards exercise and its benefits towards T2DM ($p<0.001$). One hundred and thirty (65.3%) participants reported that they check for feet injuries regularly, followed by 141(70.9) of the study participants indicating that they understood how to adjust their lifestyle to living with T2DM.
Conclusion: The study revealed that participants' knowledge and attitude were poor towards exercise and its benefits, but their practice was good. Therefore, educational methods are needed to encourage regular physical activity among individuals.

351: RELATIONSHIPS BETWEEN NON-COMMUNICABLE DISEASE RISK FACTORS, FUNCTIONAL PERFORMANCE AND HEALTH-RELATED QUALITY OF LIFE OF RURAL AND LOW-RESOURCED URBAN COMMUNITIES OF SOUTH AFRICA

Fhatuwani Walter Ramalivhana[1], Tamrin Veldsman[2], Sarah J Moss[3],
Physical Activity, Sport and Recreation Research Entity, Faculty of Health Sciences, North-West University, Potchefstroom, South Africa[1], Physical Activity, Sport and Recreation Research Entity, Faculty of Health Sciences, North-West University, Potchefstroom, South Africa[2], Physical Activity, Sport and Recreation Research Entity, Faculty of Health Sciences, North-West University, Potchefstroom, South Africa[3]
Walter.Ramalivhana@nwu.ac.za

Background: Rural-urban health disparities exist regarding non-communicable disease (NCD) risk factors, functional performance and health-related quality of life (HRQoL). Evidence regarding objectively measured NCD risk, functional performance and HRQoL is limited in rural and low-resourced urban communities of South Africa.
Methodology: NCD risk factors (objectively measured physical inactivity, body composition, blood pressure [BP], lipid and glucose profile); functional performance (handgrip, balance, sit-to-stand, agility, cardiorespiratory fitness [CRF]); and HRQoL of from rural and low-resourced urban communities were measured. Partial correlation and multiple regression analyses for the different settings were performed.

Results: The data of participants from rural (n=128; mean age 52.84 ± 11.31 years) and low-resourced urban (n=183; mean age 59.09 ± 10.69 years) communities were analysed. In rural and urban areas, body composition variables (body mass index (BMI), waist circumference (WC) and body fat) were inversely associated with balance and CRF. In rural areas, balance was associated with BMI (r = -0.337, p =0.009; r = -0.351, p =0.006) and WC (r = -389, p = 0.002; r = -0.425, p =0.001), while CRF was associated with WC (r = -0.397; p = 0.002). In urban, balance was associated with WC (r = -0.194; p = 0.051), while CRF was associated with body fat (r = -0.227; p = 0.005). In rural areas, handgrip was positively associated with diastolic blood pressure (DBP) (r = 0.302; p = 0.020) and body fat (r = 0.264; p = 0.044). Sit-to-stand and mental component (r = 0.206; p = 0.028), emotional role and balance (right: r = 0.201; p = 0.032; left: r = 0.191; p = 0.041) were positively associated in rural areas. In urban area, agility was positively associated with physical component (r = 0.211; p = 0.015) and emotional role (r = 0.257; p = 0.003). Emotional role was inversely associated with agility, while BP increased (SBP: r = -0.195; p = 0.031; DBP: r =-0.213; p = 0.018). Increased agility is associated with improved physical component of HRQoL (r = 0.211; p = 0.015). Multiple regression analyses physical and mental components of HRQOL didn't identify predictors.
Conclusion: Differences and similarities exist in the associations between NCD risk factors, functional performance and HRQoL in rural compared with urban settings. Differentiated exercise interventions are needed for rural and urban communities to address health and well-being.

STUDENT ABSTRACTS

INDEX	NAME	ABSTRACT TITLE
210	Ms Ashleigh Thomas	Challenge Accepted: A Scoping Review of the Applications of the Challenge Point Framework
392	Ms Seipati Rasenyalo	Can a tackle technique training programme improve tackling ability in women's rugby? A pilot study
397	Ms Natalie Erskine	Trends in Rugby Union Research: A bibliometric analysis
396	Mr Roscoe Fisher	Improve adherence and uptake of cardiac patients to cardiac rehabilitation in low-resourced settings – A realist review protocol
385	Dr Janesh Ganda	Assessing the role of a Comprehensive Multimodal Assessment (COMP) in the diagnosis of acute concussion (within 36 hours) in elite male professional rugby players
371	Ms Christina Sefotha	The effects of the menstrual cycle and hormonal contraceptives on selected intrinsic risk factors among female athletes
379	Mrs Faatima Adam	Health profiles of African para athletes at a Commonwealth Games Federations GAPS camp
393	Ms Jenna Hosking	Social support in women's rugby union in South Africa
308	Ms Mandisa Simamane	Using a co-design approach to develop workplace interventions for reducing sitting amongst office workers
386	Mr Chris Leckey	Machine learning approaches to injury risk prediction in sport: A scoping review with evidence synthesis

210: CHALLENGE ACCEPTED: A SCOPING REVIEW OF THE APPLICATIONS OF THE CHALLENGE POINT FRAMEWORK

Ashleigh Thomas[1], Dr Sharief Hendricks[2], Lara Paul[3], Seipati Rasenyalo[4]
University of Cape Town[1], University of Cape Town; Leeds Beckett University[2], University of Cape Town[3], University of Cape Town[4]
athoma1999@gmail.com

Background: Quality and quantity of practice are main conditions for learning to acquire new motor skills (Guadagnoli & Lee, 2004). Purposefully, and deliberately, engaging in optimal practice conditions is associated with positive performance outcomes (Guadagnoli & Lee, 2004). The Challenge Point Framework is a conceptual framework developed to guide design of practice for optimal motor skill learning (Guadagnoli & Lee, 2004). Therefore, this review aimed to synthesize and interpret the studies in which the Guadagnoli and Lee (2004) "Challenge Point Framework" has been used.
Methodology: A scoping review was conducted using adapted PRISMA guidelines and the Arksey and O'Malley framework. Four online databases; Scopus, Google Scholar, Web of Science Core Collection and PubMed, were searched. Published papers referencing the 2004, Guadagnoli and Lee "Challenge Point Framework" paper and meeting the inclusion criteria were included. A two-step search strategy was used to identify all relevant studies and which research area they fell under. Data were extracted for (1) A numerical and graphical analysis; (2) Quantitative thematic table summaries; and (3) Descriptive analyses.

Results: The CPF was applied in five fields being academic education, medical education, motor learning and development, rehabilitation, and sport. Applications included optimizing practice design, informing difficulty progressions, and improving skill transfer and retention. There have been no applications of the CPF to sports rehabilitation. Many of the applications were theoretical.
Conclusion: The CPF had different applied across various fields. Many of the applications have been theoretical. Overall, when CPF was applied in practice, learning outcomes were improved and skills were better retained. Therefore, applying the CPF in practical settings has benefits for motor skill learning and retention.

392: CAN A TACKLE TECHNIQUE TRAINING PROGRAMME IMPROVE TACKLING ABILITY IN WOMEN'S RUGBY? A PILOT STUDY

Seipati Rasenyalo[1], Lara Paul[2], Jenna Hosking[3], Ben Jones[4], Kathryn Dane[5], Sharief Hendricks[6]
Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa 2 Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department[1], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa 2 Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department[2], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa 2 Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department[3], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa 2 Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa. 3 Carnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, United Kingdom. 4 Discipline of Physiotherapy, School of Medicine, Trinity College Dublin, Dublin, Ireland.[4], Discipline of Physiotherapy, School of Medicine, Trinity College Dublin, Dublin, Ireland[5], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa 2 Health through Physical Activity, Lifestyle and Sport Research Centre (HPALS), Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa. 3 Carnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, United Kingdom.[6]
rasenyalo.s.e@gmail.com

Background: Women's rugby is one of the fastest-growing sports in the world, with over 2.7 million players. Tackling in rugby is a highly demanding skill, with effective technique being crucial for safe participation and team success. Tackles are the primary cause of injuries, accounting for 67% in rugby union (West et al., 2021) and 62% in rugby sevens (Fuller & Taylor., 2021). Tackle-related injuries impose the highest injury burden, resulting in 615 days of absence per 1,000 hours (Starling et al., 2023). Additionally, women experience a higher incidence of ACL injuries compared to men in various sports, largely attributed to female biology (Parsons et al., 2021; Sturnick et al., 2015). Female athletes also endure more severe symptoms and longer recovery times after sports-related concussions (Suzuki et al., 2020). Proficient tackle contact skills, both as a ball-carrier and tackler, are linked to reduced injury risk and increased tackle success (Hendricks et al., 2010; 2015). However, there is a lack of research on optimizing tackling technique for female athletes. The aim of the study is to determine whether a tackle technique training program can enhance tackling ability in women's rugby.

Methodology: This study will use a non-randomised-control design, with 20 participants. Players will be video recorded for 5 matches before the intervention. Baseline measurements will include tests for tackle technique, tackle capacity, and physical assessments (anthropometry, strength and power). Following this, players will engage in a 6-week intervention program focused on improving tackle technique and physical conditioning. The tackle training component is based on the Tackle Training Skill Framework by Hendricks (2018), incorporating periodization and skill development theories, and following the World Rugby Tackle Ready guidelines (World Rugby, 2020). After the 6-week program, players will undergo the same tests as at baseline. The final 5 matches of the season will also be video recorded.
Conclusion: The outcome of the study is to enhance women's tackling technique and physical preparedness, advancing tailored coaching methods. This research is crucial for coaches aiming to improve performance and clinicians focused on injury prevention in women's rugby and contribute to future researches in women rugby.

397: TRENDS IN RUGBY UNION RESEARCH: A BIBLIOMETRIC ANALYSIS

Natalie Erskine[1], Jade Riley[2], Sharief Hendricks[3], Faatiema Salie[4]
Division of Physiological Sciences, Department of Human Biology; Health through Physical Activity, Lifestyle and Sport Research Centre, Faculty of Health Sciences, University of Cape Town[1], Division of Physiological Sciences, Department of Human Biology; Health through Physical Activity, Lifestyle and Sport Research Centre, Faculty of Health Sciences, University of Cape Town[2], Division of Physiological Sciences, Department of Human Biology; Health through Physical Activity, Lifestyle and Sport Research Centre, Faculty of Health Sciences, University of Cape Town ; 3 Carnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, Leeds, UK[3], 4 Department of Industrial Engineering, Stellenbosch University[4]
nats.erskine@gmail.com

Background: Rugby Union is one of the most popular full-contact sports in the world. Given the ever-increasing participation rates and known injury risks, sport scientists and stakeholders in rugby union have been researching to develop innovative solutions to enhance performance and safeguard rugby union players. Despite the growth of rugby as a sport and the increased engagement in innovation within rugby, it is unclear what the key areas of research how these research areas have evolved over time. Identifying the main areas of research will allow us to understand how the generation of scientific knowledge has changed over the years and if there are gaps within the research field that need further investigation. This investigation utilises keyword networks to explore the rugby research landscape.
Methodology: A systematic search applying inclusion and exclusion criteria identified relevant rugby union publications. Keywords assigned by authors and extracted from titles were used to construct keyword networks for each year from 2016 to 2022. Metrics of interest, namely degree centrality and popularity, were employed to pinpoint predominant research themes in each timeframe.
Results: The number of publications increased each year from 2016 to 2022, except for a decline in 2019. The total number of keywords (both author-listed and title-extracted) each year from 2016 to 2022. The keywords with the highest degree centrality and popularity from 2016 to 2022 were “concussion”, “performance”, “injury prevention”, and “global positioning system”.

Conclusion: rugby union research has changed over the seven-year period, but the overarching research topics have remained fairly consistent focusing on key areas such as player welfare, performance, and injury.

396: IMPROVE ADHERENCE AND UPTAKE OF CARDIAC PATIENTS TO CARDIAC REHABILITATION IN LOW-RESOURCED SETTINGS – A REALIST REVIEW PROTOCOL

Roscoe Fisher[1], Martin Heine[2], Susan Hanekom[3]
Stellenbosch University, Faculty of Medicine and Health Sciences, Division of Physiotherapy, Cape Town, South Africa[1], Julius Global Health, Julius Centre for Health Sciences and Primary Care, University Medical Centre Utrecht, Utrecht University, Utrecht, The Netherlands[2], Stellenbosch University, Faculty of Medicine and Health Sciences, Division of Physiotherapy, Cape Town, South Africa[3]
roscoefisher@icloud.com

Background: Cardiovascular disease (CVD) is one of the leading causes of mortality, morbidity, and disability worldwide disproportionally affecting people from low-to-middle income countries and low-resourced settings. Cardiac rehabilitation (CR) is an evidence-based strategy to reduce adverse CVD outcomes and impact, thereby contributing to secondary prevention and improvements in health-related quality of life. Despite evidence for the efficacy of CR, real-world evidence suggests that CR has poor uptake and adherence across different populations. Barriers and facilitators to CR uptake and adherence have been described – albeit mostly in high-income settings. Few studies have explored what strategies can be adopted, how these strategies may work, and in what context. Realist approaches use stakeholder engagement and literature synthesis to develop and/or test context-mechanism-outcome initial theories for what works, for whom, and in what context. This realist review is the first to apply this methodology to unravel how, in theory, adherence and uptake to CR can be improved, and in what context. As such, it is expected to widely support the theoretical understanding of how-to bring CR to scale, with a focus on low-resourced settings.
Methodology: This realist review follows established methodological underpinnings developed by Pawson and colleagues, consisting of five iterative steps. First, the review scope is defined in consultation with stakeholders. Second, together with stakeholders, initial program theories are developed (i.e. context, mechanism, and outcome [CMO] configurations) supported by the Theoretical Domains Framework. This framework is particularly useful in the relation to behavioural mechanisms (e.g. factors affecting adherence). Thirdly, evidence is being identified that supports (or does not support) each CMO. Fourthly, evidence is selected and appraised. Finally, data is extracted and synthesized. Reporting will follow the RAMESES guideline for realist and meta-narrative evidence syntheses. To ensure global representation, we will use both an accessible core working group in initial phases, while using survey methods to solicit input from a broader and larger group of stakeholders globally. Permission will be sought from networks like the international council for cardiac prevention and rehabilitation to access their members.

385: ASSESSING THE ROLE OF A COMPREHENSIVE MULTIMODAL ASSESSMENT (COMP) IN THE DIAGNOSIS OF ACUTE CONCUSSION (WITHIN 36 HOURS) IN ELITE MALE PROFESSIONAL RUGBY PLAYERS

Janesh Ganda[1], Jon Patricios[2], Kathryn Schendier[3], Sharief Hendricks[4], Evelyn Lumngwena[5]

Wits Sport and Health (WiSH), School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg-Braamfontein, South Africa[1], Wits Sport and Health (WiSH), School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg-Braamfontein, South Africa[2], Sport Injury Prevention Research Centre, Faculty of Kinesiology, University of Calgary, Calgary, Alberta, Canada[3], Division of Physiological Sciences and Health through Physical Activity, Lifestyle and Sport, Department of Human Biology, University of Cape Town, Observatory, Western Cape, South Africa[4], Wits Sport and Health (WiSH), School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg-Braamfontein, South Africa[5]
janesh@sportdr.co.za

Background: Head injuries, including concussions, are among the more frequent tackle-related injuries in rugby union. As a heterogeneous injury, concussions can affect multiple systems following an impact. Current standardized multimodal assessments include symptom evaluation, balance testing, oculomotor assessment, cervical spine assessment, vestibular assessment, and a neurological screen. Clinical tests like the Sports Concussion Assessment Tool (SCAT) are effective within the first 72 hours post-injury, but their sensitivity decreases afterward. Combining these tests into a multimodal assessment improves concussion detection, which is further enhanced by adding the Vestibular Ocular Motor Screen (VOMS) and neuropsychiatric testing. This project aims to assess the added value of the COMP (COMPrehensive) assessment in diagnosing concussions compared to the current HIA (Head Injury Assessment) process in professional rugby players.
Methodology: This sub-study of the larger Rugby Readiness and Rehabilitation Enhanced and Personalized (RREP) study evaluates the added value of the COMP assessment in diagnosing concussions, as compared to the current HIA process, among Currie Cup participants.
It will assess:
1. Feasibility of performing COMP at HIA 3 by summarizing outcomes, player completion rates, time taken, adverse effects, and healthcare professional feedback.
2. Diagnostic accuracy of COMP against baseline scores and HIA using sensitivity, specificity, predictive values, area under the curve, and percent agreement. A multiple variable model will be used to identify the most useful COMP items.
3. COMP performance differences between criteria 1 and 2 clinical findings in players using descriptive statistics and regression analysis, adjusting for various factors such as previous history of a concussion, sex and cluster by team, with Bonferroni correction applied.

371: THE EFFECTS OF THE MENSTRUAL CYCLE AND HORMONAL CONTRACEPTIVES ON SELECTED INTRINSIC RISK FACTORS AMONG FEMALE ATHLETES

Christina Sefotha[1], Simoné Ferreira[2], Lynn Smith[3]
Department of Sport and Movement Studies, University of Johannesburg[1], Department of Sport and Movement Studies, University of Johannesburg[2], Department of Sport and Movement Studies, University of Johannesburg[3]
christinas@uj.ac.za

Background: The increase of female sports participation at a competitive level has placed an emphasis on the increase of sports performance and simultaneously, sports-related injury susceptibility. As a result, there has been a notable increase in research exploring female physiology and how its differences

affect sports performance and exercise. However, further investigation is still needed on one of the vast female physiological complexities – the menstrual cycle (MC)– and how it affects selected intrinsic sports-related injury risk factors. Aims and objectives: The main aim of this study is to determine the effects of the three phases of the MC (follicular, ovulation and luteal phase) on selected modifiable intrinsic injury risk factors amongst female track athletes and soccer players. Additionally, comparisons of intrinsic risk factors between participants using hormonal contraceptive and non-hormonal contraceptive users will be investigated.
Methodology: The study will utilise a descriptive, cross-sectional, quantitative research design with a calculated sample size of 82 female athletes over the age of 18 years at the University of Johannesburg. Participants will be required to track their menstrual cycle throughout the various phases of the MC, using the FitrWoman application. Muscular strength and flexibility will be measured using the handheld VALD DynaMo Plus dynamometer and inclinometer, respectively. Moreover, stability will be measured using the Balance Error Scoring System. Descriptive (frequency and percentage response distribution and mode) and inferential statistics (t-tests) will be used to analyse the data, using the Statistical Package of Social Sciences (SPSS, version 28). A confidence interval of 95% with a statistical significance of $p<0.05$ will be used.
Conclusion: Ethical considerations and possible outcomes:
Ethical approval was granted from the Faculty of Health Sciences Research Ethics Committee. This research study will be beneficial for the sports community at large, specifically female athletes and sports coaches, by providing essential information on how the phases of the MC affect the selected intrinsic injury risk factors. This can assist coaches and female athletes to modify their training programmes to accommodate the physiological changes during the MC.

379: HEALTH PROFILES OF AFRICAN PARA ATHLETES AT A COMMONWEALTH GAMES FEDERATIONS GAPS CAMP

Faatima Adam[1], Kristina Fagher[2], Eirik Halvorsen Wik[3], Rangana Hettige[4], Laurent Koglin[5], Wayne Derman[6], Phoebe Runciman[7]
Division of Sport and Exercise Medicine, Department of Exercise, Sport, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa[1], Department of Health Sciences, Faculty of Medicine, Lund University, Sweden[2], Division of Sport and Exercise Medicine, Department of Exercise, Sport, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa[3], Sports Medicine Unit, Teaching Hospital Peradeniya, Sri Lanka[4], Swiss Olympic Medical Centre, Hospital de la Tour, Meyrin, Geneva, Switzerland[5], Division of Sport and Exercise Medicine, Department of Exercise, Sport, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa[6], Division of Sport and Exercise Medicine, Department of Exercise, Sport, and Lifestyle Medicine, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa[7]
19435487@sun.ac.za

Background: The development of Para sport across African countries has seen considerable progress, with increasing participation of Para athletes at National and International levels. However, there remains a scarcity of literature regarding the health of African Para athletes. This study aimed to describe the health profiles garnered during periodic health evaluations (PHEs) in a cohort of African Para athletes participating in a Commonwealth Games Federations GAPS camp.

Methodology: Forty-two Para athletes from 13 African countries selected to attend the Commonwealth Games Federations GAPS camp in South Africa were invited to participate in this study. All athletes underwent standardised International Olympic Committee PHEs at the camp, conducted by qualified medical practitioners, and 24 athletes consented for their medical records to be analysed. Health profiles were described according to demographics, medical history, physical examination findings, and special investigations.
Results: There were 11 female and 13 male athletes (age: 30.7±9.7 years). The most prevalent impairments were brain disorders (n=4), limb deficiency (n=4), neuromuscular disorders (n=4), and spinal cord-related disorders (n=4). Musculoskeletal complaints/conditions were the most common during history taking (42%) and during physical examinations (92%), particularly to the lower limbs (86%). Eight athletes reported previous hospitalisation (8% Malaria, 13% orthopaedic surgery, 13% unknown). Five athletes had persistent blood pressure elevations ≥140/90 mmHg which resulted in either prescription medication or referral. Mean haemoglobin concentrations were 14.4 ±2.3g/dL, and glucose concentrations were 5.2±0.6mmol/L. However, mean female athlete (27%) haemoglobin concentrations were ≤10.8g/dL indicating possible anaemia. Dental (46%) and dermatological (42%) conditions were also prevalent. Sixteen cases required referral to health professionals (54%) or additional imaging or blood tests (13%). Findings in the case of two evaluations resulted in time loss from sport.
Conclusion: This study provides a first insight into the health profiles of African Para athletes, highlighting the prevalence of musculoskeletal, dental, and dermatological conditions in this cohort. Hospitalisation and hypertension amongst Para athletes have been reported in previous studies, however hospitalisation due to Malaria may be specific to African Para athletes. Some health conditions are similar to global athlete trends, while others may be influenced by region-specific health backgrounds of African Para athletes.

393: SOCIAL SUPPORT IN WOMEN'S RUGBY UNION IN SOUTH AFRICA

Jenna Hosking[1], Lara Paul[2], Sharief Hendricks[3]
Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa[1], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa[2], Division of Physiological Sciences, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa[3]
jhosking287@gmail.com

Background: Social support has been recognized a significant factor in maintaining physical psychological health. Social support from coaches, teammates, family, friends, and staff is considered to affect athletes' cognitive, emotional, and behavioural aspects in a positive manner. Psychological literature has also indicated that the perception of available support may serve as a more accurate predictor of health and well-being outcomes. Women's rugby union is experiencing rapid growth on a global scale. More than one third of global rugby players are women and girls. However, the majority of rugby research, laws, and regulations are based on the men's game, with limited applicability to the women's game. This extends to research concerning training load, performance, injury and concussion management. The aspects that encompass social norms, biases, and disparities evident in access to training, competition, and treatment environments are also under need for greater understanding. There is inadequate information available regarding the knowledge, experience, and support within women's rugby.

Therefore, the aim of this study will be to look at the current state of social support for women's rugby players in South Africa.
Methodology: All data will be collected from collected from senior elite and senior club level rugby players in South Africa. After the recruitment of players, validated questionnaires, such as the General Health Questionnaire, Perceived Available Support in Sport Questionnaire (PASS-Q), and Athletes' Received Support Questionnaire (ARSQ) will be distributed. The questionnaire compromises of various questions relating to their family, friend, financial, career experience and other facets of social support. Players' characteristics will also be collected and analysed.
Results: IMPLICATIONS OF STUDY
Verifying the social support available for South African athletes will contribute to the athletes' physical and psychological health, performance self-confidence, coping strategies, dealing with competitive stressors and identifying barriers and challenges in the sport. This study will help to understand more about these barriers, challenges, as well as opportunities within women's rugby that span beyond the training and skill development throughout the sport.

308: USING A CO-DESIGN APPROACH TO DEVELOP WORKPLACE INTERVENTIONS FOR REDUCING SITTING AMONGST OFFICE WORKERS

Mandisa Jewel Simamane[1], Merling Phaswana[2], Philippe Jean-Luc Gradidge[3]
University of the Witwatersrand[1], University of the Witwatersrand[2], University of the Witwatersrand[3]
Mandisa.Simamane@wits.ac.za

Background: Prolonged sitting during awake time in modern offices is linked to health issues like metabolic diseases, and musculoskeletal problems. This is a significant concern in South Africa, where research on sustainable office interventions to promote physical activity is limited. This study aims to co-design an intervention to reduce sitting time by incorporating feedback from office workers, management, and human resources (HR) departments. Through focus discussions, we seek to develop practical strategies for promoting physical activity.
Methodology: Structured focus group discussions will be held with office workers, management, and HR personnel to understand barriers to physical activity and identify strategies to overcome them. Participants will include employees from different departments and roles, supervisors, department heads, and HR professionals. Potential strategies include introducing standing desks, scheduling standing or walking meetings, organising company-wide movement challenges, and offering workshops on the benefits of reducing sitting time. These interventions will be assessed for feasibility within the existing office infrastructure and culture. Feedback from focus groups will guide the design of a comprehensive intervention plan, with data collected on its impact on sitting time and physical activity levels.
Results: We expect to identify (1) Specific barriers and facilitators to reducing sitting time in South African offices, (2) Co-designed intervention strategies tailored to office workers' needs, (3) Evidence of increased physical activity and reduced sitting time during the pilot phase, and (4) Insights into the acceptability and feasibility of the proposed interventions from both employees and management.
Conclusion: The discussions and co-design efforts aim to identify sustainable and culturally appropriate interventions to reduce sitting time and promote physical activity in South African offices. This research will provide important data on the effectiveness of such interventions, enhancing employee health and well-being and contributing to a more dynamic and productive workplace.

386: MACHINE LEARNING APPROACHES TO INJURY RISK PREDICTION IN SPORT: A SCOPING REVIEW WITH EVIDENCE SYNTHESIS

Chris Leckey[1], Nicol van Dyk[2], Cailbhe Doherty[3], Aonghus Lawlor[4], Eamonn Delahunt[5]
School of Public Health, Physiotherapy & Sports Science, University College Dublin, Dublin, Ireland & High Performance Unit, Irish Rugby Football Union, Dublin, Ireland[1], School of Public Health, Physiotherapy & Sports Science, University College Dublin, Dublin, Ireland & Section Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria, South Africa[2], School of Public Health, Physiotherapy & Sports Science, University College Dublin, Dublin, Ireland & Insight Centre for Data Analytics, University College Dublin, Dublin, Ireland[3], Insight Centre for Data Analytics, University College Dublin, Dublin, Ireland & Insight Centre for Data Analytics, University College Dublin, Dublin, Ireland[4], School of Public Health, Physiotherapy & Sports Science, University College Dublin, Dublin, Ireland & Institute for Sport and Health, University College Dublin, Dublin, Ireland[5]
christopher.leckey@irfu.ie

Background:
In an effort to explore the complex interaction of different player-related datasets, sport scientists have begun to interact with machine learning (ML). As a subset of artificial intelligence, ML has been shown to be capable of establishing previously unknown relationships in complex datasets across a variety of sporting domains, including results prediction, player scouting and tactical team analysis To address the problem of injury risk prediction in sport, ML models have been proposed as a suitable solution due to their ability to harness the non-linearity associated with the physiological and biomechanical processes that precede an injury. The objective of this scoping review is to synthesise the findings of the published literature on the use of machine learning to predict sport-related injuries by charting the approaches that have been used and assessing the efficacy of each.
Methodology: We undertook and reported this scoping review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). A search was conducted of MEDLINE via PubMed, EMBASE via Ovid, SportDiscus via EBSCOhost.
Results: 1,026 studies were identified, fifty-three full texts were screened, and thirty-seven relevant papers reviewed and charted. Soccer was the most commonly investigated sport. Random Forest was the most frequently applied machine learning method for injury risk prediction, with Extreme Gradient Boosting (XGBoost) deemed optimal in each study in which it was assessed. Logistic regression was found to outperform machine learning methods in four of the reviewed studies.
Conclusion: This scoping review demonstrates the suitability of tree-based solutions, found to offer the best predictive performance in 60% of papers. While several papers report strong predictive performance, their clinical utility can be limited. Notwithstanding the proliferation of ML research relating to sports injury prediction, the widespread variability in methodological approaches is curtailing the effective application of ML techniques. This is evident in instances where ML models have failed to outperform traditional approaches, suggesting a need for more granular, integrated datasets capable of supplying the volume of data required for ML approaches.