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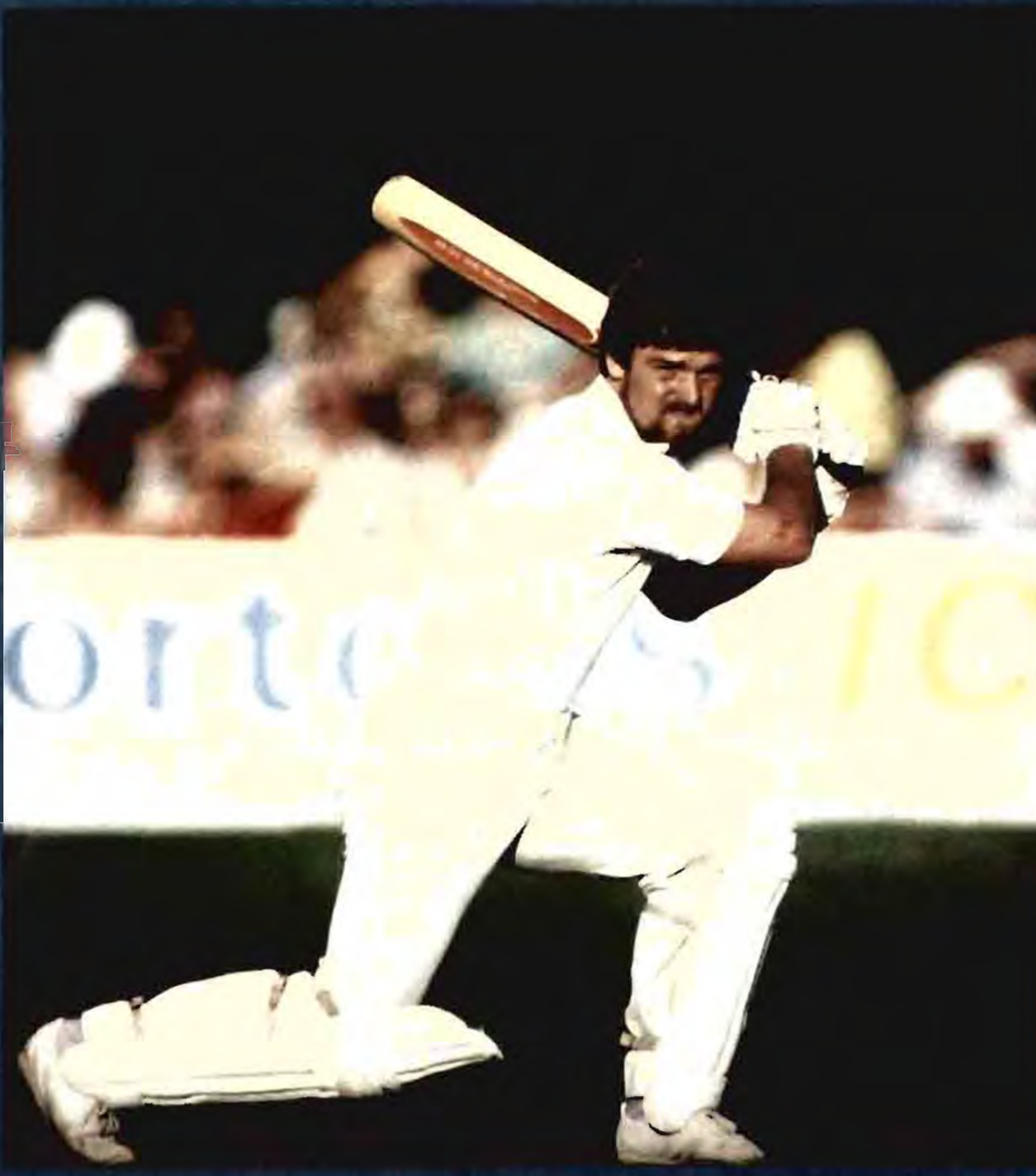
SPORTGENEESKUNDE

JOURNAL OF THE S.A. SPORTS MEDICINE ASSOCIATION
TYDSKRIF VAN DIE S.A. SPORTGENEESKUNDE-VERENIGING



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CONTENTS

JOURNAL OF THE S.A. *TYDSKRIF VAN DIE S.A.*

SPORTS MEDICINE/SPORTGENEESKUNDE

ASSOCIATION *VERENIGING*

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CONTENTS

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EDITORIAL

NECK INJURIES IN RUGBY

Rugby has been described as a collision sport, and as such injuries are inevitable.

When serious injuries occur frequently then one has to look to changing the rules to diminish the incidence of these injuries. Neck injuries because of their potentially catastrophic consequences have been featured prominently in the medical and lay literature. The International Rugby Board, through their medical committee have been active in this regard. They have penalised the high tackle and have tried to tighten up on the scrumming rules. Unfortunately this so far has not resulted in a reduction in serious neck injuries. Prof.A.T. Scher's statistics from the Cape area have revealed an increased incidence of neck injuries largely in school boys.

This means that at schoolboy level the new laws are not adequate or are not being enforced properly. In the scrum the forces on the adolescent neck are too great especially when the scrum collapses. It is therefore imperative to reduce the forces in the scrum and the danger of the scrum collapsing. A number of solutions have been suggested but many of these are highly technical such as the relationship of the hips to the shoulders and the degree of wheeling of the scrum.

Surely a reduction in the number of players scrumming at school level is the answer.

Reducing the pushing forwards to three or maximum five, will achieve both better stability in the scrum and reduce the forces in the scrum.

If 5 men are used, the second row of forwards should be in the flank and not the lock position which will further add to the stability. Once maturity is reached the eight man scrum can again be used.

As regards the high tackle, the laws should be better enforced and better tackling techniques should be taught. Neck strengthening exercises should be compulsory at all schools where rugby is played.

Finally a register of neck injuries should be kept in South Africa and the statistics made public at the end of each season.

Let's make rugby safer — Please!

Dr. Clive Noble MB BCh, FCS (SA)
Editor-in-Chief

SAMSA NEWS / SASGV NUUS

It is with great pleasure that we can announce that we are now in a position where we can continue to publish our Journal, bringing you many interesting and informative articles. However, due to the heavy financial commitment to publish a Journal of this format, we will in the future have to send the Journal only to subscribers and members of the SAMSA at a small fee. Details will be announced shortly.

Die SA Sportgeneeskundige Vereniging het hom ook beywer om 'n oorspronklike wapen te ontwerp en u sien die resultate van die goedgekeurde embleem reeds in hierdie uitgawe. Hierdie embleem is heraldies beter ontwerp as die vorige een en lui spreekwoordelik 'n nuwe era in vir ons Vereniging. Ons hoop om ons dienste aan ons lede nog verder uit te brei en ontvang graag voorstelle of kritiek in hierdie verband. Daar word reeds beplan vir 'n Sportgeneeskundige Opleidingskursus tydens 27-29 Junie 1990 in Port Elizabeth.

New SAMSA logo

The handsome new SAMSA logo appears for the first time in this issue of Sports Medicine. Members will surely agree that it meets all the criteria of a well-designed logo: It is a dynamic graphic, with a high level of energy as befits the topic it is to convey. The medical aspect integrates comfortably in the design so that all in all we have a modern design that we can live and grow with in the years to come.

Dr. Dawie van Velden MB, ChB, M.Prax.

INJURIES TO SOUTH AFRICAN CRICKETERS PLAYING AT FIRST-CLASS LEVEL

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ABSTRACT *Keywords: Injuries, cricket*

The purpose of this investigation was to determine the most common cricket injuries and to make recommendations in an attempt to reduce the number of injuries. The survey population consisted of 92 players who had played first-class cricket during the 1987/88 season. One hundred and ninety-three serious and 73 less serious cricket injuries, which had occurred throughout these players' careers, were recorded. Twenty percent of the serious injuries were to the head, neck and face, 32% to the upper limbs, 18% to the back and trunk, and 30% to the lower limbs. The injuries were primarily impact injuries as a result of being hit by the ball either while batting or fielding, stress injuries as a result of repetitive movements for a prolonged length of time, and muscle and ligament injuries normally associated with field sports. Recommendations regarding the use of equipment, training and practising for cricket were made in an attempt to reduce the risk of injuries.

INTRODUCTION

Research into cricket, a conservative and traditional sport, has been neglected. However, the South African Cricket Union and the Form-Scaff Cricket Coaching Academy have recently established a Cricket Research Centre. This Research Centre will no doubt contribute to the evolution of cricket from a traditional art to a blend of art and science.

The introduction of vast sums of money, more fixtures, especially limited-overs matches, and the increase in the number of fast bowlers on pitches prepared for them, has placed additional stresses and strains on the modern cricketer. Besides sound technical skills, these cricketers need to possess a high level of fitness thus making them susceptible to the traditional direct injuries of being struck by the ball, indirect injuries such as muscle tears and ruptures, and over-use injuries as a result of repetitive training for a sport that is becoming more explosive in nature.

The British Sport Council [1,2] surveyed 213 teams in Northern England and recorded 251 injuries during a season.

They estimated the risk of injuries to the cricket players to be 2,6 per 10 000 man hours played. However, these figures excluded injuries thought to be trivial, as well as many chronic over-use injuries. The rate of all injuries to first class cricketers in Australia was found to be 1 per 30 man-hours played. [3] A significant increase

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Acknowledgements: The author would like to acknowledge the assistance received from the RESEARCH DEPARTMENT of the FORM -SCAFF CRICKET COACHING ACADEMY for this project.

in over-use injuries in young children, especially in the areas of stress fractures and growth cartilage injuries was found. According to these authors the primary areas of concern, particularly to the young fast bowlers, is damage to the growth cartilage of the knee and traction apophysis, as well as compressive stress to the articular surface cartilage of the femur and talus.

Twenty-five percent of injuries occur to the head, face and neck with contusions, lacerations and nose bleeds being the most common. [2] Seven cases of concussion were reported in players who were struck by the ball. Eye injuries in cricket were reported as long ago as the beginning of the century.[4] Two, out of a total of fifteen, cases of ocular injuries were reported to have been caused by cricket balls. D'Ambrain [5] reported two cases of chronic glaucoma secondary to trauma, out of a total of 18 associated with cricket, while 4% of 184 cases and seven percent of 65 cases of ocular concussion injuries in sportsmen were reported [6]. Of five cases of eye injuries reported, four resulted while batting. Of these batting injuries, three were as a result of the ball deflecting off the top edge of the bat while hooking and striking the eye on the side of the dominant hand. Fingers were found to be the most vulnerable site for injuries [1,2,8,9]. These injuries consisted primarily of fractures, dislocations and contusions sustained while batting and fielding. The danger of a fracture, as a result of being struck by the ball, to the distal third of the ulnar of the top hand when batting was also indicated, but no cases of this injury were reported [9]. "Thrower's shoulder" which is caused by degeneration and inflammatory changes or partial and complete ruptures of the rotator cuff, usually muscle of the biceps tendon, is regarded as a common cricket injury.[10]

The case of a young fast bowler who developed acute pneumomediastinum and bilateral pneumothoraces while practising fast bowling was reported[11], while spondylolysis was found to be common in Australian fast bowlers playing first class cricket [9]. This injury is due to a stress fracture that occurs to the parts interarticulans on the side opposite the bowling arm as a result of the rotation and extension of the back when bowling fast. Pain occurs in the lower lumbar region or is localized in one side of the spine, sometimes radiating to the buttocks or leg after continuous stress to the back. Serious injuries, mainly to the lower back of a number of elite and junior fast bowlers were found [12]. Corrigan [9] reported that muscle tears of the abdomen occurred in fast bowlers, while batsmen suffered rib fractures and soft tissue injuries, especially to the upper leg, abdomen and testicles.

Many injuries occur in the lower limbs due to impact from the ball, stress injuries associated with repetitive movements and other injuries normally associated with field sports. Twenty-five percent of injuries occur to the lower limbs with the majority being strains and sprains. Fast bowlers are particularly likely to suffer from muscle tears, especially of the hip flexor, the adductor longus of the leg and the rectus femoris muscles [9,10]. Corrigan [9] is of the contention that stress fractures are common in fast bowlers and occur primarily in the metatarsal bones, the fibula and tibia. Furthermore talotibial exostoses, patellar tendonitis, bruised heels and 'shin splints' occur as a result of over-use and are more common towards the end of the season [9].

The purpose of this investigation was to determine the most common cricket injuries and to make recommendations in an attempt to reduce the risk of injury.

METHODS

Postal questionnaires were sent to 154 cricketers who had played in the 1987/88 Currie Cup and Castle Bowl competitions. Ninety-two questionnaires (60%) were returned. The injuries recorded were not restricted to those received during that season, but were all the injuries received while playing club and provincial cricket. For the purpose of this survey injuries were grouped according to two classifications. The less serious injuries were those that did not prevent the player from practising or training for the game, while the serious injuries were those that prevented the player from practising or training for a day or more. The injuries were further divided into injuries in four regions of the body: the head, neck and face; the upper limbs; the back and trunk; and the lower limbs. The Sample Statistical Analysis System (SAS) was used to compute the data and to perform cross tabulations. The small sample size did not allow for further statistical analysis.

RESULTS

Nineteen of the cricketers in this investigation had played cricket at international level, while the highest level the other 73 players had played at was provincial level. They had a mean age of 27,0 years, and a mean body mass of 82 kg and a mean stature of 1,82 meters. These values were similar to those measured in an anthropometric study on South African first-class cricketers [13].

The respondents consisted of 31 batsmen, 36 all-rounders, 16 bowlers and nine wicket-keepers. During the off-season 30% of the respondents spent no time practising or training for cricket, while 47% spent between one and four hours per week training and practising for the various aspects of the game. During the pre-season period, 70% of the respondents spent between three and eight hours a week practising and training specifically for cricket. During the season, 50% of the respondents spent between seven and ten hours per week practising and training for cricket, while a further 27% spent more than ten hours per week practising and training.

One hundred and ninety-three serious and 73 less serious cricket injuries were recorded. Of the serious injuries 20% were to the head, 32% to the upper limbs, 18% to the back and trunk and 30% to the lower limbs. Seventy-four percent of these injuries occurred during matches, 21% during practices and 5% occurred during both matches and practices. Forty-two percent of the serious injuries occurred while batting, 33% while bowling, 19% while fielding and 5% while either warming up or training. Of the less serious injuries 16% were to the head, 43% to the upper limbs, 14% to the back and trunk and 27% to the lower limbs.

HEAD NECK AND FACIAL INJURIES

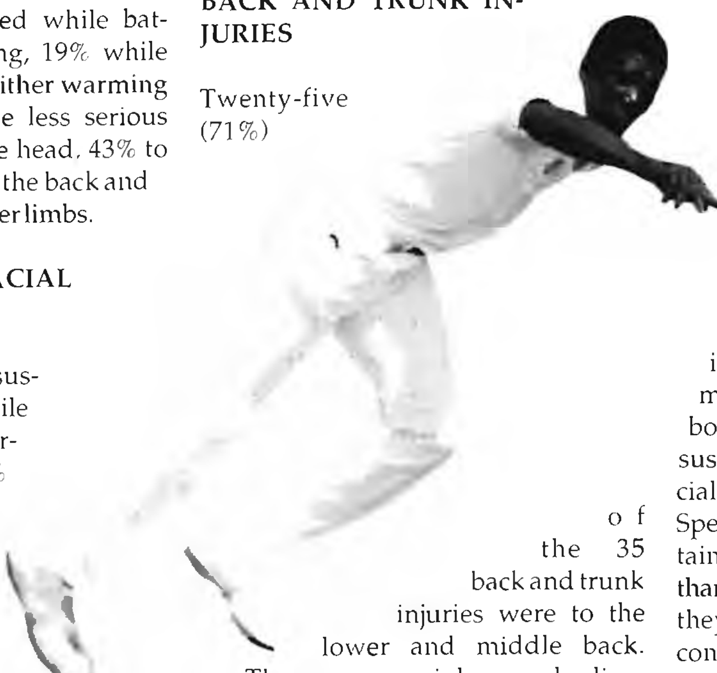
Of the 38 head injuries sustained, 66% occurred while the batsmen were wearing no helmet and 24% while the batsmen were wearing helmets with ear pieces only. Thirty-one (81%) of the head injuries were as a result of either being struck by the ball while attempting to hook, by the ball deflecting off the top edge of the bat on to the head while playing a horizontal bat stroke, or as a result of being struck by the ball rearing off the pitch. These head injuries sustained while batting included two concussions, eight broken nose and cheek bones, and 21 lacerations, requiring stitches, around the eyes, mouth and chin. The top and middle order batsmen sustained more impact injuries to the head (24) than the lower order batsmen (11).

UPPER LIMB INJURIES

Of the 62 upper limb injuries nine cases of shoulder injuries were recorded with four of these sustained while bowling and five while fielding. The phalanges, metacarpal and lower arm injuries made up 50 (81%) of the upper limb injuries. Thirty of these were caused while batting with the top and middle order sustaining 24 injuries. Nineteen injuries were sustained while catching or fielding the ball and one while warming up for a match.

These results support the findings of other researchers who found that finger injuries were the most common cricket injuries.[1,2,3,9]

BACK AND TRUNK INJURIES



Twenty-five (71%) of the 35 back and trunk injuries were to the lower and middle back. These were mainly muscle, ligament and tendon injuries. Twenty-three of these were sustained while bowling or as a result of the repetitive movements of bowling many overs.

LOWER LIMB INJURIES

The 58 lower limb injuries consisted of injuries to the bones of the foot (11), ankle ligament (11), muscles of the lower leg (5), knee cartilage (6), quadriceps and hamstring muscles (10) and the groin (13). Twenty-two (38%) lower limb injuries were either as a result of continual bowling or caused by bowlers tramping in the rough foot marks on the pitch in their delivery stride and follow through. Ten (17%) lower limb injuries sustained were muscle and ligament injuries caused while batsmen were running between the wickets.

LESS SERIOUS INJURIES

The less serious injuries consisted of 30 (41%) impact injuries, 21 (29)% stress injuries from repeated actions and 22 (30%) injuries normally associated with field sports. The impact injuries were as a result of being struck by the ball on the hand and forearm (19), head (10) and foot (1) The other injuries were mainly muscle and ligament strains to the neck, back and trunk (13), shoulder and elbow, (11) groin (4) and hamstring (8) and three minor cases of shin splints.

DISCUSSION

The top order batsmen face the fast bowlers at the beginning of the innings when the bowlers are rested. During the early part of the innings the ball and wicket possess more bounce and tend to favour the bowlers making the batsmen more susceptible to impact injuries, especially to the head, hands and forearms. Specialist bowlers were found to sustain more hand injuries while batting, than the specialist batsmen even though they spent less time batting [3]. They contended that the bowlers were not as skilled at batting and did not possess the reactions and technique required to deal with fast bowling. One factor that may have resulted in the difference in these findings is that the Australian pitches are traditionally faster and more bouncy than those in South Africa thus making it more difficult for the less skilled batsmen to play fast bowling.

The ability to run with the pads on and the skill of running between the wickets is not often practised by cricketers. More attention should be placed on this aspect, by including it as part of the fitness training, in an attempt to eliminate any unnecessary injuries sustained while running between the wickets.

At front-foot impact, the fast bowler's

(Continued on page 19 . . .)

DIE FISIOLOGIESE VOORDELE VERBONDE AAN OPWARMING EN AFKOELING

Dr P E Kruger

INLEIDING

Indien ons vandag 'n gesprek sal voer oor die beginsels van oefenprogramvoorskrifte, sal alle afrigters met gesag daaroor kan praat en kan getuig dat hulle oefenprogramme een of meer van hierdie beginsels insluit. Wanneer ons egter oor opwarming en fleksiteitsoefening praat, dan sal die meeste van ons erken dat hierdie gedeelte van ons voorbereiding nie sy regmatige plek in ons oefenprogramme en voorbereidingsfases inneem nie. Daar word slegs 'n paar minute voor en miskein na die oefening, dus die afskeeptydjies, aan hierdie gedeelte van ons inoefening bestee terwyl dit in werklikheid 'n integrale deel van ons voorbereiding moet uitmaak. Laat ons dan nou baie vlugtig kyk na wat die voordele van opwarming en fleksiteitsoefeninge is en hoe dit kan bydra tot verbeterde prestasie.

FUNKSIES VAN OPWARMING

1 VERBETERDE PRESTASIE

In die rustende liggaam is die bloedvloei na die spiere relatief laag as gevolg van die vasokonstriktiewe toestand van die klein bloedvate. Soos wat die intensiteit van 'n aktiwiteit verhoog word, so vasodilateer die bloedvate en meer bloed vloei na die spiere. Tydens rus vloei 15-20% van die kardiale uitset (Q) na die spiere. Tydens oefening van 10-12 minute verhoog die bloedvloei na 70-90% van die Q. 'n Spier kan dan ook slegs sy maksimale prestasie lewer wanneer al sy bloedvate oop is (Peterson en Renström 1986 p 87; Sharkey, 1985 p 21).

Die belangrikste fisiologiese aanpassing in die liggaam as gevolg van opwarming is egter 'n verhoging in liggaamstemperatuur. Die voordeel van 'n hoë liggaamstemperatuur en veral spiertemperatuur, lê daarin dat die metaboliese prosesse temperatuurafhanklik is. Vir elke graad styging in liggaamstemperatuur, styg die ensiematiese aktiwiteit, en dus die metaboliese reaksies in die sel geassosieer met die energiesisteme, die sogenaamde Q_{10} ofte wel die metaboliese reaksietyd, met 13%. Daar vind dus 'n vinniger en meer volledige dissosiasie van O_2 plaas vanuit die hemoglobien en mioglobien na die weefsel waardeur die suurstofvoorsiening tydens die oefening verbeter word - die oksihemoglobien-dissosiasiekurwe verskuif dus na regs. Op hierdie manier verhoog die sportman se fisieke werksvermoë (prestasie) omdat meer O_2 beskikbaar is en daar 'n afname is in die weerstand van die pulmonêre bloedvloei. So vroeg as in 1947 het Ho en Ljimggren bewys dat na 'n behoorlike opwarming was die verbetering in die 100m tyd 3-4% (0,5-0,6 sek), die 400 m tyd 3-6% (1,5-3,0 sek) en die 800m tyd 2,5-5,0% (4-6 sek). Soortgelyke resultate is by swem gevind (Åstrand en Rodahl, 1977, p 562; Roy en Irvin, 1983, p 39; Fox en Mathews, 1981, p 271; Brooks en Fahey, 1985, p 22; Klafs en Arnheim, 1981, p 98).

Uit bogenoemde figure kan baie duidelik waargeneem word hoe die maksimale, suurstofverbruik ($VO_{2\,maks}$), die hartfrekwensie (HF), die laktaatkonsentrasie en Q_{10} tydens maksimale oefening direk verband hou met die spiertemperatuur. Hoe hoër die spiertemperatuur was, hoe hoër was die VO_2 en HF. Daar is egter ook bewys dat by 'n rektaaltemperatuur van meer as 40°C was daar 'n afname in die VO_2. Alhoewel die arbeidstyd by die hoogste spiertemperatuur nie toegeneem het nie, was die laktaatkonsentrasie aansienlik laer. Verder blyk dit dat 'n toename van 10°C in spiertemperatuur die metaboliese reaksietyd (Q_{10})verdubbel en dat die kurwe in die fisiologiese omvang baie skerp styg (Brooks en Fahey, 1985, p21; Fox en Mathews, 1981, pp271-272).

Daar is verder aangetoon dat deur die spiergroepe voor 'n kragaktiwiteit te oorlaai, dit tot 'n verbetering in prestasie lei. Daar word vermoed dat daar 'n verhoogde vlak van prikkeling van die motoreenhede is wat opgeroep word om die verhoogde arbeidslas te hanteer. Hierdie motoreenhede word dan oorgedra na die werklikheidsprestasie met 'n gevolglike toename in die sportman se fisieke werksvermoë. (Klafs en Arnheim, 1981, p98).

2 KOÖRDINASIE

Opwarming veroorsaak 'n toename in spiertemperatuur met 'n gevolglike verbetering in koördinasie. Die rede is dat die senuwee-impulse vinniger

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beweeg by hoër temperatuur en daarom moet die sportman sy spiertemperatuur geëlever hou om sodoende sy kontraksiespoed en koördinasie te verhoog (Åstrand en Rodahl, 1977, p 562; Peterson en Renström 1986, p 87). Met ander woorde,daar is 'n toename in die tempo van die neuromuskulêre transmissies (oorsendings) en die oproep van spiervate, sowel as die aktivering van die "neuromuskulêre geheue" vir die spesifieke bewegings wat nodig is vir die item (Roy en Irvin, 1983, p 39).

Verder verbeter opwarming die sportman se koördinasie deur die ontwikkeling van die sportman se kinestetiese gewaarwording en vestig so 'n neuromuskulêre patroon van prestasie. Dit help dan die sportman om te bepaal wanneer hy 'n toestand van gereedheid bereik het - hy sê gewoonlik "ek voel nou reg" (Klafs en Arnheim, 1981, p 98.

3 VOORKOMING VAN BESERINGS

Progressiewe opwarming lei tot 'n merkbare afname in die risiko vir beserings. Dit voorkom en/of verminder die spanning in, en die skeur van die spiervesels vanaf hulle tendineuse aanhegtings. Dit vind gewoonlik in die antagonis plaas. Die onvermoë van die antagonis om vinnig te verslap, plus die groot kontraktiele krag van die agonis, plaas die antagonis onder geweldige spanning wat kan veroorsaak dat die spiervesels sowel as die tendon-aanhegtings kan skeur. Deur middel van opwarming word die ligamente en ander kollageneuse weefsel gestrek om so 'n groter mate van fleksiteit te verseker (Peterson en Renström, 1986, 87; Klafs en Arnheim, 1981, p 98).

Barnard et al. het abnormale EKG patrone gevind in 70% van 44 normaalweg asimptomatiese probante tydens uitputtende oefening toe geen vooraf opwarming gedoen was nie. Toe 'n 2 minuut opwarming (draf op die plek) die oefening voorafgegaan het, was al die probante se EKG patrone normaal (Åstrand en Rodahl, 1977, p 563). Hierdie verskynsel word toegeskryf aan 'n onvoldoende bloedtoevoer na die hart.
(Fox en Mathews, 1981, p 272).

4 PSIGOLOGIESE VOORBEREIDING

Opwarming dra by tot die verwydering van liggaamlike spanning voor wedywering. Spanning is meer opmerksaam voor wedywering wat deur opwarming verminder word en tot 'n groter mate van ontspanning lei.

METODE VAN OPWARMING
(opwarmingsprogram)

Opwarming kan in twee kategorieë ingedeel word, naamlik:

(i) *Algemene of nie-verwante opwarming* - dit behels die algemene opwarming van die liggaam en sluit in aktiwiteite soos liggies draf en fleksiteitsoefeninge;

(ii) *spesifieke of verwante opwarming* - sluit in aktiwiteite wat soortgelyk is aan dié wat in die vaardigheid van die item gebruik word (Klafs en Arnheim, 1981, p98).

'n Gekombineerde opwarmingsprogram wat saamgestel is uit verskeie navorsingstukke sal as volg daaruit sien:

(i) *fleksiteitsoefeninge* - matige en beperkte strekking van spiere en spiergroepe van die hele liggaam en dié wat gebruik gaan word in die aktiwiteit:

(ii) *stadige drafoefeninge* - begin stadig en vermeerder geleidelik die intensiteit, die oefening moet aansweting veroorsaak en die liggaamstemperatuur laat styg, byvoorbeeld tempolope;

(iii) *fleksiteitsoefenings* - stadige en volledige strekking van die spiere, spiergroepe en gewrigte wat spesifiek vir die vaardigheid/aktiwiteit benodig word;

(iv) *sportspesifieke opwarmingsaktiwiteite* - bestaan uit vaardigheidsdriloefeninge wat die aktiwiteite van die sportitem insluit, bv hekkiedriloefeninge. Begin weer eens teen 'n matige intensiteit en vermeerder die intensiteit soos wat hy voel sy liggaamstemperatuur styg en sy kardiovaskulêre stelsels versnel. Voorbeeld: bofbal - doen goeie, veldwerk, kolfwerk en vangwerk. *Hierdie tipe van oefeninge het 'n tweeledige doel:*

a) sorg dat die spiertemperatuur en bloedvloei optimaal is in die spiere wat direk deur die sportman gebruik gaan word, en
b) voorsien 'n opwarming vir die hand-tot-oog koördinasie en ander neuromuskulêre meganisme wat direk betrokke is by die item (Fox en Mathews, 1981, p 272; Roy en Irvin, 1983, pp 39-40; Klafs en Arnheim, pp 98-99).

Na die opwarming moet 'n droë T-hemp aangetrek word om te voorkom dat die spiere te gou afkoel as gevolg van sweetverdamping. Die positiewe voordele van opwarming begin gou om te verminder en die ideale tydsverloop tussen die opwarming en die aanvang van die item moet nie langer as 10-15 minute wees nie (Peterson en Renström, 1986, p 88).

TYDSDUUR VAN OPWARMING

Die intensitiet en duur van opwarming word bepaal deur die item en die fiksheidstatus van die sportman. 'n Opwarmingsprogram wat geskik is vir 'n goed gekondisioneerde sportman sal verseker 'n swak gekondisioneerde sportman uitput.

sportman aantree vir sy item moet hy sy sweetpak uittrek. By velditems in atletiek moet die atleet weer sy sweetpak aantrek na voltooiing van sy poging, en indien hy te lank moet wag vir sy volgende poging moet hy ligte opwarmingsoefeninge tussen sy pogings uitvoer (Klafs en Armheim, 1981 p 99).

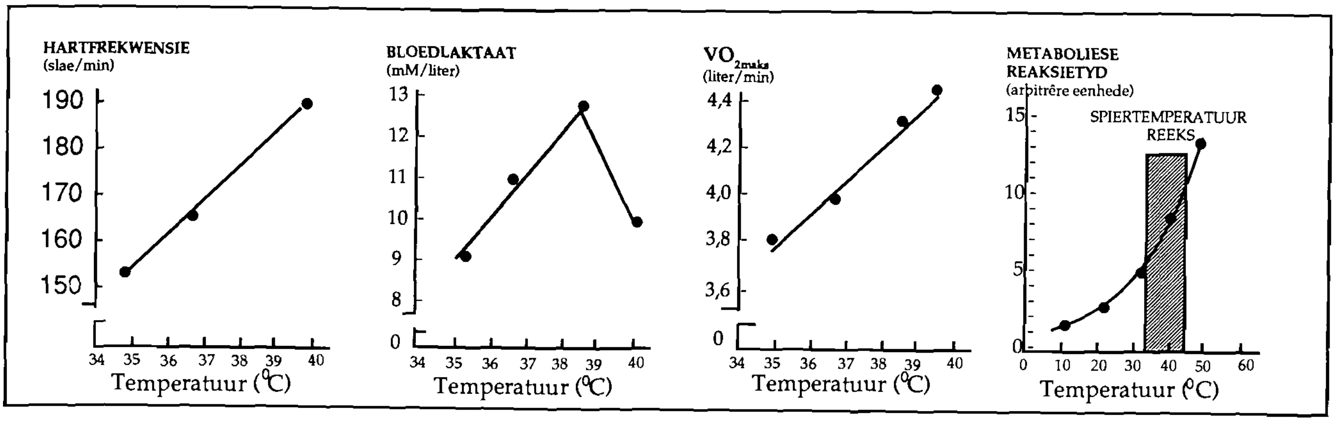
Die rusperiode tussen die opwarming en die item moet hoogstens 15 minute wees, want na 45 minute is die voordelige invloed van die opwarming gekanseleer en het die spiertemperatuur teruggekeer, na die pre-opwarmingsvlakke (Åstrand en Rodahl, 1977, p 563).

tydens die item. Baie atlete vind die uitvoering van veral die strekoefeninge baie ontspannend (Roy en Irvin, 1983, ; p 40; Peterson en Renström, 1986, p 88).

Volgens Fox en Mathews (1981, p 273) is afkoeling absoluut noodsaaklik weens die volgende twee fisiologiese redes:

(i) Die bloed - en spierlaktaatvlakke daal vinniger tydens 'n arbeidsherstel as tydens 'n rusherstel; en

(ii) matige oefening hou die spierpomp aan die gang, dit voorkom opdamming van bloed in die ekstremiteite en verminder so die gevaar van floutes en/of duiseligheid na oefening.



Die meeste navorsers beveel 'n opwarmingsperiode van 15-30 minute aan teen 'n relatiewe hoë tempo van energieverbruik (3,0 tot 3,4 liter O_2/min of teen 'n hardloopspoed van 12-14 km/h).

Die duur en intensiteit van die opwarming moet ook aangepas word by die omgewingstemperatuur en kleredrag. Hoe hoër die omgewingstemperatuur is en hoe groter die hoeveelheid klere wat gedra word, hoe gouer word die verlangde liggaamstemperatuur van 38,5°C bereik (spiertemperatuur 39°C of hoër). Dus 'n styging van ongeveer 2°C word verlang (Åstrand en Rodahl, 1977, p 563; Roy en Irvin, 1983, p 39; Kalfs en Arnheim, 1981, p98). Op koel dae moet die opwarmingstyd verleng word en moet die opwarming in 'n sweetpak gedoen word. Eers wanneer die

Huidiglik glo baie sportlui nog dat opwarming hulle sal uitput, maar uit die voorafgaande bespreking is dit duidelik dat die sportman sy prestasie kan verbeter indien by korrek en oordeelkundig opwarm. 'n Opwarmingsperiode van 15 minute word aanbeveel vir hoërskoolatlete.

AFKOELING

Die sportaktiwiteit moet gevolg word deur 'n afkoelperiode van 3-5 minute waartydens laktaat en ander metaboliese produkte uit die spiere en weefsel verwyder word om spierstyfheid en spierpyn te verminder. Strekoefeninge en liggies draf maak deel uit van hierdie program. Verder gee dit die sportman geleentheid om kalm en rustig te word (fisies en psigologies na die afskeiding van groot hoeveelhede epinefrien (adrenalien)

SOURCE OF GRAPHS:
Brooks en Fahey, 1985
Fox en Mathews, 1981

VERWYSINGS

ÅSTRAND, P.O., RODAHL, K. Textbook of work Physiology, (2e uitgawe), New York: McGraw-Hill Book Co., 1987.

BROOKS, G.A., FAHEY, T.D. Exercise Physiology: Human Bioenergetics and its Applications, London: MacMillan Publishing Co., 1985.

FOX,E.L. MATHEWS, D.K. The Physiological basis of Physical Education and Athletics. (3e uitgawe), New York: Saunders College Publishing, 1981.

KLAFS, C.E., ARNHEIM, D.D. Modern Principles of Athletics Training, (5e uitgawe), St Louis: CV Mosby Co., 1981.

PETERSON,L., RENSTRöM, P. Sports Injuries, Johannesburg: Juta and Co. Ltd., 1986.

ROY,S.A.,IRVIN,R. Sports Medicine, New Jersey: Prentice-Hall, Inc., 1983.

SHARKEY, B.J. Physiology of Fitness, (2e uitwage), Illinois: Human Kinetics Publ., 1984.

MIDDELS IN SPORT:

RESULTATE VERKRY TYDENS DIE SA SENIOR ATLETIEKKAMPIONSKAPPE VAN 1988 en 1989

PJ van der Merwe
Ph.D., Nat. Sci.

OPSOMMING

Siftingsmetodes waarin gaschromatografie en gaschromatografie/massa spektrometrie gebruik is, is uitgevoer op 124 urienmonsters wat tydens die SA Senior Atletiekbyeenkomste van 1988 en 1989 versamel is in 'n poging om die gebruik van verbode middels aan te toon. Middels wat deur die Internasionale Olimpiese-Komitee as verbode verklaar is, is in 4% van die urienmonsters aangetoon. Die resultate toon duidelik dat atlete onwetend medisyne gebruik wat verbode middels bevat of middels bevat wat hulle prestasie nadelig kan beïnvloed.

INLEIDING

Die eerste toetse vir die gebruik van verbode middels deur atlete in Suid-Afrika is tydens die SA Senior Atletiekbyeenkoms van 1983 gedoen toe 100 urienmonsters versamel en geanaliseer is.[1] Sedertdien was die gebruik van verbode middels in sport in 'n poging om prestasie te verbeter verskeie kere die onderwerp van wye nuusdekking gewees.

Hierdie verslag handel oor die resultate wat verkry is deur die analise van 124 urienmonsters wat tydens die SA Senior Atletiekkampioenskappe van 1988 en 1989 versamel is.

MATERIAAL EN METODE

In die twee jaar is 124 urienmonsters versamel - al die medaljewenners van 1988, 'n totaal van 95, en al die atlete wat eersteplekke behaal het in 1989, 'n totaal van 29.

Hierdie urienmonsters is geanaliseer deur twee siftingprosedures: metode A vir die teenwoordigheid van stimulasie en ander basiese verbindings met behulp van gaschromatrografie (GC) en metode B vir die teenwoordigheid van anaboliese steroïede met behulp van gaschromatografie/massaspektrometrie (GC/MS). Alle verbindings wat deur metode A aangetoon is, is bevestig met GC/MS.

RESULTATE EN BESPREKING

In 1988 was daar 29 (30,5%) urienmonsters wat vreemde verbindings bevat het teenoor die 8 (27,6%) in 1989. Tabel I toon die verbindings wat geïdentifseer is met GC en GC/MS volgens metode A. Metode B het geen anaboliese steroïed aangetoon nie. Die 39 verbindings wat in 1988 geïdentifiseer is het in slegs 29 urienmonsters voorgekom en die 11 verbindings wat in 1989 geïdentifiseer is het in 8 urienmonsters voorgekom wat aandui dat sommige urienmonsters meer as een verbinding bevat het. Die verbode middels wat in 7 urienmonsters voorgekom het was fenkamfamien en metaboliet (1), fenielpropanolamien (3), kodeïen (2) en efedrien (3). Die konsentrasies van efedrien in die 2 urienmonsters was egter te laag om as 'n positiewe resultaat beskou te word (volgens internasionale bepaling). Antihistamiene, wat soms saam met ander verbindings soos efedrien, kafeïen en antibiotika in dieselfde urienmonsters voorgekom het, was in 11 monsters teenwoording. Hoewel antihistamiene nie verbode middels is nie gee dit ongewenste newe-effekte soos slaperigheid, duiseligheid, spierswakheid, verlaagde konsentrasievermoë en gebrek aan koördinasie, almal wat die prestasie van atlete nadelig kan beïnvloed. Kafeïen word as 'n verbode stimulant beskou as dit in konsentrasies hoër as 12 µg/ml in die urien voorkom. Daar was 10 urienmonsters wat 'n kafeïenkonsentrasie tussen 5 en 12 µg/ml (hoogste 10,5 µg/ml) gehad het. Hierdie vlak kan nie maklik

Verbindings Geïdentifiseer deur Gaschromatografie en Gaschromatografie/massaspektrometrie

VERBINDING	FREKWENSIE 1988	1989
Oksatomied	1	0
Fluoxatien en metaboliet	1	0
Orfenadrien	1	0
Doksilamien	1	0
Pirimetamien	1	0
Fenielpropanolamien	1	2
Fenframien en metaboliet	1	0
Kodeïen	1	1
Fenkamfamien en metaboliet	1	0
Diklofenac	2	0
Trimetoprim	2	0
Efedrien	2	0
Chlorokien en metaboliet	3	1
Chlofeniramien en metaboliet	7	1
Nikotien	7	2
Kafeïen (hoër as ug/ml)	7	3
Verapamil en metaboliete	0	1
TOTAL	39	11

bereik word deur die normale inname van alledaagse kafeïen-bevattende dranke soos koffie, tee en Coca-Cola nie[2,3] en dit weerspieël die gewildheid van kafeïen-bevattende tonikums onder ons atlete.

Na deeglike bestudering van al die gegewens is slegs 3 urienmonsters (3,2%) in 1988 en 2 urienmonsters (6,9%) in 1989 as positiewe resultate gerapporteer; 'n gemiddeld van 4%.

SAMEVATTING

Hoewel slegs 4% van die versamelde urienmonsters verbode middels bevat het wat as positief gerapporteer is, was daar 'n groot aantal monsters wat ander verbindings bevat het wat hoofsaaklik afkomstig is vanaf medisynes wat vir griep en verkoue gebruik word. Hierdie situasie is nie tydens ander SA Senior Atletiekbyeenkmomste waarby sedert 1983 getoets is, opgemerk nie. Veral die gebruik van antihistamiene wek kommer.

Die oplossing van die probleem lê veral in die volgende:

1. Geneeshere moet bewus wees daarvan dat sommige griep-, verkoue- en hoespreparate verbode middels bevat en dus nie deur sportmanne gebruik mag word kort voor of tydens byeenskomste nie. Dokters moet nie sulke medisyne aan deelnemers voorskryf nie omdat die vertoon van 'n voorskrif nie die skuldigheid van 'n atleet ophef nie.

2. Die onus rus in die finale instansie nog by die sportman om seker te maak dat hy nie onwetend enige medisyne gebruik wat verbode middels of ander middels wat sy prestasies kan benadeel, bevat nie.

DANKBETUIGINGS

Die skrywer wil graag sy opregte dank betuig aan mej HSL Kruger vir haar bydrae tot die analise van die urienmonsters asook aan die Suid-Afrikaanse Amateur Atletiekunie vir hulle samewerking.

LITERATUURVERWYSINGS

1. Hundt HKL, Van der Merwe PJ en Van Velden DP (1984)
Drugs in sport: A report of laboratory investigation into the prevalence of their use in South Africa.
S.Afr.Med.J., 66, 878-88.
2. Van der Merwe PJ, Müller FO en Müller F. (1988)
Caffeine in sport: An investigation into the urinary excretion of caffeine in healthy volunteers after intake of common caffeine-containing beverages.
S.Afr.Med.J., 74, 163-164.
3. Seifart HF, Van Velden DP, Esterhuizen M, Parkin DP, Van Jaarsveld PP. (1987)
Konsentrasies van kaffeïen in urien: Riglyne vir die atleet.
SA Sportgeneeskunde Tydskrif, 2, 12-14.

CATASTROPHIC RUGBY INJURIES OF THE SPINAL CORD: AN INCREASING PROBLEM

Alan T. Scher, M.B., Ch.B., D.M.R.D.

INTRODUCTION

In 2 previous papers [1,2], I have reported on 50 patients admitted to the Spinal Cord Injury Centre at Conradie Hospital in Cape Town from 1964 to 1980, with paralysis due to rugby injuries to the cervical spinal cord. Since the first paper, published in 1976 [1] there has been considerable discussion as regards reducing the incidence of these serious injuries and various changes to the rules have been introduced. In an attempt to ascertain whether following on these rule changes, there has been any decrease in the incidence of, or change in the mechanism of, these injuries, an analysis of the case histories and the radiographs of all rugby players admitted to the Spinal Cord Injury Centre during the 7 year period 1981 to 1987 has been made.

FINDINGS

A total of 38 players with cervical spinal cord injury either permanent or temporary, were identified. Nine (24%) of the players were 17 years of age or under at the time of injury. The distribution of the levels of injury are shown in Table I. Notable is the high percentage (32%) of players who sustained injury at the C4/C5 level. Two players were injured at the C2 level and 10 players showed no evidence of orthopaedic injury on x-ray examination. The majority of injuries were sustained either in the scrum (39%) or during tackles (42%) as shown in Table II. This is in keeping with the findings in previous analyses. [1,2] A wide spectrum of orthopaedic injuries were sustained, but the majority of players (66%) sustained their injuries as a result of pure flexion violence or a combination of flexion and rotation. Notable was the high number of flexion disclocations sustained consequent upon collapse of the scrum.

Fifteen (39%) of the players were injured in scrums. This figure correlates well with the 40% incidence of scrum injuries noted in my previous analyses [1,2] and also with international experience.[3,4] Thirteen of the 15 players were injured as a result of collapse of the scrum, the majority of these being players in the front row, either props or hookers. One player was injured by crashing of the two packs of forwards with the injured player being caught unprepared.

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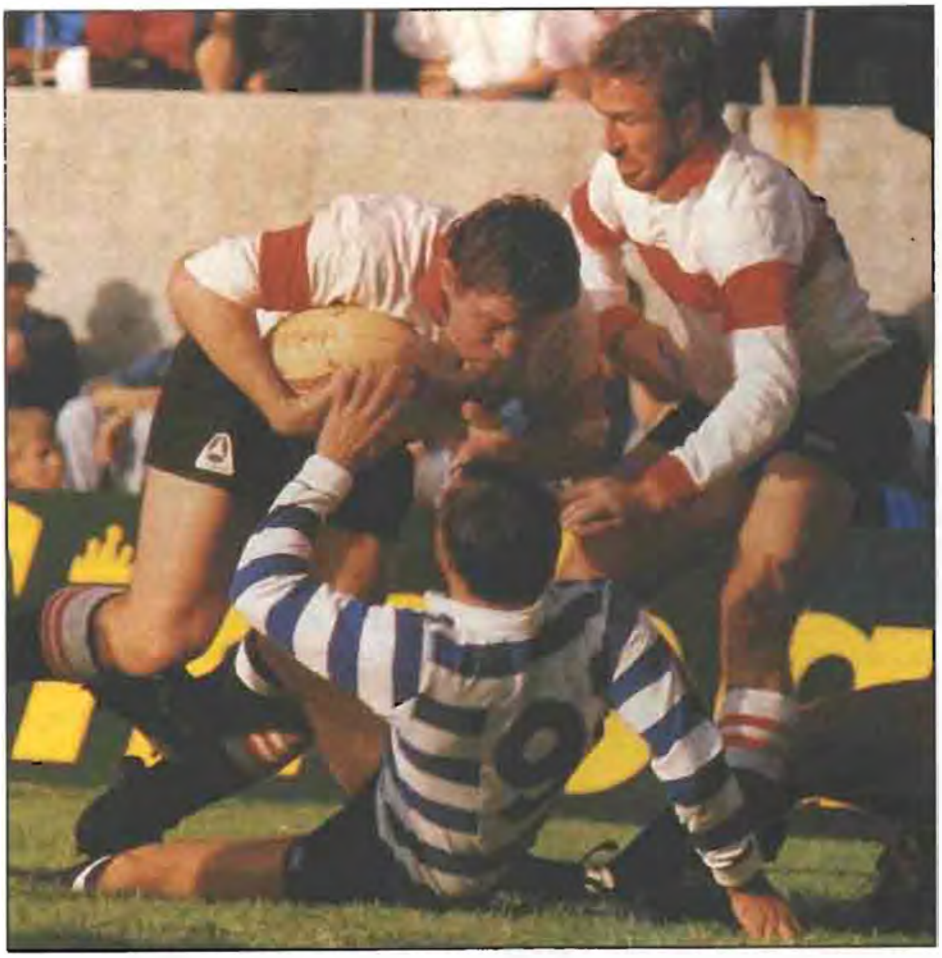

Pic Courtesy of SA Sports Illustrated

Six players sustained complete, permanent quadreplegia. The majority of orthopaedic injuries sustained (Table III) were anterior dislocations, either bilateral or unilateral.

TABLE I
ORTHOPAEDIC LEVELS OF INJURY

LEVEL	NUMBER	LEVEL	NUMBER
C2	2	C2/3	-
C3	-	C3/4	1
C4	1	C4/5	12
C5	2	C5/6	5
C6	3	C6/7	2
C7	-	C7/T1	-
NO ORTHOPAEDIC INJURY - 10			

TABLE II
PHASES OF THE GAME IN WHICH INJURY OCCURRED

	NO.	%
SCRUMS	15	39,0%
TACKLES: (A) TACKLER	3	42,0%
(B) TACKLED	13	
RUCKS/MAULS	4	10,0%
COLLISION	1	2,6%
UNKNOWN	2	5,0%

TABLE III
TYPE OF ORTHOPAEDIC INJURY SUSTAINED IN DIFFERENT PHASES OF THE GAME

	BLF	ULF	SUB-LUXATION	'TEAR DROP' FRACTURE	COMPRESSION FRACTURE	HANGMAN'S FRACTURE	NO ORTHOPAEDIC INJURY
SCRUM	7	3	2	-	-	-	5
TACKLE	-	2	-	1	3	2	6
RUCK	1	2	1	-	-	-	-
OTHER	2	-	-	1	-	-	-

Tackle injuries.

Sixteen (42%) of players were injured during a tackle (Table II). The neurological deficit was less severe and only 4 players sustained complete paralysis. The spectrum of orthopaedic injury (Table III) varied considerably from the injuries sustained due to scrumming. This wider variation of orthopaedic injury and lesser degree of neurological deficit is in keeping with the more varied mechanism.

One player was injured as a result of a double tackle. Of particular note and cause for concern, is the observation that 6 players were injured as a result of a high tackle around the neck. The overall percentage of injuries sustained in tackles has increased which is in keeping with the findings of Silver [5].

Injuries sustained in rucks and mauls.

Only 4 (10%) of the players were injured in these phases of the game. This low percentage is somewhat surprising, as in a previous analysis[2], a 20% incidence was recorded. Silver, reporting on 63 players injured in England, comments on an increase in the percentage of players injured in rucks and mauls.[5]

The reason for this significant decrease in the percentage of players injured in rucks and mauls is not clear.

CONCLUSION

During the period 1964 to 1980, 50 rugby players with cervical spinal cord injury were admitted to the Spinal Cord Injury Centre at Conradie Hospital,[2] an average of 3 players a year. During the period under review in the present paper (1981 to 1987) 38 players were admitted, an average of 5,4 players a year. This indicates that despite increased public awareness of serious rugby spinal injuries and considerable amendments to the rules, the incidence of rugby spinal cord injuries in the Cape Province has not decreased. Silver and Gill [6] comment on the gratifying decrease of serious cervical spinal cord injuries in rugby players in the United Kingdom, Wales and New Zealand, but note that the only country where there has not been a decrease in the incidence is South Africa.

"... the incidence of rugby spinal cord injuries in the Cape Province has not decreased "

As commented on in previous papers,[1,2] and also in reports from overseas [4], flexion remains the most important mechanism of injury. The two phases of the game where most serious injuries occur are again identified to be the scrum and the tackle.

Foul play was responsible for a significant number of injuries. Apart from the single instance, where a player was injured by crashing of the scrum, a disturbing number of players were injured by the high tackle. Despite previous comment on the danger of this illegal play[7] no decrease in these avoidable injuries has taken place.

REFERENCES

1. Scher AT. Rugby injuries to the cervical spinal cord. S Afr Med J 1977; 51: 473-475

2. Scher AT. Rugby injuries of the spine and spinal cord. Clin Sports Med 1987; 6(1): 87-99.12.

3. Burry HC, Gowland H. Cervical injury in football - a New Zealand survey. Br.J Sports Med 1981; 15: 56-60.

4. Williams P and McKibbin B. Unstable cervical spine injuries in rugby a 20-year review. Injury 1987; 18(5): 329-332.

5. Silver JR, Injuries of the spine sustained in rugby. Br.Med J 1984; 288: 37-43.

6. Silver JR, Gill S. Injuries of the spine sustained during rugby. Sports Med. 1988; 5: 328-334.

7. Scher AT. The high rugby tackle - a continuing menace. S Afr Sports Med 1981; 11: 3.

PSYCHOSOCIAL FACTORS AND SPORTS INJURIES

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During the past two decades there has been a growing awareness of the association between psychological factors and sports performance. In particular the effectiveness of various psychological techniques and procedures in improving performance was extensively researched. However, a review of the literature revealed that very little systematic research has been done on the possible relationship between psychological factors and sports injuries.

The genesis of injury is considered a complex, multifactorial process. The only psychological variable studied in this regard is stress. Findings by Holmes & Rahe (1967) that the onset of illness is significantly associated with an increased perception of stressful life events, was expanded into the field of life stresses and athletic injuries by Bramwell, Masuda, Wagner & Holmes (1975). Their study showed that an injured group of football players had a significant higher life stress level than the non-injured group. They divided players into low-risk, moderate-risk and high-risk groups on the basis of low, moderate and high Life Change Units. In the low-risk group 30 percent of the players suffered injuries. In the moderate-risk group 50 percent of the players suffered injuries, while in the high-risk group 73 percent of the players suffered major time loss injuries.

Similar results were reported by Sarason, Johnson & Siegel (1978). Coddington & Troxell (1980) conducted a similar study on high school football players. They found significant differences between the injured and non-injured athletes for the factors of family events and object loss. Six players reported divorce of their parents, and four players reported death of a parent. The researchers concluded that the risk of injuries for these players was five times greater than for those reporting no such loss.

In a recent study, May, Veach, Southard & Herring (1985) studied ninety-seven elite male and female athletes (biathlon, race walking, figure skating, gymnastics and basketball). Their study again demonstrated that "the amount of life change is an important force in an individual's life which may influence the onset of injury" (p.177). Athletes, especially those experiencing high life changes which can lead to considerable anxiety regarding performance, ended up actually experiencing problems. As would be expected, these individuals had several health problems which are commonly related to stress, such as headaches, digestive tract disturbances, anxiety and substance use. The authors considered the use of non-prescribed medication by these athletes as of particular interest. They argued that these individuals who experienced high degrees of change were so anxious that they avoided going to the appropriate health care practitioner. This self-medication leads to more problems, and therefore, their health and performance deteriorated even more. Another interesting finding of this study is that the younger, developmental athlete tended to be more vulnerable to life stresses. It may well be that the younger, developmental athlete has not yet learned the psychological coping skills or the psychological preparation skills to be as efficient or consistent as the elite athlete.

According to these researchers the effect of life change and the ensuing stress may be to hinder concentration on environmental cues that are crucial and/or to block previously learned adaptive responses when difficult and potentially damaging situations are recognized.

According to Niedeffer (1981) this also explains why some athletes never seem to recover completely from an injury. This failure is often seen in the case of knee injury. What has happened for the injured athlete is that the pain and anxiety generated by the injury (fears of future injuries) result in his being more attentive and sensitive to this area. Attention is distracted from the usual cues to which the athlete attends. He begins to look for someone coming from the side instead of running with the same relaxed feelings he had prior to the injury. Performance is inhibited by the attentional distractions. In addition, muscle tension increases through bracing and a desire to protect the knee. As a result, flexibility on the playing field is reduced even though it isn't reduced in the lab or test situation. Given these changes the athlete doesn't perform as well and increases the likelihood of future injuries because of the reduction in flexibility (p148).

These results on stress and injury contradict the common myth that accidents occur as a natural process of a sport or are the physical hazards of a particular activity. These studies suggest that one component of injury and illness is an environmental or psychological factor. The consequence of this finding is that the behavioral component is potentially preventable (May et al., 1985, p.178).

What are the psychological consequences or concomitants of injury and how is future performance influenced by previous injury? Again, very little research has been done on this issue.

According to Rotella (1985) the research by Kübler-Ross (1969) on the stages of death and dying offers the best conceptual framework within which to understand the psychological consequences of athletic injury. According to this model, a loss (e.g. death of a loved one, divorce, amputation , etc.) is an extremely stressful experience which will trigger typical physiological and psychological responses. Sports injuries, according to this theory, also constitute a loss, i.e. loss of the ability to practise and perform. Injured athletes would therefore progress through similar and predictable stages. This response pattern is typified by the following emotional components:

DENIAL

According to Rotella (1985) it is normal for athletes, immediately following an injury, to respond by stating that there is no damage, it is less extensive than originally thought, or it will probably be better tomorrow. It may be manifested in keeping an injury from the coach, minimising the severity of an injury or refusing to see a physician. Denial also serves as a protection against the negative emotions accompanying injury and may hamper the process of acceptance and recovery. Should the injury persist, momentary isolation and loneliness may follow. As they become aware of the extent of the injury they advance through the following stage which is typified by anger and aggression (p. 276).

ANGER AND AGGRESSION

The athlete becomes irritated with himself and directs his irritability against family, friends or people who want to help. He may protest against or resist treatment. He may blame an opponent for aggressive play or himself for insufficient preparation. Often it is expressed in more subtle ways and thus is less obvious, e.g. thoughts like "why did this happen to me?" occur.

BARGAINING

The next stage is heralded when the athlete begins to bargain, e.g. "Ok, I'm injured but I must be able to play in time for the playoffs". According to Rotella (1985) this stage is typified by a true sense of loss. The athlete observes a leg in a cast or an arm in a sling and he is well aware that the injured limb is the difference between observing action from the sidelines and performing in the competition. Identity has been lost and a perception is formed that the loss may also be the team's loss (p. 276).

DEPRESSION AND GUILT

The athlete may experience a deep empty feeling, even with outbursts of crying. Feelings of despair may surface (e.g. "I will never be able to perform effectively again", or " I may never come back to full strength again"), accompanied by negative self esteem and physical symptoms such as restlessness, nausea, loss of appetite, poor sleep, etc. Feelings of guilt are common (e.g. "I have let my coaches, teammates, friend down by getting

injured") and may even arise from his aggressive feelings or feelings of jealousy (envies other healthy athletes).

ANXIETY

It may arise from thoughts like "What is going to happen to me now?" "How am I going to cope?" "What are my chances?" or may be due to a feeling of loss of control over his emotions. Anxiety is considered a common consequence of injury. According to Rotella (1985) anxiety related to an injury may lead to reinjury, injury to another part of the body due to forcing the recently injured limb, a temporary performance decrement due to lowered confidence and permanent loss of confidence and ability to perform (p. 273). It is also often hypothesized that "injury-prone" athletics may be among the more anxious and insecure competitors, but except for a few studies there is little corroboration of this relationship (Cratty, 1983). More research needs to be done dealing with this intricate interaction between injury and anxiety.

These emotional components are not constant and always present: it can appear in any order, with varying intensity and importance for different persons. However, a knowledge of these factors is important, because it will enable the coach or trainer, the physician and other persons attending to the injured athlete to better understand his reactions and improve the quality of their care.

In conclusion, injuries in all sports are increasing despite technological advances in safety equipment (Bramwell et al., 1975). However, a review of the literature reveals that the relationship between psychological factors and sports injuries as well as the psychological rehabilitation of the injured athlete are rather neglected areas in research.

Important questions remain unanswered, e.g.: Apart from stress, do other psychological variables such as self esteem, concentration, attention, coping skills, etc. contribute to injury? Why do certain athletes seem to be more prone to injury than others? Why do some individuals never seem to recover completely from an injury? What are the psychological consequences of injury and how can they be dealt with?

It is evident that in future, closer research attention will have to be given to the role of psychological factors in sports injuries. Existing findings, however, suggest that those involved in the training and care of athletes must be aware of emotional conditions that may contribute to injury, and thereby assist in reducing the psychological risk component and injury rate. Team physicians, trainers and coaches must also pay close attention to the psychological rehabilitation of the injured athlete. That the body is ready to return to competition does not imply that the mind is also prepared. Failure to attend to the psychological consequences of injury may increase the risk of reinjury and a deterioration of performance.

REFERENCES

Bramwell, S., Masuda, M., Wagner, N. & Holmes, T (1975). Psychosocial factors in athletic injuries. Journal of Human Stress, 1, 6-20.

Coddington, R. & Troxell, J (1980). The effects of emotional factors on football injury rates. Journal of Human Stress, 4, 2-6.

Cratty, B.J. (1983). Psychology in Contemporary Sport (2nd ed.). New Jersey: Prentice Hall.

Holmes, T & Rahe, T. (1976). The social readjustment rating scale. Journal of Psychosomatic Research, 11, 213-218.

Kubler - Ross, E. (1969). On death and dying. New York: Macmillan.

May, J.R., Veach, T.L., Southard, S.W. & Herring, M.W. (1985). In N.K. Butts, T.T. Gushiken & B. Zarin (Eds.) The Elite Athlete. New York: Spectrum Publishers.

Nideffer, R.M. (1981). The ethics and practice of applied sport psychology. New York: Mouvement Publications.

Rotella, R.J. (1985). The psychological care of the injured athlete. In L.K. Bunker, R.J. Rotella & A.S. Reilly (Eds.) Sport Psychology. Charlottesville: Dept. of Health and Physical Education.

Sarason, J.G., Johnson, J.H. & Siegel, J.M. (1978). Assessing the impact of life changes: Develop-

NEXT UP IN SPORTS MEDICINE

The next issue of Sports Medicine will contain, amongst others, the following articles:

Sports injuries:
Survey at Bureau for Students Health - University of the OFS.
E Prinsloo.

Swimming:
Epidemiological study of failure to complete a long distance swim.
Derek Yach.

Strength Fitness:
A biomechanical approach
Mel Siff.

Physiotherapy:
Soccer: Warming-up and Stretching.
Gary Jacobsen.

Nutrition:
Energy value of food
Mieke Faber.

General:
Acute cauliflower ear.
JDA Bekker.

Congresses:

Report-back on Sports Medicine Congress.

PLUS:
Details of "Best Article" Competition.

Letters to the Editor

Injury Rehabilitation with Machines.

Dear Sir,

I would like to comment on the article by M.C. Siff "Injury rehabilitation with machines" in the Volume 3 No. 2 1988 issue in which he discusses the use of machines in rehabilitation. There is definitely no one type of exercise machine that can offer all the best available forms of muscle work. As we know, all muscle work is highly specific to the sporting activity of that particular athlete. When discussing rehabilitation the isokinetic apparatus offers you a great spectrum of rehabilitation variables above pulleys, proprioceptive neuromuscular facilitation (P.N.F.) and normal strength machines. I have worked with this equipment and have found it to be exceptionally helpful in the acute rehabilitation phase of the post-operative patient. P.N.F. is very effective but in many cases the patients are far too strong for the physiotherapist. Usually the physiotherapist is too fatigued to be of any effect, and therefore cannot give the patient a reasonable exercise session, unless the patient is exceptionally weak. This equipment also offers the athlete direct visual feedback which helps to motivate the patient. An important aspect of early isokinetic rehabilitation in certain post operative conditions e.g. Kennedy L.A.D. reconstruction of the anterior cruciate ligament. In such cases the knee joint must not be loaded in full extension for approximately 6 months. This can be controlled extremely safely for the full rehabilitation period allowing the patient to load the relevant thigh musculature without danger of overloading the reconstruction. An acute medial collateral ligament must not be loaded in full extension either, these athletes can undergo extensive quadriceps atrophy. With early controlled strengthening you can limit loading of the involved ligament while very effectively maintaining and even improving the quadriceps strength for early return to play. Another good example is an acute ankle sprain which can be actively rehabilitated in non-weight-bearing doing inversion and eversion ranges of movement, strictly controlling the inversion so as not to overload the healing lateral structures.

In many soft tissue injuries it is unwise to initially load damaged structures eccentrically. This can aggravate the healing process e.g. muscle tissue. Concentrics/isokinetic loading is preferred before progressing onto eccentric loading, which I agree is extremely important. Once the athlete is rehabilitated to a painfree full range of movement he is able to be tested. This helps to motivate the patient into co-operating with further rehabilitation which is normally a big problem. Many a patient is extremely cautious and anxious in the early stages of rehabilitation. Isokinetic apparatus helps them to build up this confidence initially. Confidence is not easily gained when a patient is handling a pulley which he does not control. If he experiences pain he can drop the weight and damage himself further.

The isokinetic apparatus offers a well-controlled environment for rehabilitation and this can be used as a foundation for strengthening before progressing the patient onto other exercise machines and muscle work modalities.

The best rehabilitation environment for any athlete is one which offers isokinetic, eccentrics, variable isotonics and pulleys. Diagonal patterns are also important. Most important of all is that the patient should be introduced back to extensive functional activities, before returning to his sporting activities.

Yours Faithfully,

Ivan Levinrand
(B.Sc (Physiotherapy) (Wits)
B.Sc (Med. Hons) in Sport Science
(U.C.T)

Dear Sir,

The need in the private sector to establish a South African Resuscitation Centre has been evident for some time.

Initiated by the Red Cross (East Cape Region) and with the assistance of Dr Mark Harries who was instrumental in establishing the UK Council, the South African Centre has now been established.

The Council would like to invite other interested persons to join and become involved in the work of RESCO.

The Council will promote uniformity and standardisation in CPR techniques/methods in all areas ranging from basic to advanced Life Support.

Application forms are available from the Secretary, Resuscitation Council of South Africa, P.O.Box 492, Port Elizabeth, 6000 .

Yours faithfully,
C.A.Scales (Mrs.)
pp J.A.Strömbeck MB.Ch.B.
Chairman.

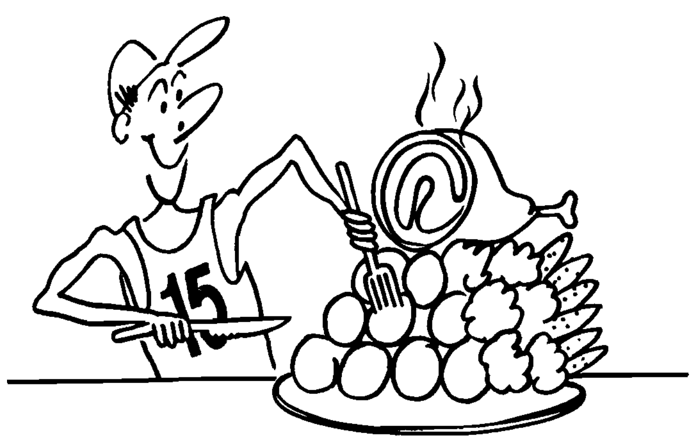
THE ATHLETE AND HIS DIET IN GENERAL

Mieke Faber, RIND,
SA Medical Research Council.

There are many superstitions about the various foods athletes should eat (and avoid) to improve their performance. However, it is known that the nutritional requirements of athletes are based on the same fundamental principles that govern the nutrition of human beings in general. It should be kept in mind that a nutritionally well balanced diet could aid the athletes performance and manipulation of the diet may even improve his performance. Good eating habits entail knowing how to compile the diet from the various foods available. The following guidelines should be kept in mind:

* In a weight stable person of ideal weight the energy intake should equal the energy expenditure. This will result in the body weight remaining more or less stable.

* Less than 30% of the energy intake should be supplied by fat. Saturated fat (mainly animal fat) should not supply more than 10% of the total energy intake.



* Between 10-15% of the energy should be supplied by protein, 1-1,5g protein/kg body weight should be sufficient for most athletes.

* Approximately 55-58% of the energy should be supplied by carbohydrates, mainly in the form of complex carbohydrates. It should be kept in mind that although sugar is a concentrated form of energy, it does not supply any nutrients other than energy. If most of the carbohydrates in the diet are supplied by sugar, the athlete is at risk of developing vitamin and mineral deficiencies.

* Provided that a well balanced diet is consumed, under most circumstances there is no need for additional vitamin and mineral supplementation.

When selecting the food intake, it should be kept in mind that none of the ordinary foods are of special value or contraindicated in athletic performance.

Letters to the Editor

(Continued from p16)

Dear Sir,

APPLIED KINESIOLOGY

With reference to Dr. Kromhout's letter in the June 1988 issue elaborating on the merits of Applied Kinesiology, I wish to comment as follows:

1. Applied Kinesiology cannot be referred to as `highly accurate'. The basis of this system is the diagnosis of physiological imbalance by manual estimation of the strength of certain indicator muscles. Though this may suggest some imbalance, accuracy can be achieved only by means of suitable instrumentation such as a dynamometer, force plate or strain guage. Moreover, manual isometric testing can produce measurable fatigue in the muscles of the patient and the practitioner, so the test protocol itself can introduce imbalance!
2. The basis of the system needs to be carefully evaluated, since perfect muscle balance is unphysiological. The human body is asymmetric in structure and function, even in elite athletes. In biomechanical research I have performed on weightlifters, not a single subject has displayed symmetry of muscle strength, yet each one has been thoroughly healthy.
3. Dr.Kromhout points out correctly that anthropometric or radiological techniques measure structural differences unrelated to functional imbalance. Both chiropractors and orthopaedic specialists should make use of apparatus which can assess the functional characteristics of the sportsman during actual sporting movements.
4. Muscle balance is altered both after strenuous exercise or prolonged inactivity, a situation which can introduce serious uncertainty into applied kinesiological testing.

Applied Kinesiology requires more extensive study and better application.

Yours faithfully,
M.C.Siff. Ph.D.
Communication Studies Division,
University of the Witwatersrand.

VOLTAREN EMULGEL

ULTRAMAN 1989 ROUND-UP

For the second year in succession, Nic Bester walked away with the top laurels in the 1988/89 Voltaren Emulgel Ultraman Competition.

Bester's winnings totalled R16 000 and other medalists shared R14 000. There were cash prizes of R2 000 for the first Ultraman to finish each event.

For a time it looked as though Danny Biggs might maintain his early lead as he was still well ahead after the Midmar Mile and the Two Oceans.

An exciting contest was settled on the last event of the Ultraman Calendar -- The Comrades Marathon. Bester's fourth place enabled him to wipe out Biggs' 6 point lead and win by a further 8 points.

The women's race was totally dominated by Sally Bantock. This former Provincial Hockey player scored 375 points, no less than 200 points ahead of the second lady, Sandra Eardley. Sally was placed 14th overall in the Voltaren Emulgel Ultraman Competition.

The Veterans was a close run thing with Wilmot finishing on 442, less than 20 points ahead of Max Botha

Winners all! Pictured above are the overall winners in the three Ultraman categories. Nic Bester (Men), Sally Bantock (Women) and Wilmot (Veterans)

Picture Courtesy of Sports International

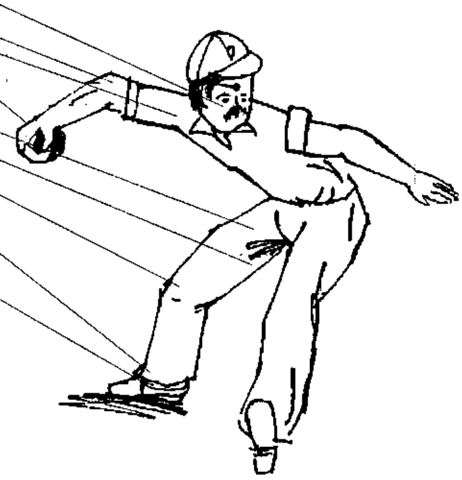
(... Continued from page 5) (Text continues on following page)

ACUTE AND CHRONIC INJURIES SUSTAINED IN FIRST-CLASS CRICKET

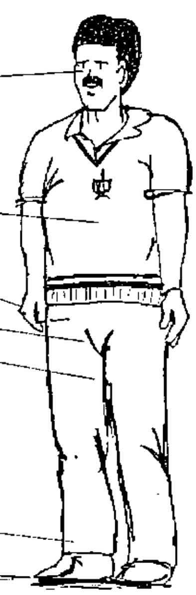
DURING BATTING (n=81)

DURING BOWLING (N=64)

DURING FIELDING (N=37)



DURING TRAINING AND WARMING UP (N=11)



TOTAL INJURIES SUSTAINED N=193

Table I: Serious and less serious injuries sustained while playing cricket

	SERIOUS INJURIES						LESS SERIOUS	
	Bat	Bowl	Field	Other	Total	%	Total	%
Head, Neck and Facial injuries	31	3	1	3	38	20	12	10
Upper Limb injuries	30	5	26	1	62	32	31	43
Back and Trunk injuries	5	28	-	2	35	18	10	14
Lower Limb injuries	15	28	10	5	58	30	20	27
Total Injuries	81	64	37	11	193		73	
%	42	33	19	6		100		100

body has to absorb a vertical force 4,1 times greater than the body weight and a horizontal deceleration force 1,6 times his body weight. [14,15]

These authors found that these impact forces, in association with the lateral flexion, extension, rotation and compression of the vertebral column during delivery, to be the reason for the increase in back injuries in fast bowlers. A front-on action would make the bowler more susceptible to injuries than one who bowls with a side-on action allowing him to summate his body forces more efficiently thus producing maximal ball velocity with minimal strain to his body structures [16].

In a study on the fitness of cricketers [17] it was found that cricketers had an above average level of fitness, with the exception of back and hamstring flexibility. No significant differences in the various components of fitness were found when batsmen, bowlers, all-rounders and wicket-keepers were compared. The bowlers, who need to possess strength in the hips, back and shoulders, showed the lowest score for strength and muscular endurance of the arms and shoulders.[18] This lack of strength and flexibility in the back and hamstrings, could be one of the main causes of back injuries in bowlers. By following a specialized training programme aimed at developing an appropriate level of fitness specific to the task to be performed in a match, unnecessary injuries could be avoided.[19]

CONCLUSIONS

The following recommendations are made in an attempt to prevent serious injuries taking place, as well as to try to reduce the normal injuries associated with field sports:

* consideration may have to be made to make the wearing of helmets, particularly those with a full visor, compulsory,
* batsmen need to practise on pitches that are similar to those they are likely to encounter in a match,
* bowlers need to develop leg, back and trunk strength and flexibility,
* bowlers should ensure that the boots worn are able to absorb the tremendous forces generated at front-foot impact in the delivery stride,
* captains and coaches should avoid over-bowling their fast bowlers, particularly at the beginning of the season,
* bowlers and coaches need to place special emphasis on technique in an attempt to develop a side-on bowling action,
* all cricketers need to follow personalized training programmes catering for their specific needs and their specialisation in the team.

The game of cricket is demanding more physical output from the players who cannot afford to suffer unnecessary injuries, particularly at vital stages of the season. At all levels the astute coach and player must ensure that unnecessary injuries are not a contributing factor in a team's failure to reach its potential.

REFERENCES

1 Weightman, D and Browne, R.C. Injuries in eleven selected sports. British Journal of Sports Medicine, 1971, 2, 27.

2. Temple, R. Cricket Injuries: Fast Pitches change the Gentleman's Sport. The Physician and Sportsmedicine, 1982, 10(6) 186-192

3 Payne, W.R., Hoy, G., Laussen, S.P. and Carlson J.S. What research tells the Cricket Coach. Sports Coach, 1987, 10(4) 17-22.

4. Ogilvie, F.M. On one of the results of concussion injuries of the eye ("holes" at the macula) Trans Aphthalmol Soc U.K.1900,20,202-229

5 D'Ambrain, A. Traumatic monocular - chronic glaucoma, Trans Ophthalmol Soc. Aust., 1945, 5, 116-120.

6. Lillewood, K.R. Blunt ocular trauma and hyphaema, Australian Journal of Ophthalmol, 1982, 10, 263-266.

7 Jones, N.P. and Tullo, A.B. Severe eye injuries in cricket, British Journal of Sports Medicine, 1986, 20,(4), 178-179

8. Williams, J.G.P. Joint Injuries, In: J Cohen, G.R. Beaten and D Mitchell (Editors). The South African Textbook of Sports Medicine, University of Witwatersrand, Johannesburg 1979.

9. Corrigan, A.B. Cricket Injuries, Australian Family Physician 1984, 13(8), 558-562.

10 Colson, J.H.C. and Armour, W.J. Sports Injuries and their treatment, Stanley Paul and Co, London, 1975.

11. Clements, M.R. and Hamilton D.V. Pneumomediastinum as a complication of fast bowling in cricket, Postgraduate Medical Journal, 1982, 58, 435.

12. Foster, D., Elliott, B. Gray, S., and Herzberg, L. Guidelines for the Fast Bowler, Sports Coach, 1984, 7(4) 47-48

13. Stretch, R.A. Anthropometric profile of first-class Cricketers, S.A. Journal for Research in Sport, Physical Education and Recreation , 1987, 10(1), 65-76.

14. Elliott, B.C. and Foster, D.H. A Biomechanical Analysis of the front-on and side-on fast bowling techniques, Journal of Human Movement Studies, 1984, 10, 83-94

15. Elliott, B.C. Foster, D.H. and Gray, S. Biomechanical and Physical Factors - influencing Fast Bowling, Australian Journal of Science and Medicine in Sport, 1986, 18 (1) 16-21.

16. Foster, D. Injury and its Prevention in Fast Bowling, Proceedings of A.S.M.F. Annual Scientific Conference, Perth Australia, 1984.

17. Stretch, R.A. and Buys, F.J. Physical Fitness Profile of South African Universities Crickelers, Unpublished paper, 1987.

18 Reddick, T. Play Cricket the right way, Seven Seas publications Cape Town, 1979.

19. Davis, K. Training principles related to Cricket. Sports Coach, 1984, 8(3), 23-25