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Generating Geothermal Energy

Move over Eskom, perhaps it's time for South Africa to engage with Iceland to solve our looming chilly and gloomy prospects. Iceland is digging holes into volcanos in search of a new form of renewable energy. Scientists have begun boring into the world's deepest geothermal hole (3.1 miles deep) in the Reykjanes peninsula where they hope to use the extreme pressure and heat to tap into a source of electricity. At these depths, there is a mixture of molten rock and water which are under extreme heat and pressure. This condition imparts to the water properties that make it neither a steam or a gas, and turn it into what is known as a "supercritical steam.". Supercritical steam has far more potential energy than either of the aforementioned states of matter, and may be the key to generating vast amounts of electricity. However, even if such volcanic holes were available in South Africa, we would still need to be ethically conscious of the negative environmental impact and costs of deep drilling, and weigh these up against the possible benefits. Ultimately future research needs to focus on renewable and sustainable energy (and then on dispelling the notion that dentistry is painful and stressful for clinicians and patients alike!)



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Prof NH Wood

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Sub-editors

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Prof J Yengopal

Please direct all correspondence to:

South African Dental Association

Private Bag 1, Houghton 2041

Tel: +27 (0)11 484 5288

Fax: +27 (0)11 642 5718

Email: info@sada.co.za

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Generating Geothermal Energy

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PRODUCTION OFFICE

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 Electronic Doctor (E-Doc),
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Tel: +27 (0)10 020 1013
 Physical Address: 91 Opaal Rd,
 Lyttelton Manor X 03, Pretoria, 0157
 Postal Address: P.O. Box 37545,
 Faerie Glen, Pretoria, 0043
 Website: www.edoc.co.za

Publisher and Project manager

Mr René Smulders

GENERAL AND ADVERTISING ENQUIRIES

Mr René Smulders
 Email: rene@edoc.co.za

Design and Layout

Mrs Melani de Beer
 Email: production@edoc.co.za

Website smalls advertising / CPD Enquiries and

Member contact detail update

South African Dental Association
 Tel: +27 (0)11 484 5288
 Email: info@sada.co.za

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Season's greetings and best wishes

SADJ November 2022, Vol. 77 No.10 p585

Prof NH Wood - BChD, DipOdont(MFP), MDent(OMP), FCD(SA), PhD

The past year has seen a return to some form of social normalcy in our society and communities since the upliftment of the COVID-19 pandemic lockdown. Where many sighed in relief, others struggled to find their footing after the tumultuous phase in our lives. Recovery is a long process; however, I believe that we are all relieved and can guardedly say that the worst is now behind us. We look forward to ending this year peacefully and start afresh in 2023 with new challenges and goals that await us.

One of the functions of the South African Dental Journal is to further the knowledge frontier, and this provides a scientific platform for our researchers and subject experts to present their knowledge and insights to the broader community. The production of scientific knowledge sees a cascade initiated that eventually influences the progression of social equality, improvements in the diagnoses and management of diseases, uplifting community welfare, and even addressing poverty.

Furthering the knowledge frontier is not simply a means to build a curriculum vitae, but a dedicated and sincere effort to improve humankind in this particular way. The efforts to produce and present this knowledge takes great investments in time and other resources, which is then presented to peers for detailed scrutiny and criticism. The scientific method sees us able to sustain

our community's ability to contribute to the global pool of knowledge and we should always strive to produce work of the highest quality.

The SADJ is constantly evolving, and we are furthering our efforts to create more exposure and indexing opportunities and subsequently citations for our authors. We aim to provide the latest and most up to date peer-reviewed information to our readership and association members. To this end we encourage our readers and our researchers to provide us with a sustained feedback and information. In this way we can act to improve and grow our journal to achieve more highlights. You can find all the relevant information regarding the SADJ at <https://journals.assaf.org.za/index.php/sadj/index> and the office is always ready to assist with any questions. We look forward to receiving your comments and inputs. After all, the creation of new knowledge is preceded by ideas based on existing knowledge.

We have reached the conclusion for the 2022 edition of the South African Dental Journal, and it is with a deep gratitude that we would like to thank all our content contributors and advertisers from all over South Africa and even further abroad. As we sign off for this last issue of 2022, I would like to wish you all the best for this upcoming festive season. Please travel safely if this is in your planned activities, and we look forward to many more engagements in 2023.



Year end stress in the workplace

SADJ November 2022, Vol. 77 No. 10 p586

Dr Nthabiseng Metsing, Head: Professional Development, SADA

Stress is a feeling of emotional or physical tension. It can come from any event or thought that makes a person feel frustrated, angry, or nervous. Stress is the body's reaction to a challenge or demand. In short spurts, stress can be positive, such as when it helps you avoid danger or meet a deadline.

Between the upcoming holiday season and the end-of-year push at work, your organization may see rising stress levels among employees. This stress can have major impacts on individual, team and business performance. With learners and students also writing their exams, they may also experience some of the stress symptoms. Stress can affect anybody and as such the advice can be given to patients, staff or used by the clinicians themselves

Effects of stress

You may be aware of the physical and emotional symptoms of stress such as headaches, stomach aches, and anxiety. Stress can manifest in several problems at work, including lower productivity and morale and higher absenteeism and turnover.

Classic signs of stress in adults may include:

- Crying spells or bursts of anger.
- Difficulty eating.
- Losing interest in daily activities.
- Increasing physical distress symptoms such as headaches or stomach pains.
- Fatigue.
- Feeling guilty, helpless, or hopeless.
- Avoiding family and friends.

Effects of stress in the Orofacial region

Jaw issues, or disorders of the temporomandibular joint (TMJ) or chewing muscles - these can cause pain around the ear or face.

Teeth grinding, or bruxism - this can happen during the day, especially when you're concentrating, or at night. Poor oral hygiene, caused by a lack of good brushing and flossing. If you're too busy or forget to keep up with your dental hygiene, you can wind up with tooth decay and gum disease.

Aphthous ulcers (Cracker sores), which can be triggered by vitamin B deficiency and any type of mouth injury or irritation. Several studies now show that stress is another big trigger for canker sores.¹

Oral infections or sores, which may show up as ulcers, white lines, or white or red spots. These can be brought on by stress.

The role of the dentist in assisting patients to cope with stress

- Patients should talk to their dentist about treatment options. The dentist might do or advise on the below:
- Address teeth grinding by making a custom-fitted night guard. It can be worn at night to prevent tooth damage caused from grinding and clenching. The night guard also creates a cushion to remove stress on your aching muscles and joint tissues.
- Advise the patient to avoid hard or crunchy foods when they're in pain.
- Avoid coping with tobacco and alcohol because these products can may worsen the oral symptoms.
- Advise to manage pain through gentle massage, physical therapy or pain relief medications.
- Prescribe anti-inflammatory drugs that will help reduce inflammation of the (TMJ). Antiviral drugs may be given to prevent the development of cold sores.
- Advise patient to avoid the sun or use a sunscreen with at least an SPF of 30 to help reduce cold sores.
- This is an important reminder to members to be on the lookout for some of the stress symptoms in their patients so that they are able to advise on management or referring accordingly.

CPD questionnaire on page 638



The Continuous Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.

In-vitro comparison of bonding time and strength of adhesive pre-coated and standard metal orthodontic brackets

SADJ November 2022, Vol. 77 No. 10 p587-p591

R Essop¹, E Ghabrial², PJ Becker³

ABSTRACT

Objective

To compare the shear bond strength and bond time of 3M Unitek's APC (Adhesive Pre-Coated) Flash-Free™ system applied to metal brackets.

Materials and Methods

An in vitro study was performed on 40 extracted sound human premolar teeth randomly divided into two groups (20 per group) bonded either with Adhesive Pre-Coated Flash-Free metal brackets or metal brackets coated manually with Transbond XT™ light-cure adhesive.

Bonding time was measured using a stopwatch. Thermocycling was performed on the samples (500 cycles) to simulate the oral environment between baths of 5°C and 55°C distilled water. Debonding shear bond strength measurements were performed in an Instron universal testing machine.

Results

The APC Flash-Free group bonded in significantly ($p < 0.001$) less time (mean 34.06s/tooth) than the manually coated group (mean 55.14s/tooth). Shear bond strength of the manually coated group was significantly ($p < 0.001$) higher (mean 13.32 MPa) than the APC Flash-Free group (mean 10.95 MPa).

Conclusion

The APC Flash-Free free system is efficient and allows for reduced chair time during the bonding appointment while attaining a mean shear bond strength of 10.95MPa, which is higher than the minimum shear bond strength of between 4MPa and 7MPa¹.

INTRODUCTION

Since the inception of the acid etch technique described by Buonocore² adhesive dentistry has evolved with a multitude of adhesive products, including orthodontic adhesives.³⁻⁵ When a bracket is bonded to a tooth, it is either bonded by manually coating brackets with adhesive or with brackets pre-coated with adhesive.^{6, 7} One of the problems with manually coated brackets is the need to remove the excess adhesive flash from around the bracket prior to curing.^{8, 9}

The second problem with manually coated brackets is that clinically, a common site of enamel demineralization is at the enamel-adhesive interface of the tooth surrounding an orthodontic bracket.⁸⁻¹¹ When the excess adhesive flash is not removed adequately, the rough adhesive surface remaining provides a site for rapid attachment and growth of oral microorganisms.¹²⁻¹⁴ Patients undergoing orthodontic treatment, thus face a high risk of developing enamel demineralization (white spot lesions) and caries at the bracket-enamel interface.¹⁴

The APC Flash-Free Adhesive Coated Appliance system was developed by 3M Unitek (Monrovia, Calif) in 2013 in an attempt to eliminate flash removal.^{9, 15} The technology was first applied to ceramic brackets in 2013, and in 2016 introduced to metal brackets.^{9, 15} The bracket base comprises a nonwoven polypropylene mesh infused with a low viscosity resin.^{9, 15} When applying pressure to the compressible mat, the resin is expressed in sufficient quantity to spread out and conform to the tooth surface, making uniform and consistent contact with no flash to clean-up.^{15, 16} The low viscosity resin is achieved by reducing the filler content of the adhesive,¹⁷ however, Faltermeier et al.¹⁸ have shown that a reduction in filler particles results in reduced bond strengths.

In addition, Foersch et al.⁹ have demonstrated that the APC Flash-Free™ system did in fact express some flash at the bracket margins when examined microscopically. The flash ranged between 0.08 – 0.16mm, but due to the low viscosity of the resin, was shown to have a smooth surface. This was found to be a positive feature as the minute volume of flash confirms the presence of a marginal seal while the smooth surface is less susceptible to plaque accumulation.⁹

Research performed by 3M Unitek reported a reduced bonding time, adequate bond strength, and no adhesive flash clean-up when the APC system was applied to ceramic brackets.¹⁵ In 2016 3M Unitek applied the APC

Author affiliations:

1. **Dr Rashid Essop:** BCom, BChD, Registrar, Department of Orthodontics, University of Pretoria. ORCID: 0000-0001-5374-9355
2. **Dr Emad Ghabrial:** BChD, MchD(Orthod), PhD, H Dent Dipl, PG Dipl Dent (P. Manag) Specialist/ Senior Lecturer, Department of Orthodontics, University of Pretoria. ORCID: 0000-0002-7213-9760
3. **Prof Piet J Becker:** MSc(Pret) PhD(Unisa), Research Office, Faculty of Health Sciences, University of Pretoria ORCID: 0000-0002-9384-6472

Corresponding author:

Dr Rashid Essop
Registrar, Department of Orthodontics, University of Pretoria.
Email: essoprashid@gmail.com,
Tel: 0833388882

Author contributions:

1. Dr Rashid Essop: 80%
2. Dr Emad Ghabrial: 10%
3. Prof Piet J Becker: 10%

Flash-Free™ technology to metal brackets. However, after a thorough literature search, no studies could be located which evaluated the properties of the APC Flash-Free™ technology when applied to metal brackets.

The objective of this study was to determine (1) the shear bond strength (SBS) between APC Flash-Free™ adhesive coated and manually coated metal Victory Series™ (3M Unitek, Monrovia, Calif) brackets and (2) to determine whether there is a significant difference in the bond time between the two systems.

MATERIALS AND METHODS

Ethics Approval

The study protocol was approved by the Faculty of Health Sciences Research Ethics Committee, University of Pretoria, South Africa. Ethics Reference No.: 499/2017.

Sample

Forty extracted human premolar teeth were collected from the Maxillofacial and Oral Surgery clinic. The sample size was guided by previously published *in-vitro* studies evaluating bonding time and bracket bond strength on extracted human teeth.^{6,19-22} Any deposits on the teeth were removed with a brush or a dental scaler and rinsed under running water. The inclusion criteria for the extracted teeth were sound enamel surfaces with no carious lesions, fluorosis or cracks, no demineralisation of the enamel, and no restorations present. The teeth were randomly divided into two groups (20 per group) and stored in a 0.1% Thymol solution to inhibit any microbial growth.²³ All teeth were bonded within 48 hours of being extracted.

Brackets

Adhesive precoated brackets were introduced by 3M Unitek in 1991.²⁴ The brackets were precoated with a modified version of Transbond XT™ that has been developed to have reduce viscosity.²⁴ These earlier APC systems lessened the number of bonding steps; however, flash removal was still necessary.²⁵ In 2013 3M Unitek released the APC Flash-Free system which the company had developed after recognising the shortcomings of excess adhesive flash removal.¹⁵ For the purpose of standardisation, maxillary premolar metal twin brackets (Victory Series™, 3M Unitek, Monrovia, Calif) were used in this study. Twenty uncoated metal (Victory Series™) brackets in conjunction Transbond XT™ (3M Unitek, Monrovia, Calif) were used in the control group (Group 1, Transbond XT™) and twenty APC Flash-Free precoated metal (Victory Series™) brackets were used in the experimental group (Group 2, APC Flash-Free).

METHODOLOGY

Bonding procedure: The bonding surfaces of each tooth were polished with non-fluoridated pumice and water for 15 seconds. The surfaces were then rinsed, air dried and etched with 37% phosphoric acid (Ultraetch™, Ultradent, St Louis, MO, USA) for 30 seconds. After rinsing and drying, Transbond XT™ primer (3M Unitek, Monrovia, Calif) was applied and thinned out using a burst of air. The bonding procedure was performed by the principal investigator as follows:

- **Group 1:** Transbond XT was applied to the bracket base directly. The bracket was then placed on the tooth with firm constant pressure. The excess flash

was then removed, and the bracket was corrected to the ideal occluso-gingival and mesio-distal position on the tooth.

- **Group 2:** The APC Flash-Free coated brackets were removed from their individually packaged containers and placed onto the tooth with firm constant pressure. The bracket was then corrected to the ideal occluso-gingival and mesio-distal position on the tooth.

An LED light curing unit (Woodpecker™, Model: LED.B, Woodpecker Medical Instrument Co, Guilin) was used to cure the adhesive. The light was applied for ten seconds (five seconds from the mesial and 5 seconds from the distal of the bracket) at an intensity of between 1070 mw/cm² and 1120 mw/cm².

Measurement of bond time: The bonding procedure was timed to the nearest hundredth of a second by an independent observer using a stopwatch. Timing began when the operator secured the bracket onto the bracket holding forceps and was stopped when the operator deemed the bracket to be in the correct occluso-gingival and mesio-distal position.

Thermocycling: Thermocycling tests were developed after it was noted that oral temperature changes resulted in stresses at the restorative-substrate interface.²⁶ It is a method of simulating oral temperature changes *in-vitro* by immersing specimens in circulating baths set at predetermined temperatures for predetermined time durations.²⁷ Previous studies have demonstrated that after thermocycling, a significant decrease in shear bond strength was observed.^{28, 29} Bonded teeth were placed in a net which was attached to the motorised arm of a thermocycling system (Model MX07R-20-A11B, Polyscience Temperature Control Solutions™, Niles, IL). The teeth were cycled 500 times between baths of 5°C and 55°C.³⁰ Distilled water was used in the baths, and the exposure time in each bath was 20 seconds with a transfer time of 5 seconds between baths.³⁰

Debonding procedure: The bonded teeth were secured into copper rings which were then mounted onto the clamp of an Instron™ universal testing machine (Model 3366, Instron Corp, Norwood, MA, USA). The mounted teeth were adjusted until the occlusal portion of the bracket was parallel to the shearing blade of the testing machine. The shearing blade of the Instron™ machine applied an occluso-gingival load to the bracket at a speed of 1mm per minute and SBS was recorded in Mega Pascals (MPa).

Statistical Analysis

Based on previous studies^{6, 9, 16, 31} the expected shear bond strength of the manually coated brackets was 10.4 MPa with a standard deviation of 1.39. A 15% increase or decrease in shear bond strength of the preloaded appliance would therefore be regarded as clinically significant. Based on this, a sample of 20 teeth per group would have a 90% power to detect a 15% change when testing at the 0.05 level of significance.

Descriptive statistics, including the mean, standard deviation, minimum, and maximum values, were calculated for each group tested. The two-sample t-test was used to test for differences between groups and

any statistical interaction between the different adhesives used. The Shapiro-Wilks test was used to test the normality of the distribution of Shear Bond Strength and Bond Time. All statistical calculations were performed at the 95% confidence interval.

RESULTS

Bond Time

The mean bond time of brackets in Group 1 (Transbond XT™) was 55.14s (min: 49.12, max: 59.46, SD: 3.14). Brackets in Group 2 (Flash-Free) were bonded in a mean time of 34.06s (Table 1). According to the two-sample t-test, the time-saving effect of Group 2 (Flash-Free) (21.01s per bracket) was found to be statistically significant ($p < 0.001$).

Group	*n	Mean	**Std Dev	Minimum	Maximum
Group 1 (Transbond XT)	20	55.14	3.14	49.12	59.56
Group 2 (APC Flash-Free)	20	34.06	4.73	19.65	42.48

*Number in sample
** Standard deviation

Shear Bond Strength

The mean SBS of the brackets in Group 1 (Transbond XT™) was 13.32 MPa (min: 9.23, max: 15.67, SD: 1.72). The mean SBS of the brackets in Group 2 (Flash-Free) was 10.95 MPa (min: 6.19 MPa, max: 16.7 MPa, SD: 2.29) (Table 2). According to the two-sample t-test, Group 1 (Transbond XT™) brackets bonded with a significantly higher shear bond strength than brackets in Group 2 (Flash-Free) ($p < 0.001$).

Group	**n	Mean	***Std Dev	Minimum	Maximum
Group 1 (Transbond XT)	20	13.32	1.72	9.23	15.67
Group 2 (APC Flash-Free)	20	10.95	2.29	6.19	16.70

*Megapascal
**Number in sample
*** Standard deviation

DISCUSSION

The objective of this study was to evaluate the shear bond strength (SBS) and bond time of a flash free pre-coated bracket adhesive system (APC Flash-Free, 3M Unitek, Monrovia, California).

This in vitro study demonstrated a statistically significant decrease in bonding time when using the pre-coated APC Flash-Free™ system [Figure 1]. This was expected since two steps (adhesive application and excess adhesive flash removal) are eliminated from the bonding procedure. The flash-free system took, on average, 21 seconds less to bond per tooth. This agrees with the results of Lee and Kanavakis⁶, Foersch et al.⁹ and Grunheid and Larson.¹⁷ The percentage reduction in bond time per tooth reported by Foersch et al.⁹ was 58%, Lee and Kanavakis⁶ 74%, and Grunheid and Larson¹⁷ – 37%. In this study the percentage reduction in bond time per tooth using the flash-free system was 62%. This equates 8.75 minutes

when bonding 25 teeth. However, in a systematic review and meta-analysis, Alaktash et al.³² reported that there was no clinical significance regarding bonding time between pre-coated and manually coated brackets.³²

In this study, the ideal bracket position was marked on each tooth. This step was performed to eliminate the time taken to position each bracket at the correct height and mesio-distal position. Due to variations in tooth morphology, positioning the bracket ideally without prior marking could result in unreliable recorded bond times. It should be considered that the brackets of the flash-free system are sealed individually in a light resistant package and the handling of this packaging during the bonding procedure could possibly affect the overall bond time. In this study the time taken to open the package was not considered when measuring bond time.

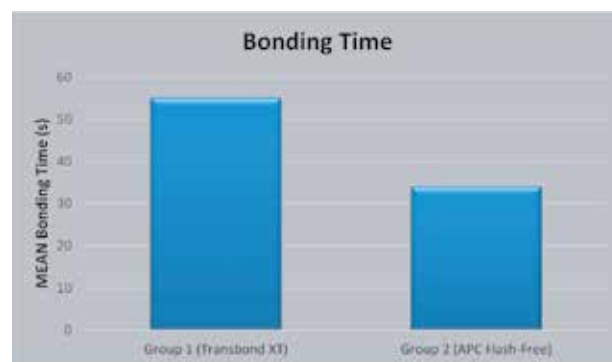


Figure 1: Comparison of bonding time.

Thermocycling is a method of simulating changes in oral temperature which occurs during routine function. This is achieved using circulating baths set at predetermined temperatures. Previous studies have demonstrated that after thermocycling, a significant decrease in shear bond strength was observed.^{28, 29} In addition, none of the earlier investigators evaluating the APC Flash Free™ adhesive systems SBS had performed thermocycling on their samples.^{6, 9, 16}

In this study the mean shear bond strength of Group 2 (Flash-Free) (10.95 MPa) was significantly lower than that of Group 1 (Transbond XT™) (13.32 MPa) ($p < 0.001$) [Figure 2]. These results conflict with the results of Lee and Kanavakis⁶, where greater shear bond strengths were achieved with the flash free system compared to manually coated brackets. However, Lee and Kanavakis⁶ compared ceramic flash free brackets to conventionally bonded metal brackets in their study, and the sample was not subjected to thermocycling.

In addition, the bond strength achieved by Lee and Kanavakis⁶ using the flash-free coated ceramic bracket was less than the bond strengths reported by Reddy et al.³³ and Uysal et al.³⁴ who investigated manually coated ceramic brackets. Lee and Kanavakis⁶ reported a mean shear bond strength of 13.37 MPa for their flash-free sample which was comparable to the mean shear bond strength achieved on conventionally bonded metal brackets (13.32 MPa) in the present study. This was unexpected since previous studies have demonstrated that ceramic brackets bond with greater shear bond strengths than metal brackets.^{33, 34} This could possibly

be explained by the debonding method used by Lee and Kanavakis⁶ in which a tensile shearing force was applied to the bracket whereas in the present study a compressive shearing force was used.

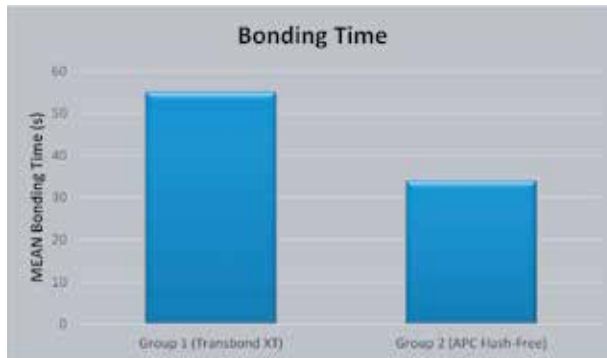


Figure 2: Comparison of shear bond strength.

According to Reynolds, the minimum shear bond strength required for clinical success should be in the range of 6 to 8 MPa.¹ Despite the lower bond strength of the flash free adhesive bracket system compared to conventionally bonded brackets in the present study and in the research by Lee and Kanavakis⁶, the APC Flash Free™ bracket system bonded with sufficient strength for clinical use when integrated on either metal or ceramic brackets. In addition, Alaktash et al.³² reported no difference of pre-coated brackets over manually coated bracket systems regarding the clinical failure rate of brackets.

CONCLUSION

- This study demonstrated that the APC Flash-Free system applied to metal brackets produced shear bond strengths adequate for clinical use.
- The APC Flash-Free™ system is a convenient bonding method which could potentially save significant chair time.

Conflict of interest

None declared.

REFERENCES

1. Reynolds IR. A Review of Direct Orthodontic Bonding. *Br J Orthod.* 1975;2(3):171-8.
2. Buonocore MG. A simple method of increasing the adhesion of acrylic filling materials to enamel surfaces. *J Dent Res.* 1955;34(6):849-53.
3. Anusavice KJ, Phillips RW, Shen C, Rawls HR. *Phillips' science of dental materials.* St. Louis, Mo.: Saunders; 2013.
4. Green JIJ. The origins and evolution of fixed orthodontic appliances. *J Dent Nurs.* 2014;10:524-8.
5. Ewoldsen N, Demke RS. A review of orthodontic cements and adhesives. *Am J Orthod Dentofacial Orthop.* 2001;120(1):45-8.
6. Lee M, Kanavakis G. Comparison of shear bond strength and bonding time of a novel flash-free bonding system. *Angle Orthod.* 2016;86(2):265-70.
7. Grünheid T, Sudit GN, Larson BE. Debonding and adhesive remnant cleanup: an in vitro comparison of bond quality, adhesive remnant cleanup, and orthodontic acceptance of a flash-free product. *Eur J Orthod.* 2015;37(5):497-502.
8. Kim J, Kanavakis G, Finkelmann MD, Lee M. Microleakage under ceramic flash-free orthodontic brackets after thermal cycling. *Angle Orthod.* 2016;86(6):905-8.
9. Foersch M, Schuster C, Rahimi RK, Wehrbein H, Jacobs C. A new flash-free orthodontic adhesive system: A first clinical and stereomicroscopic study. *Angle Orthod.* 2016;86(2):260-4.
10. Gwinnett AJ, Ceen RF. Plaque distribution on bonded brackets: a scanning microscope study. *Am J Orthod Dentofacial Orthop.* 1979;75(6):667-77.
11. Ho CS, Ming Y, Foong KW, Rosa V, Thuyen T, Seneviratne CJ. *Streptococcus mutans* forms xylitol-resistant biofilm on excess adhesive flash in novel ex-vivo orthodontic bracket model. *Am J Orthod Dentofacial Orthop.* 2017;151(4):669-77.
12. Mei L, Busscher HJ, van der Mei HC, Ren Y. Influence of surface roughness on streptococcal adhesion forces to composite resins. *Dent Mater J.* 2011;27(8):770-8.
13. Årtun J, Brobakken BO. Prevalence of carious white spots after orthodontic treatment with multibonded appliances. *Eur J Orthod.* 1986;8(4):229-34.
14. Rosenbloom RG, Tinanoff N. Salivary *Streptococcus mutans* levels in patients before, during, and after orthodontic treatment. *Am J Orthod Dentofacial Orthop.* 1991;100(1):35-7.
15. Cinader DK, Aung M, Ugai R, Conley A. APC™ Flash-free adhesive: a technical overview. *Orthodontic Perspectives.* 2013;20(1):7-9.
16. Grünheid T, Sudit GN, Larson BE. Debonding and adhesive remnant cleanup: an in vitro comparison of bond quality, adhesive remnant cleanup, and orthodontic acceptance of a flash-free product. *Eur J Orthod.* 2015;37(5):497-502.
17. Grünheid T, Larson BE. Comparative assessment of bonding time and 1-year bracket survival using flash-free and conventional adhesives for orthodontic bracket bonding: A split-mouth randomized controlled clinical trial. *Am J Orthod Dentofacial Orthop.* 2018;154(5):621-8.
18. Faltermeier A, Rosentritt M, Faltermeier R, Reicheneder C, Müßig D. Influence of filler level on the bond strength of orthodontic adhesives. *Angle Orthod.* 2007;77(3):494-8.
19. Bishara SE, Gordan VV, VonWald L, Jakobsen JR. Shear bond strength of composite, glass ionomer, and acidic primer adhesive systems. *Am J Orthod Dentofacial Orthop.* 1999;115(1):24-8.
20. Bishara SE, VonWald L, Laffoon JF, Warren JJ. Effect of a self-etch primer/adhesive on the shear bond strength of orthodontic brackets. *Am J Orthod Dentofacial Orthop.* 2001;119(6):621-4.
21. Bishara SE, Olsen ME, Jakobsen JR. Evaluation of a new light-cured orthodontic bonding adhesive. *Am J Orthod Dentofacial Orthop.* 1998;114(1):80-7.
22. Toledano M, Osorio R, Osorio E, Romeo A, de la Higuera B, Garcia-Godoy F. Bond strength of orthodontic brackets using different light and self-curing cements. *Angle Orthod.* 2003;73(1):56-63.
23. Aydin B, Pamir T, Baltaci A, Orman MN, Turk T. Effect of storage solutions on microhardness of crown enamel and dentin. *Eur J Dent.* 2015;9(2):262-6.

24. Hirani S, Sherriff M. Bonding characteristics of a self-etching primer and precoated brackets: an in vitro study. *Eur J Orthod*. 2006;28(4):400-4.
25. Oliver B, Dama M. A retrospective six-months clinical trial of adhesive precoated brackets and bonding system. *J Can Dent Assoc*. 1997;63(2):101-3, 7.
26. Nelsen RJ, Paffenbarger GC, Wolcott RB. Fluid exchange at the margins of dental restorations. *JADA*. 1952;44(3):288-95.
27. Gale MS, Darvell BW. Thermal cycling procedures for laboratory testing of dental restorations. *J Dent* 1999;27(2):89-99.
28. Summers A, Kao E, Gilmore J, Gunel E, Ngan P. Comparison of bond strength between a conventional resin adhesive and a resin-modified glass ionomer adhesive: an in vitro and in vivo study. *Am J Orthod Dentofacial Orthop*. 2004;126(2):200-6.
29. Rix D, Foley TF, Mamandras A. Comparison of bond strength of three adhesives: composite resin, hybrid GIC, and glass-filled GIC. *Am J Orthod Dentofacial Orthop*. 2001;119(1):36-42.
30. Bishara SE, Ostby AW, Laffoon JF, Warren J. Shear bond strength comparison of two adhesive systems following thermocycling: a new self-etch primer and a resin-modified glass ionomer. *Angle Orthod*. 2007;77(2):337-41.
31. Bishara SE, Oonsombat C, Soliman MM, Warren JJ, Laffoon JF, Ajlouni R. Comparison of bonding time and shear bond strength between a conventional and a new integrated bonding system. *Angle Orthod*. 2005;75(2):237-42.
32. Alakttash AM, Fawzi M, Bearn D. Adhesive precoated bracket systems and operator coated bracket systems: Is there any difference? A systematic review and meta-analysis. *Angle Orthod*. 2019;89(3):495-504.
33. Reddy YG, Sharma R, Singh A, Agrawal V, Chaturvedi S. The Shear Bond Strengths of Metal and Ceramic Brackets: An *in-Vitro* Comparative Study. *JCDR*. 2013;7(7):1495-7.
34. Uysal T, Ustdal A, Kurt G. Evaluation of shear bond strength of metallic and ceramic brackets bonded to enamel prepared with self-etching primer. *Eur J Orthod*. 2009;32(2):214-8.

Social Media and Dentistry

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A Davids¹, SB Khan², A Rawoot³, A Sayed⁴, S Bruintjies⁵, K Kajee⁶, A Raabe⁷

ABSTRACT

Numerous social media platforms are accessible to healthcare professionals and to patients. The aim of this study was to determine the role of social media platforms in the academic life of undergraduate and postgraduate dental students, and general dentists and specialists working in an academic setting.

Method

A cross-sectional survey was conducted targeting 4th and 5th year dentistry students, postgraduate clinical assistants, qualified dentists, and specialists working at an Oral Health Centre. The survey questions focused on the role of social media sites in the academic setting, and how these can be used to interact on a professional basis in sharing knowledge efficiently and for teaching, as a marketing tool and the ethics related to its use.

Results

Most participants appreciated the use of social media to share and receive information for educational purposes. They indicated that online communication increases the spread of information and knowledge efficiently and timeously. They also specified taking advantage of this efficient spread amongst the population as a

marketing tool to gain patients. Though there are some individuals who do not quite agree and have suspicions for ethical or personal reasons, and they explained this by indicating that once something is posted online it cannot be removed.

Conclusion

The study concluded that the use of social media in dentistry has positive and negative aspects, thus the hesitancy to use it and suspicions expressed by participants. Information placed online should be closely monitored even after having received permission to do so.

Keywords

Social media; SoMe for education; SoMe as marketing tool; ethics and SoMe; knowledge shared timeously

INTRODUCTION

Social media (SoMe) sites have become an increasingly popular method of engaging in mass communication on social as well as professional issues due to easy accessibility. Specifically, the different SoMe types have become a very convenient tool utilized by medical and dental health practitioners for various reasons.¹

However, the motivation for the use of SoMe among dental practitioners in the private and public sectors may differ according to their needs and requirements, that is, students and qualified professionals may upload clinical content for very different reasons.² Regarding professionals utilizing SoMe sites, the most common reasons are related to creating platforms to post teaching and learning content, for improving marketing and service strategies and for uploading pictures depicting clinical scenarios with the intention to praise their work, skills, or capabilities.²

Regardless of the motivation behind the posting of these clinical procedures, it is undoubtedly crucial to acknowledge the ethical and legal considerations related to the act that many may regard as a misdeed.³ There are numerous discussions regarding the ethical considerations of these healthcare practitioners, such as the permissibility to post clinical content and if informed consent had been obtained from the patient or if the patient's identity is concealed by means of blocking out their eyes.⁴

To explore some of the reasons why dentists share confidential information on the internet, it was found that a significant driving factor was to increase sales by means of enhancing the advertising strategies of the dental practice.⁵ SoMe marketing is a cost-effective way to reach potential new patients who search for competent practitioners online. Using SoMe as a marketing tool

Author affiliations:

1. **Dr A Davids:** (BDS), Community Service
2. **Dr A Rawoot:** (BDS), Community Service
3. **Dr A Sayed:** (BDS), Community Service
4. **Dr S Bruintjies:** (BDS), Community Service
5. **Dr K Kajee:** (BDS), Community Service
6. **Dr A Raabe:** (BDS), Community Service
7. **Prof Saadika B. Khan:** (BChD, PDD, MSc, PhD) Department of Restorative Dentistry, Faculty of Dentistry, University of the Western Cape, South Africa. Orcid: 0000-0001-6017-959X

Corresponding author:

Saadika B. Khan
Associate Professor
Department of Restorative Dentistry, Faculty of Dentistry, University of the Western Cape, South Africa.
Tel: +27 21 9373006
E-mail: skhan@uwc.ac.za

Author contributions:

A Davids, A Rawoot, A Sayed, S Bruintjies, K Kajee, A Raabe: 70% Contributed to Protocol, Data collection and Analysis and Manuscript preparation and finalization

Saadika B. Khan: 30% Supervisor; Contributed to Protocol, and Manuscript preparation and finalization

Data availability statement

1. The datasets generated during and/or analysed during the current study are available from the corresponding authors on reasonable request.
2. Data generated or analysed during this study are included in this published article
3. Ethics Registration number: BM20/4/9

in healthcare can guide you to understand the needs and desires of potential patients and to meet those requirements with the highest standards achievable.⁶

SoMe also has a significant role in an academic setting, as well as in personal and professional relationships. One of the main benefits of SoMe inclusion in the academic setting has been to encourage student learning.⁷

Educators have merged the use of SoMe as a means of teaching and have demonstrated that their students were motivated with the content shared.⁸ Thus, education in the medical field has expanded beyond the classroom. SoMe has thus become the bridge between formal and informal learning as it allows students to engage in educational content outside of the classroom, after hours and at their own pace.⁹ The results of a survey conducted by El Bialy and Jalali (2015) indicated that 79% of educators and 100% of students use the different SoMe sites. It was also found that 33% of educators use social networks to engage and interact with their students. The most common platforms that were used were Facebook, Twitter, and LinkedIn.⁹ Other SoMe sites, on the rise and used include Instagram, YouTube, WhatsApp and ResearchGate. Educators use YouTube videos of procedures that are available and are aligned to their teachings to share with students.⁹

SoMe sites have made it easier for students to communicate with one another by sharing notes, video clips, links and documents that will aid them in their studies.¹⁰ Other SoMe platforms such as Twitter and blogs have been identified to portray case-based scenarios as well as clinical concepts.¹¹ This is seen as a positive change by educators as SoMe allows engagement between students which encourages peer-to-peer learning.⁸

Many times, patients are unaware that images of their treatment can be found on various online platforms. It is incumbent upon every dental practitioner to inform and seek permission from the patient, as well as respect their privacy and requests, if they prefer not to have their work posted. Engaging with SoMe sites is also prone to many dangers. For example, anything posted online may be altered by others without the original poster's permission.

With dental professionals posting online, it may reach many with potential negative consequences amongst the uneducated public. This could harm patients and even have far reaching legal and ethical concerns if the dentist did not carefully consider the consequences before posting any clinical work online.

The downfall of posting on SoMe is that these sites are not governed by a third party compared to professional online journals. Here all papers submitted go through rigorous review and security processes before it is made available to the public. Most importantly, permission needs to be granted for use of patients' images or treatment records. Moreover, precautions must be taken on how anonymity may be preserved once a post is made available on SoMe platforms, as this is the only way of ensuring that patients and practitioners are protected. The aim of this study was to determine the

role of different social media platforms in the academic life of undergraduate and postgraduate students and general dentists and specialists that form the academic staff at a dental institution.

The objectives included determining whether social media platforms were used as an interactive educational medium; identifying what the role of posting clinical work on the different social media platforms was and lastly, ascertaining the knowledge and understanding of posting the clinical content in different formats (videos, images, and discussions) on social media from an ethical point of view by dental students and staff.

METHODOLOGY

Ethical clearance was obtained from the University of the Western Cape Biomedical Research Ethics Committee (Reg. No. BM20/4/9). For this cross-sectional study, a survey was conducted amongst the 4th and 5th year dentistry students, postgraduate clinical assistants, academic staff (qualified dentists and specialists) working at an Oral Health Centres. The Yamane formula was used to determine and finalize sample size for a finite population.¹² The calculation of this random sample of academic students and staff was completed to ensure a sufficiently powered number (N=250) from the total number of participants from the different cohorts were included.¹²

A questionnaire was created using Google forms, verified by piloting it amongst some students and staff to validate the questions and changes were made to eliminate any ambiguity, confusion and misunderstandings. The questionnaire was subsequently sent to the various participants via email:

The questionnaire was divided into four distinct sections focusing on participants demographics, social media used as an academic tool, social media as a marketing tool and ethical considerations of social media use amongst dental professionals:

- *Section A* of the questionnaire included questions to obtain participants' demographic information and questions about use of personal SoMe accounts,
- *Section B* consisted of questions regarding the use of social media in academia,
- *Section C* included questions focusing on the necessity for a dental practice to have an active SoMe account and the,
- *Section D* questions covered the important topic of the ethics of using SoMe sites amongst dental professionals.

A 4-point Likert scale was used in Section B with responses ranging from: Agree, Strongly Agree, Disagree and Strongly Disagree. The results obtained from the online questionnaires were entered into a database (Microsoft Excel spreadsheet). It was then analyzed by using the Statistical Package for Social Science (SPSS Version 27.0) for windows.

As this was an online survey, consent would have been guaranteed without completing any forms, but the consent form was posted with the questionnaires

nonetheless. All participants' responses were allocated a number which were found on the forms they were given to complete. This also further ensured the participants' right to anonymity. The matter of informed consent, privacy and confidentiality was therefore ensured and shared with participants. Basic statistical frequency and significance tests ($p < 0.005$) were calculated using Excel and SPSS packages.

RESULTS

From the 250 questionnaires sent to participants, 78 were completed and returned by participants from the different sections of the dental profession, giving a response rate of 31%.

a) Demographic details of participants:

The results showed that most of the respondents were female (64%, $n=50$; Table 1). The expectation that participants had personal SoMe accounts were realized as 97.4% of 76 responded positively to this question (Table 1). Of the participants that indicated they had a personal SoMe account, most (82.1%; $n=62$) specified that they followed reports related to dentistry. The respondents also indicated that they used SoMe apps, and in order of preference, these included WhatsApp at 34% ($n=26$), followed by Instagram at 25% ($n=19$) and Facebook at 25% ($n=19$).

b) Social media used as an academic tool

The participants were asked various questions relating to the importance of SoMe as an educational tool within an academic environment. Not only did most of the participants (69.2%, $n=54$) agree that social media sites were effective academic tools, they (91%, $n=71$) also concurred that these sites were an important interactive educational medium.

Table 1. Demographic details of participants	
Demographics	Percentage (%)
Do you have a personal social media account?	
Yes	97.4
No	2.6
Do you follow/ belong to social media accounts related to dentistry?	
Yes	82.1
No	16.7
Sometimes	1.2
Gender	
Female	64.1
Male	35.9
Current Profession	
Dentist	37.2
Undergraduate student	25
Postgraduate student	24.4
Other (Full-/part-time lecturer, PhD student, Com service dentist)	13.4
Social Media Apps used	
Facebook	25
Instagram	25
WhatsApp	34
Other (Twitter, Tiktok, YouTube, Snapchat and LinkedIn)	16

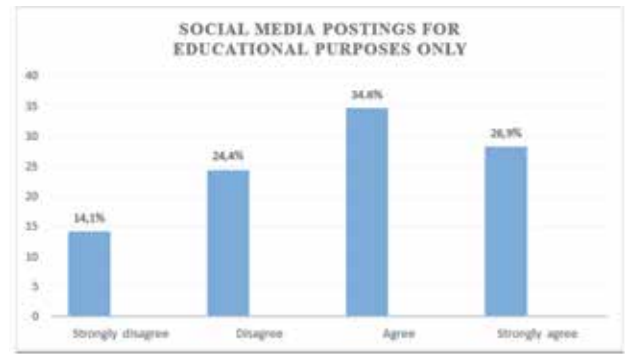


Figure 1: Social media platforms and posting material for educational purposes only

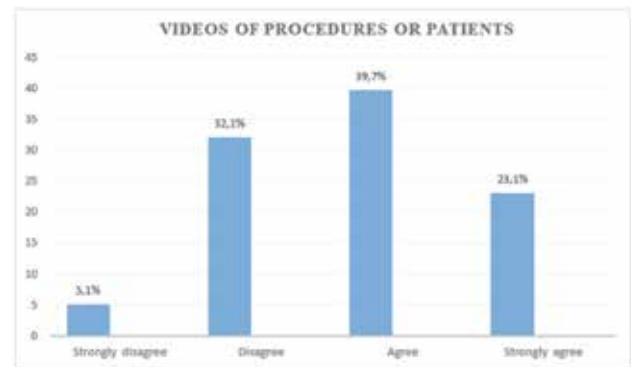


Figure 2: Videos of procedures and patients shared on social media

Regarding posting or sharing videos of patients or clinical procedures without obtaining a patient's informed consent, respondents were very clear about their opinions and responded negatively; even if it was for educational purposes only as they did not accept this mindset readily.

There was definite disagreement by a third of the participants (38.5%, $n=30$) even if it was for educational purposes only or even if these were useful (37.2%, $n=29$) (Figures 1 and 2). This indicates that respondents did not have the tendency to share videos per se, and whether they were uncomfortable or find it offensive or not, can be further investigated. Respondents did not have a problem with sharing useful procedures (93.6%, $n=73$) or dental and clinical questions (94.9%, $n=74$) under the platform of online learning and teaching on SoMe. In fact, a large majority (87.2%, $n=68$) indicated their agreement that online learning and teaching should be the stance of universities, and this was paired with using quality websites (97.4%, $n=76$) to ensure success using SoMe sites.

The differences between those agreeing to share videos on SoMe and those disagreeing must be explored further as their reasons may add value to the current hype of these sites.

c) Social media used as a marketing tool

The effectiveness of using SoMe as a marketing tool was evaluated using several questions which were phrased differently. The responses showed that although using SoMe aided in gaining new patients (93.6%, $n=73$), the experience/ qualifications of the dentist (87.9%, $n=69$)

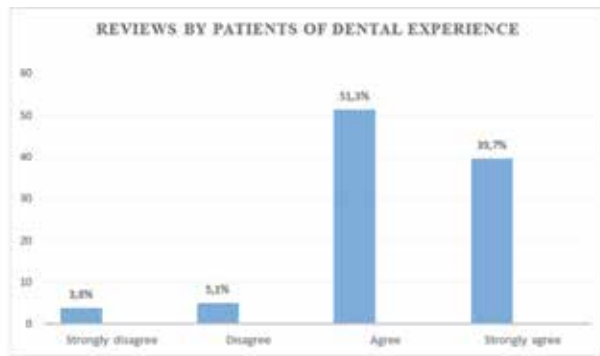


Figure 3: Importance of online reviews of patients' dental experiences

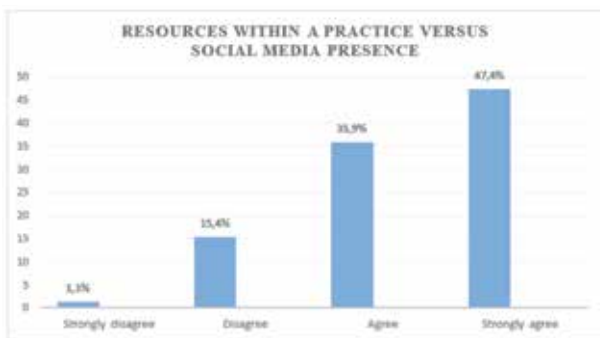


Figure 4: Importance of resources within a practice as a marketing tool to gain patients

was seen as more important by participants than having an online presence. The participants also indicated that gaining of new patients using SoMe did not happen automatically, incentives must be offered to patients to attract them to attend practices. The respondents also agreed that SoMe must be used to advertise special offers for certain procedures to make attending these practices appealing to patients.

Moreover, respondents indicated that the input from patients in the form of online reviews of their dental experiences (91%, n=71; Figure 3) or their opinions on the resources or facilities of practices must also be considered (Figures 3 and 4). Respondents were thus quite clear and emphatic when questioned about the role of SoMe versus several other important aspects within a practice such as the facilities, the resources or the experiences of practitioners.

d) Ethical considerations of social media

The permissibility of posting patient-based cases and clinical procedures completed on them were evaluated as there are ethics to consider before posting such content online (Figure 5). Participants were given questions regarding ethical considerations such as informed consent, privacy, and confidentiality.

Respondents were very emphatic in their disagreement when asked about posting pictures with

1. patients' eyes blurred (75.7%, n=59), or
2. patient cases for educational purposes without consent but with eyes blocked out (84.6%, n=66) and
3. not having asked patients' consent and sharing cases where you think the patient will not find

out whilst their descriptive details are blocked out (93.6%, n=73; Figure 5).

The high percentages of disagreement from participants indicated their understanding of consent, confidentiality, respect, privacy, and permission required from them when wanting to share educational information or content.

DISCUSSION

The objectives of this cross-sectional study were largely met, and it was interesting to note how the participants displayed knowledge and understanding of SoMe sites and postings, but at the same time indicated understanding and indicating a sensitivity towards their patients by not agreeing to post without their consent. Whether this stems from their training as dental health care practitioners was not the subject of this study but it certainly pointed in that direction.

The first question relating to the important role of SoMe in the professional and academic environment is strongly supported by the results which are in line with the thinking of other researchers' work.¹³ This can also be related to most participants sharing the same view on the benefits of interaction between colleagues, students, and lecturers via SoMe, especially during the COVID-19 Pandemic, which most of the world experienced, and when this study was conducted. This type of interaction may be due to students personally enjoying making use of SoMe, which was observed by teachers, who then employed such means to bring knowledge across to their students in a familiar and pleasant setting.

The questions for this study referring to posting of clinical procedures for educational purposes was based on this mindset of using a platform that students know and used to share knowledge. But the question was interpreted differently by the varied participants, thus the results are so closely related. The different responses could be strongly linked to the ethical aspects of posting pictures or videos and respondents tried to indicate a thoughtfulness towards their patients and of exposing them on SoMe.

Students are also known to combine learning formally when with their peers and informally with more personal and social relationships in their free time, making it a part of everyday life.⁸ Some individuals may disagree

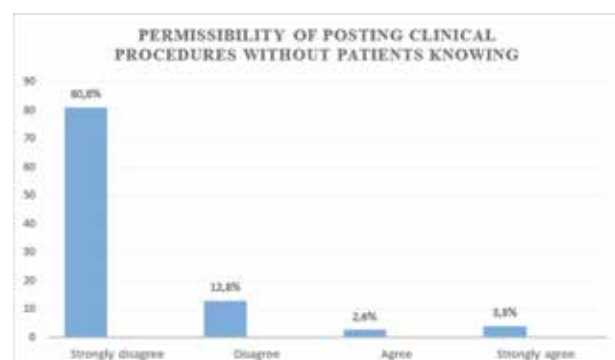


Figure 5: Ethics related to posting patients' clinical procedures without consent

that these two platforms could be mixed and would rather want to separate their academic and personal relationships and use different SoMe sites for each.⁵ Also, by posting these pictures, there is no distinct line or clarity where education starts and ends using the same SoMe site. Some participants may have believed that education should be done formally only whereas others may have said that education should be part of everyday life and therefore the platforms for professional and private SoMe sites may be shared.¹¹

According to Farsi, (2021) despite the contrasting evidence, it is important to strike the right balance between traditional and digital access to healthcare.¹⁴ For the naysayers, the problem was once something was posted on SoMe, anyone who has access to it can do anything with it, making it difficult to control the information shared.¹⁵ Also, the few individuals that disagreed with the usefulness of posting and sharing clinical and academic content may either not have been exposed to SoMe properly or in a manner allowing them to view these sites more positively relating to even ethical perspectives. Thus, the responsibility is therefore on the one posting it, and these people should exercise caution when doing so to protect themselves and their patients whose content is being shared.¹⁵

The results for this study are very similar to a study conducted by Abdul Hamid and Jaafar (2021),¹³ where they strongly leaned towards agreement that content such as dental procedures, news and academic and clinical questions posted on SoMe be regarded as useful. Researchers that agree with this statement of posting dentally related work are certainly familiarized with the benefits of using SoMe as a platform to interact and exchange information easily and efficiently.

Again, variations between respondents' replies may be interpreted differently where the posting of procedures could be regarded as educational to some, for others it is seen as exposing themselves to danger. More participants, however, believed in the usefulness of videos posted on SoMe, where they viewed it as sharing information of procedures to prepare other patients before they undergo the same or similar procedures. It may be seen as 'hands-on' educational exercise without being present in the clinical setting and therefore having a sense of being prepared for such or similar clinical situation and eliminating fears of the unknown.

Several students and patients may also argue that they are visual learners, where such videos assist them when posted on good quality websites, rather than benefiting from reading about these only. Another reason that pre- and post-treatment pictures should be posted online and are important for patients is that it gives potential patients the reassurance that their condition can be successfully treated. The numerous individuals that do not agree with the use of videos are indeed doubtful that all viewers would treat the content with respect.

In Dentistry, practitioners work on a 'fee-for-service' system and thus rely heavily on the number of patients treated to secure an income, thus it is expected that many participants would strongly agree that advertising on

SoMe is an effective marketing tool to gain more patients. Considering that many of the participants of this study were dental students and would-be future dental practitioners and probably be employed in the private sector, it is understandable why their responses attributed great importance to questions related to effective marketing and increasing patient numbers.

However, it is also important to note that government hospitals also rely on patients paying for treatment in addition to remuneration received from the government. Therefore, marketing is also an important tool in increasing patient numbers in the government sector. The results received regarding the use of SoMe as a marketing tool was congruent to a study done by Ajwa et al. (2018).⁶ In this study, 89.8% of dental students and professionals agreed that the presence within SoMe in relation to a dental practice would increase their patient base and worked as an effective marketing tool.⁶

In accordance with research conducted by Alalawi et al. (2019),¹⁶ advertising and promoting the dental practice by means of special deals/ promotions on SoMe sites is also an effective way of appealing and gaining the attention of potential patients.¹⁶ This study reported that 61,1% of participants responded positively regarding the efficacy of gaining new patients when special offers were advertised on SoMe.¹⁶

In support of this, Dentistry in combination with SoMe can promote positive clinician and patient relationships as well as improve the community's knowledge about common oral health practices.¹⁷ Thus, integrating SoMe marketing efforts and dentists providing a path for patients/ users leading to their practice site and incorporating these with traditional marketing tactics was considered an effective strategy.¹⁸ Furthermore, building strong professional relationships with clients is an important aspect of marketing that can be achieved through the use of effective online social communities.¹⁹

SoMe platforms are also used to engage with target audiences and used for health promotion.²⁰ Most participants for this study agreed that the reviews of previous patients posted on SoMe are important. This may be since dental students and staff understand the stigma behind the kind of clinical procedures performed by dentists and that most patients associate dental treatment with pain. Therefore, a negative review may be the result of a misinformed patient unaware of the severity of their condition and not necessarily due to any fault incurred by the healthcare professional.

However important and effective SoMe impact may be in its communication with and the ability to influence the minds of people in need of good dental treatment. An almost opposite and equally significant response was gathered related to resources within a dental practice as reported in this study. This reported notion, by respondents who themselves are clinicians, of having good/ modern resources within the dental practice plus having highly experienced clinicians was the driving factor behind advertising and building a good client base. This was an indication that advertising by word of mouth, from the vast experience of participants, and mainly using the efficacy

of the dentists' work plays a major role in building dental practices clientele rather than just having a good SoMe presence.

One of the most controversial factors to consider within the healthcare profession, is the ethical considerations with SoMe use and exposure. Concerns from patients' perspectives are that of confidentiality as well as informed consent given by a patient, including anonymity of patients for photographs taken and intended for use on SoMe sites.²¹ By introducing clinical scenarios and sharing clinical cases on various SoMe platforms using pictures or videos, one is faced with the dilemma of deciding if the reason for engagement is for a good cause and whether it is safe to do so.

When SoMe is used for the purpose of online teaching and learning to enhance the skills of aspiring healthcare workers, it becomes evident that it carries more benefits than drawbacks or risks, even for the patient, as it enhances the quality of treatment performed and students gain more knowledge by this. For this study, many participants agreed that healthcare practices and faculties should make use of SoMe platforms for teaching and learning. In contrast to these findings, a study performed by Paton et al, (2011) concluded that there was insufficient evidence to support the effective use of SoMe in medical and health education.²² However, given the timeframe when this article was published, it is safe to assume that the attitudes towards SoMe as an educational platform have changed as it has gained more popularity over the last five years and especially during and post the corona virus disease (COVID 19) pandemic.²²

Since this research was carried out on a population that included senior students, academics and clinicians working in a learning and teaching environment, all participants would have been aware of the importance of consent from patients before posting their images or videos on SoMe. This is irrespective of the reasoning for doing so, be it for academic purposes or treatment methods or as a means of advertising, as everyone would have been exposed to the principles of ethics which forms part of their curriculum.

An average of 89, 1% of participants for this study disagreed with posting online without patient consent even if their details were blocked out. This is in accordance with the regulations of the national laws of this country and as stated within the guidelines of the health professions council of South Africa (HPCSA).²³ More specifically, when it comes to engagement online and consent, confidentiality and privacy, the HPCSA is very clear that consent must be obtained from the patient before placement of the information online, whether the patient can be recognized or not as posts cannot be deleted once posted.²³ The response by participants thus indicates that they are aware of the limitations of sharing their patients' information online even though the use of SoMe sites has become common practice amongst academics and clinical practitioners.

The results of this study also indicated that almost a quarter of participants agreed to the idea of posting patients' images online as ethically sound if the eyes

were blocked out and making patients unrecognizable. Considering the guidelines from the HPCSA related to confidentiality and privacy, it may not be acceptable or sufficient to post content without consent, or without the eyes being blocked out, or without the patient understanding the use of their information online as they may still be identifiable even with minimal censoring of their data.²³ Moreover, any information consented to by the patient is shared with the health professional under the pretext of mutual respect and must therefore be treated as such and ensure the patient is always protected and if practitioners are not cautious, the engagement online can have potential unintended risks and consequences.²³ The sharing of confidential entrusted information online can only be done if the patient's written consent has been received or under exceptional circumstances, such as, if required by the court of law.²³

Healthcare professionals are thus advised not to engage patients online, nor access information from SoMe sites which was not shared in the healthcare setting regarding their patients. More importantly, practitioners must only advise professionally using evidence, and avoid taking photographs of patients and/or make any derogatory comments related to patients or other professionals. Also, healthcare professionals must not accept invitations to engage patients on non-professional platforms which may result in inappropriate communications and stalking by patients. Healthcare professionals are advised to consider other ethical guidelines in conjunction with SoMe site rules, report any inappropriate online communications to the HPCSA to protect themselves and the profession.²³ Thus, the ethical and legal considerations for sharing of patient information online should not be taken lightly, even if the clinician unintentionally causes a breach of privacy, legal matters could ensue. Therefore, health professionals and students should have an in-depth understanding of online methods of communication, ethics and laws pertaining to the sharing of patient information via SoMe or any other online source.²⁴

Conclusions and recommendations

In conclusion, participants of this study widely support the introduction of medical and dental cases into the world of SoMe. Despite all the ethical considerations, the undergraduate and postgraduate students largely agreed that SoMe carried a positive effect on how teaching and learning can take place. The recommendation is to use SoMe sites regularly in the academic programs to improve the teaching and learning platforms for students and academics. In addition, the recommendation is to include the different SoMe sites to enhance the marketing of practices and faculties, and this must be seen as beneficial to the public as well as to medical and dental practitioners and to Dentistry as a profession once all ethical considerations are observed.

Limitations

SoMe access can ensure engagement with patients on a much larger scale than physical marketing media, using pamphlets or posters. The evidence contrary to this presented above must be overlooked, as these articles

were published at a time when SoMe was used only as a means of sharing information. Introducing medical and dental cases is a relatively new development and was not done previously which limited the development of diagnostic and management skills of students. With this said, including it also improves the skills development of students of the faculty.

Significance

This study was conducted during the COVID 19 pandemic which impacted on the communication between students and staff, and their education. The COVID 19 pandemic taught us how important and valuable the different SoMe sites are and that these may even be seen as lifesaving communication in particular instances. The value that SoMe sites brought to education (both school and higher) cannot be overemphasized. So much so that many institutions have now adopted a blended learning approach, and where possible some work is taught online, and where needed, others use the face-to-face teaching methods. Senior academics engage in communications using a hybrid approach, that is, both face-to-face and online sessions, making it possible for many more people to attend important meetings and sharing knowledge and posting these on YouTube. Currently thus, the SoMe sites are a part of the health profession education system, and the use thereof adds value and it must therefore be embraced.

Conflict of interest

The authors declare no conflict of interest

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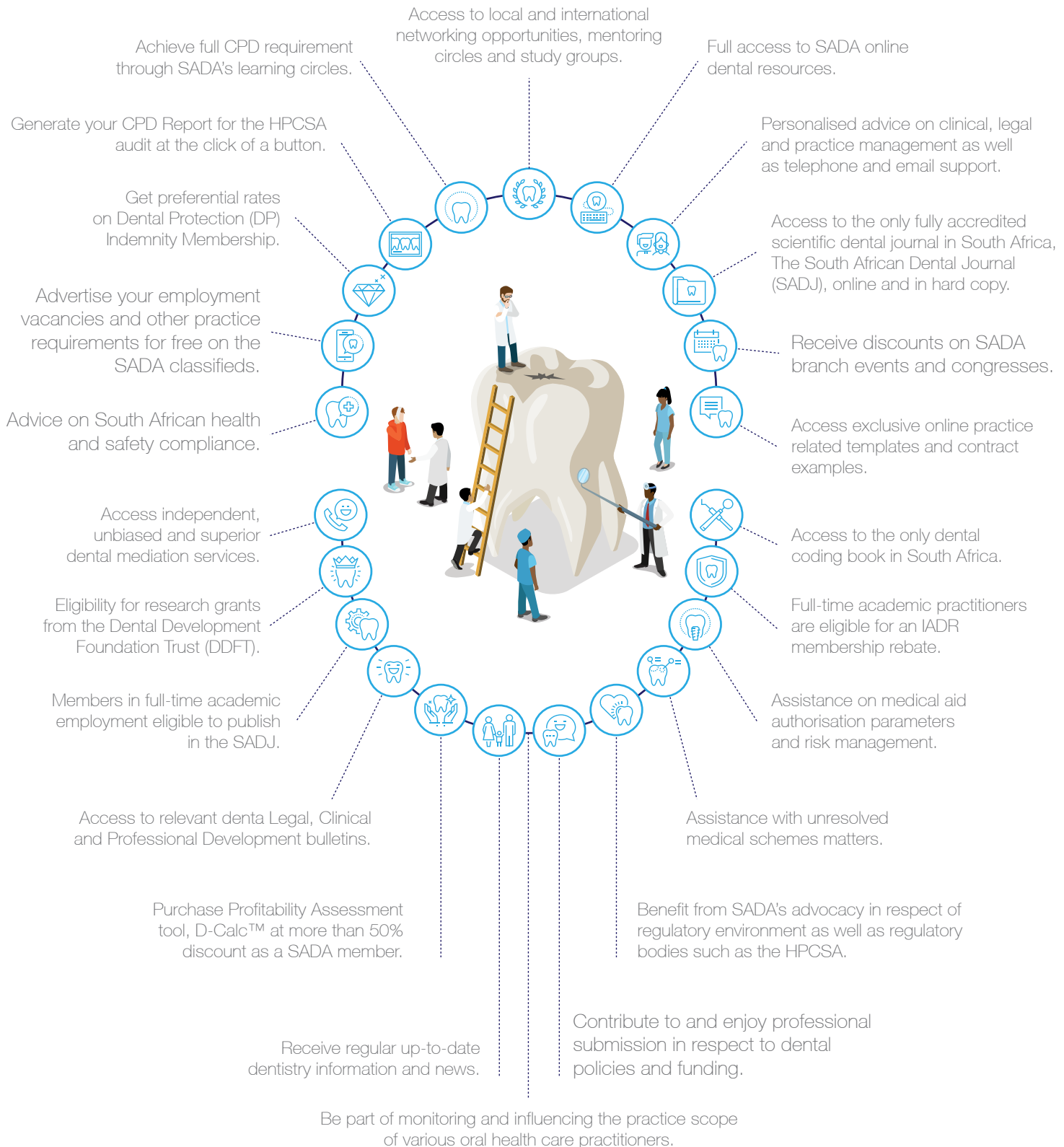
REFERENCES

- Hamm MP, Chisholm A, Shulhan J, et al. Social media use by health care professionals and trainees: a scoping review. *Acad Med* 2013 88(9):1376-83.
- McAndrew M, Johnston AE. The role of social media in dental education. *J Dent Educ* 2012 76(11):1474-81.
- Pathiraja F, Little D. Social media: the next frontier in radiology. *Clin Rad* 2015 70(6):585-7.
- Lockhat R. Social media and the Protection of Personal Information Act. *Southern African J Anaes and Analg* 2021 27:69-72.
- Ventola CL. Social media and health care professionals: benefits, risks, and best practices. *Pharm and Therapeut* 2014 39(7):491.
- Ajwa N, Al Mohsen S, Kuwail A, Al Osaif E. The Impact of Using Social Media Networks on Dental Treatment Marketing in Saudi Arabia: The Practitioners and Patient's Perspectives. *J Oral Health and Dent Sci* 2018 2(3):1-9.
- Kind T, Patel PD, Lie D, Chretien KC. Twelve tips for using social media as a medical educator. *Med Teach* 2013 1(7):1-7. <https://doi.org/10.3109/0142159X.2013.852167>
- de Peralta T, Fariior O, Flake N et al. The Use of Social Media by Dental Students for Communication and Learning: Two Viewpoints. *J Dent Educ* 2019 83(6):663-8.
- El Bialy S, Jalali A. Go Where the Students Are: A Comparison of the Use of Social Networking Sites Between Medical Students and Medical Educators. *JMIR Med Educ* 2015 1(2): e7.
- Neville P, Waylen A. Social media and dentistry: some reflections on e-professionalism. *Brit Dent J* 218(8):475.
- Sterling M. et al. The use of social media in graduate medical education. *Acad Med* 2017 92(7):1043-56.
- Yamane T. *Statistics an Introductory Analysis*, 2nd ed. New York: 1967, Harper & Row.
- Abdul Hamid NF, Jaafar A. Use of social media in Dental Education: A single institutional study. *Archives of Orofac Sci* 2021 16(2):141-52.
- Farsi D. Social Media and Health Care, Part I: Literature Review of Social Media Use by Health Care Providers. *J Medic Internet Res* 2021 23(4): p.e23205.
- Moore R. Social Media – What dentists need to be aware of. *Dent Update* 2018 1(1): 5-6.
- Alalawi A, Aljuaid H, Natto ZS. The effect of social media on the choice of dental patients: A cross-sectional study in the city of Jeddah, Saudi Arabia. *Pat Pref and Adher* 2019 13:1685-92.
- Snyman L, Visser JH. The adoption of social media and social media marketing by dentists in South Africa. *SADJ* 2014 69(6).
- Hughes K. Social Media: Connecting patients and practices. *Insid Dent* 2012 8(5).
- Farquhar J, Rowley J. Relationships and online consumer communities. *Bus Proc Man J* 2006 12:162-7.
- Kubheka BZ, Carter V, Mwaura J. Social media health promotion in South Africa: Opportunities and challenges. *Afr J Prim H Care Fam Med* 2020 12(12):1-7. <https://doi.org/10.4102/PHCFM.V12i1.2389>.
- Sykes LM, Harrypersad A, Evans WG, Gani F. Social Media and Dentistry: Part 8: Ethical, legal, and professional concerns with the use of internet sites by health care professionals. *SADJ* 2017 72(3).
- Paton C, Bamadis P, Eysenbach G, Hansen MM, Cabrer M. Experience in the Use of Social Media in Medical and Health Education. *Nur H Prof Fac Res Pub* 2011 Paper 6.
- Health Professionals Council of South Africa. Ethical guidelines on social media. 2019. Available at: https://www.hpcs.co.za/Uploads/Professional_Practice/Ethics_Booklet.pdf (Accessed 05 September 2020).
- Kubheka B, Chb MB, Management DP. IN PRACTICE Ethical and legal perspectives on use of social media by health professionals in South Africa; 2017 107(5):386-9. <https://doi.org/10.7196/SAMJ.2017.v107i5.12047>

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Self-reported oral health status: Perspectives of patients undergoing therapy for cancer of the head and neck region, in the eThekweni District, KZN

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BS Bauluck-Nujoo¹, S Singh²

ABSTRACT

Background

There is a dearth of published evidence related to understanding oral health needs for patients undergoing therapy for cancer of the head and neck region in South Africa.

Aim and objectives

This study aimed to assess perceived oral health status of patients undergoing therapy for cancer of the head and neck region, in eThekweni district, KwaZulu-Natal.

Methods

This was a cross-sectional case study using quantitative data to determine patients' perspectives of oral health status and need. The study population comprised 235 voluntary patients (aged between 20-70 years old), undergoing treatment or follow up for cancer therapy of the head and neck region, in a public tertiary referral hospital in the eThekweni district, KwaZulu-Natal. Purposive sampling technique was used for participant selection. The research instrument comprised a combination of two previously validated questionnaires: a core questionnaire (EORTC QLQ-C30, Version 3.0) and the head and neck cancer specific module (EORTC H&N-35). Data was analysed using the statistical package for software sciences (SPSS), version 24.

Results

More than half of the study population were male (60%; n= 141). The mean age was 54.38 (SD= 12.30). The results indicate that 14.5% (n=34) were employed, 46.4% (n=109) were unemployed because of cancer and 39.1% (n=92) were unemployed due to other reasons (old age, housewife). Oral cavity cancer was the most common (n=91; 38.7%), followed by laryngeal cancer (n= 53; 22.6%) among all the other head and neck cancers. Males (n=50; 21.3%) were more affected by oral cavity cancer as compared to females (n=41; 17.4%). With reference to treatment, 20.4% (n=48) were on radiotherapy, 28.5% (n=67) were on chemotherapy and 9.8% (n=23) were on CCRT, 17.4% (n=41) had surgery, 8.5% (n=20) were recently diagnosed with cancer of the head and neck and 23.4% (n=55) were on follow up. Oral health-related symptoms were experienced to varying degree by the participants.

The majority of participants (n=125; 53.2%) did not report any pain and discomfort. More female participants (n=7; 7.4%) in the age group of 41-60 reported of severe difficulty in swallowing liquids than males of the same age group. Most participants (n=148; 63.0%) had difficulty in swallowing solid foods. Similarly, the majority of participants experienced problems with their teeth (n=162; 69.0%), reported xerostomia (n=159; 67.7%). With reference to trismus, a higher proportion of females (n=27; 28.7%) reported severe trismus compared to male participants (n=33; 23.4%). With reference to increased viscosity of saliva, 34.0% (n=32) of females reported extremely sticky saliva as compared to 29.8% males (n=42).

CONCLUSION

It is apparent from the findings that oral health-related complications are present in varying degrees in the study participants with head and neck cancer. It is important to educate patients to seek treatment for these complications. It is equally important that dentists and dental health care providers with specific skills-mix, assess and manage such complications efficiently and timely so as to improve the quality of life of patients with head and neck cancer.

INTRODUCTION

The head and neck region is a complex anatomical structure¹. This region and its physiological functions are

Author affiliation:

1. **Bibi S Bauluck-Nujoo:** BDS (SSR Medical College-University of Mauritius), M.MEDSc (UKZN), School of Health Sciences, University of KwaZulu-Natal, South Africa. ORCID Number: 0000-0002-7157-5122
2. **Shenuka Singh:** B.OH, M.Sc (Dent), PhD (UWC), PG Dip Heal Res Ethics (Stell), PhD (Clin and Res Ethics (Stell)) Professor: Discipline of Dentistry, School of Health Sciences, University of KwaZulu-Natal, South Africa. ORCID Number: 0000-0003-4842-602

Corresponding author:

Shenuka Singh

Discipline of Dentistry, School of Health Sciences, University of KwaZulu-Natal.

Tel: 031-2608591, Fax: 031-2608069

E-mail: singhshen@ukzn.ac.za

Author contributions:

- | | |
|----------------------|-----|
| 1. BS Bauluck-Nujoo: | 70% |
| 2. S Singh: | 30% |

both affected by cancer or its multimodality treatment¹. Head and neck cancer (HNC) is a complex disease extending from the skull base to the clavicles, comprising different subsites namely, pharynx (including hypopharynx, nasopharynx and oropharynx), larynx, paranasal sinuses and nasal cavity, minor and major salivary glands, oral cavity (including lip, alveolar ridge, buccal mucosa, gingiva, oral tongue, retromolar trigone and floor of mouth), ear, skin and neck^{2,3}. Cancer of the eye was also included besides that of oral cavity, pharynx, larynx, nasal cavity, paranasal sinuses and salivary glands since it is also found in the head and neck region⁴.

Radiotherapy (RT), chemotherapy (CT), concurrent chemoradiotherapy (CCRT), and surgery are the different treatment modalities employed in the management of head and neck cancer⁵. The oral cavity, its subsites and dental hard tissues are some of the vital structures which get affected either directly or indirectly by effects of radiotherapy, chemotherapy, concurrent chemoradiotherapy and surgery of any head and neck cancer⁶. Thus, oral health support and maintenance is of dynamic importance before, during and even after therapy since multimodal treatment-related oral complications like radiation caries, oral mucositis, xerostomia, osteoradionecrosis, periodontal disease, trismus, hypersensitivity and infections, pose a challenge for optimum oral health care⁷. The motor functions including mastication, deglutition, speech and sensory functions of the gustatory, olfactory and auditory systems are disturbed⁸. Disfigurement of the facial appearance is also a challenging complication because of the highly conspicuous nature of this region⁹.

Poor oral health is linked to poorer quality of life and increased mortality¹⁰. Therefore, assessment of the oral health of patients with cancer of the head and neck is an important form of support in oral health care since the head and neck region comprise of vital organs which, when affected, unfavourably impact on the overall well-being.

Oral health services are delivered via the public and private sector in South Africa¹¹. The public sector caters for 80% of the population of South Africa by providing primary preventive and restorative care¹¹. The rural areas of KwaZulu-Natal comprise of almost 62% of the total population. However, an unequal distribution of services is present since the urban areas are more privileged in terms of oral health care access¹². Inadequate and unequal distribution of dental health care providers and dental professionals is one of the reason contributing to this unequal trend in service delivery^{11,12}. Delivering oral health care through an integrated approach is incessantly and persuasively mentioned in policy planning documents but research demonstrated that this approach is not fully translated into actions and hence a lack in meaningful content is observed¹³. A qualitative component of this present study also showed that there is a significant gap in service delivery for patients undergoing treatment for head and neck cancer since there is no specific oral health policy for this population group.

This study arose as a need to assess the perceived overall well-being and oral health status of patients undergoing therapy for cancer of the head and neck so as to empower

patients to identify their own needs which will subsequently provide a contribution to provincial oral health planning.

For ease of analysis, cancer of the lip, buccal mucosa, anterior two thirds of tongue, floor of mouth, maxilla, mandible, hard palate, gingiva and retromolar trigone were grouped under oral cavity cancer^{4,14}. Similarly, cancer of the base of the tongue, soft palate and tonsils were categorised under oropharyngeal cancer¹⁴. Salivary gland cancer consisted of only parotid and submandibular gland cancer. There were no other cancers of the salivary gland like sublingual gland and minor salivary gland cancer.

METHODS

This was a descriptive cross-sectional case study conducted between April to August 2017 to determine the perceptions of overall well-being and oral health status in patients undergoing treatment for head and neck cancer using quantitative methods. The study site was a public tertiary central referral hospital for the management of cancer, located in the Ethekwini Metropolitan Municipality within the province of KwaZulu-Natal. The sample population consisted of 235 voluntary adult patients of both sexes who were undergoing therapy exclusively for cancer of the head and neck region (active treatment, prior to treatment, or follow up). Purposive sampling technique was used for participant selection.

The sample size was calculated by taking into consideration the proportion of population in KZN, using a uniform distribution to have an estimate of the head and neck cancer cases in KZN and assuming that 65% of head and neck cancer patients attend public hospitals. The required sample size according to the calculation was 147. However, it was agreed that 250 participants would be included in the study instead of 147 so as to have more conclusive and accurate results and increase the statistical power. However, the final sample size was 235, given that fifteen patients did not consent. A total of 250 patients were approached either from the waiting room or radiotherapy or chemotherapy departments of the Oncology Unit of the hospital and explicit information about the study and time commitments were given verbally. All interested persons were given a participant information sheet to allow voluntary informed decisions to be made before consenting. The information sheets contained full details about the nature, purpose and any potential benefits and risks of the study in a simple, concise and easily understandable language. Participants were also informed of their right to withdraw from the study at any time they wish so without incurring any penalty or loss of treatment benefits to which they are entitled to receive. The inclusion criteria were histologically diagnosed head and neck cancer participants undergoing therapy, aged between 20-70 years old.

The research instrument comprised of a combination of two different validated questionnaires: A core questionnaire (EORTC QLQ-C30, Version 3.0) and the head and neck cancer specific module (EORTC QLQ-H&N35). A total of 30 and 35 questions respectively were answered in a four-point likert type scale format with responses such as 1 (Not at all), 2 (A little), 3 (Quite a bit) and 4 (Very much) for all questions but 2 items related to global health and quality of life in EORTC QLQ-C30 where there is a scale of 1-7 and

5 items of EORTC QLQ-H&N35 where there is a choice between yes or no.

The EORTC QLQ-C30 is known as the core questionnaire and was chosen because its reliability and validity have been researched and implemented using a modular and integrated approach for over a decade and is used in numerous international clinical trials and is reported to be accurate, valid and reliable¹⁵. The newer version, that is version 3.0, was used in this research as it was shown to be more reliable than previous versions based on the physical functioning scale¹⁶. This questionnaire consists of 30 questions with both single item and multi item scales, out of which 5 cover the functional scales (physical, role, cognitive, emotional and social),⁹ cover the symptom scales (pain, fatigue, nausea, vomiting, diarrhoea, constipation, loss of appetite, financial difficulties and insomnia) and one scale being related to global health status and quality of life¹⁵.

EORTC QLQ- H&N35 is a specific module for head and neck cancer and has been field tested in more than ten countries and was found to possess robust psychometric validity, although some minor modifications were intended to be made^{15,17}. It has to be used together with the core questionnaire. It is composed of 35 questions containing both single and multiple item scales to assess treatment side effects and symptoms¹⁵. There are 11 single item questions (like mouth opening, dry mouth, sticky saliva, teeth problems, feeling ill, cough, pain killers, nutritional supplements, use of feeding tube, weight loss/gain) and 7 multiple item questions on pain, swallowing, sexuality, social contact, social eating, speech and senses¹⁵.

The English and IsiZulu versions of the questionnaires are both available. Permission from the EORTC Data Centre was obtained prior to using both questionnaires in both languages in this research project. The questionnaires were administered by the researcher (for English-speaking participants) and a research assistant (for IsiZulu-speaking participants).

Approval from the KwaZulu-Natal Department of Health and ethical clearance from the Biomedical Research Ethics Committee of the University of KwaZulu-Natal were given prior to the commencement of the study (BREC Ref: BE041/17). Ethical principles were strictly adhered to.

Demographic details including gender, race, age, municipality, employment history, cancer site and treatment history were recorded. The cancer site was confirmed with the oncologist or oncology nurse from the participants' medical files. The other details were obtained verbally from the participants prior to administering the questionnaires.

The data set was captured on Microsoft excel spreadsheet on a password-protected computer and imported onto IBM Statistical Package for Social Sciences (SPSS) Version 24. Demographic details of the participants were calculated using descriptive statistics (mean, frequency, percentages, standard deviation). Pearson Chi-Square test was used to assess possible relationship between the independent and dependent variables. The p-value was set to less than 5% (< 0.05) to be significant.

Both questionnaires have been validated in previous studies¹⁶. The questionnaires (EORTC QLQ-C30 and EORTC QLQ-H&N35) used were aligned to the aims and objectives of this study and this added to the internal validity. The generalisability of this study is limited to the study site which is a tertiary hospital. Reliability was maintained by double checking the data during data entry and eliminating all outliers.

RESULTS

The study population consisted of 235 patients undergoing treatment for cancer of the head and neck. The sample population comprised of 60% (n= 141) male and 40% (n=94) female. The mean age was 54.38 (SD= 12.30). The majority of participants was from Ethekwini municipality (n=175; 74.5%). Amajuba district recorded the least number of participants (n=1; 0.4%). Concerning employment history, 14.5% (n=34) were employed, 46.4% (n=109) were unemployed because of cancer and 39.1% (n=92) were unemployed due to other reasons (old age, housewife). As for treatment history, currently (at the time of data collection) 20.4% (n=48) were on radiotherapy, 28.5% (n=67) were on chemotherapy and 9.8% (n=23) were on CCRT. Participants who were recently diagnosed with cancer of the head and neck (treatment not yet started) accounted for 8.5% (n=20), while 23.4% (n=55) were on follow up.

The oral cavity cancer was found to be the most common (n=91; 38.7%), followed by laryngeal cancer (n= 53; 22.6%) among all the other head and neck cancer. Males (n=50; 21.3%) were mostly affected by oral cavity cancer as compared to females (n=41; 17.4%). Our study also showed that laryngeal cancer was three times more common in males (n=40; 17%) than in females (n=13; 5.5%). A significant relationship was found between laryngeal cancer and Coloured male and female, Indian male and female and White male. A significant statistical difference for Indian with cancer site variable was found ($p < 0.05$).

The findings (Table 2) indicate that the majority of participants (n=125; 53.2%) did not experience any pain in the jaw (maxillary and/or mandibular) while the rest of the participants (n=110; 46.8%) had varied responses to perceived pain. Among those who had pain in the jaw, a greater number of males (n=26; 18.4%) than females (n=10; 10.6%) reported minimal/negligible ("a little") pain in the jaw, while more females (n=24; 25.5%) reported severe ("very much") pain in the jaw than males (n=22; 15.6%). The results also demonstrated that perceived intra-oral discomfort ("soreness in the mouth") was statistically significant ($p=0.010$). The majority of participants (n=135; 57.4%) did not experience any intra-oral related pain and discomfort (soreness of the mouth). The results indicate that only 13.8% females (n=13) and 7.8% males (n=11) experienced severe intra-oral related pain and discomfort. With reference to swallowing liquids, 10.6% females (n=10) and 5.7% males (n=8) indicated severe difficulty in swallowing. The findings further demonstrate that more female participants (n=7; 7.4%) in the age group of 41-60 reported of severe difficulty in swallowing liquids than males of the same age group. Male participants who perceived

Table 1: Demographic and clinical characteristics of all participants		
Variable	n	%
Gender		
Male	141	60
Female	94	40
Age range		
20-30	13	5.5
31-40	24	10.2
41-50	38	16.0
51-60	74	31.5
61-70	86	36.6
Employment history		
Employed	34	14.5
Unemployed because of cancer	109	46.4
Unemployed because of other reasons (old age, housewife)	92	39.1
Cancer site		
Oral cavity	91	38.7
Oropharynx	22	9.4
Nasopharynx	5	2.1
Hypopharynx	12	5.1
Larynx	53	22.6
Salivary gland	15	6.4
Nasal cavity	16	6.8
Paranasal sinuses	2	0.9
Eye	13	5.5
Ear	6	2.6
Treatment history		
Treatment not yet started	20	8.5
Actively on radiotherapy**	48	20.4
Actively on chemotherapy**	67	28.5
Actively on CCRT**	23	9.8
Surgery	41	17.4
Follow up	55	23.4
(** includes those who had undergone surgery also)		

severe difficulty to swallow liquids were all in the age group of 51-70. Only one female in the age group of 31-40 reported severe difficulty in swallowing liquids. The majority (=135; 57.4%) of participants did not experience any problem in swallowing pureed foods. Among those who did have difficulty (n=100; 42.6%) to swallow pureed food, equal proportion of males (n=27; 19.1%) and females (n=18; 19.1%) experienced minimal difficulty to swallow pureed foods. However slightly more females (n=13; 13.8%) experienced severe difficulty in swallowing pureed foods than males (n=17; 12.1%). Most of the participants (n=148; 63.0%) experienced difficulty to swallow solid foods, among whom 65 participants (27.7%) comprising 26.2% (n=37) males and 30% (n=28) females reported severe difficulty in swallowing solid foods. The results indicate that the majority of participants experienced

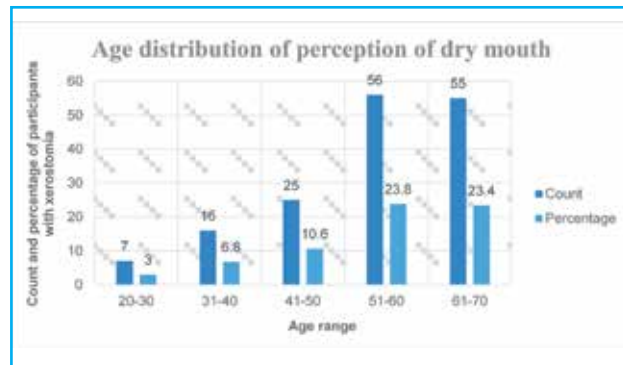


Figure 1: Age distribution of patient-reported xerostomia

problems with their teeth (n=162; 69.0%).

With reference to trismus (difficulty to open the mouth wide), the majority of participants (n=141; 60%) reported difficulty to open their mouth completely and there was a higher proportion of females (n=27; 28.7%) who reported severe trismus compared to male participants (n=33; 23.4%). A significant number of participants experienced xerostomia, ("dry mouth") (n=159; 67.7%). Almost 28% of participants (n=65) experienced severe xerostomia. More females (n=33; 35.1%) than males (n=32; 22.7%) experienced severe xerostomia. Increased viscosity of saliva ("sticky saliva") was also reported by the majority of participants (n=157; 66.8%).

Thirty four percent (34.0%) of females (n=32) reported extremely sticky saliva as compared to 29.8% males (n=42). Further, 44.3% (n=104) participants did not experience dysgeusia (taste alteration/taste distortion), while the majority of participants (n=131; 55.7%) had varied responses to the severity dysgeusia. Among those who perceived dysgeusia, less females (n=13; 13.8%) reported negligible dysgeusia than males (n=25; 17.7%) while 22.3% females (n=21) reported severe dysgeusia as compared to 19.1% males (n=27). The findings also indicate that 41.3% participants (n=97) did not experience any difficulty to eat while the majority of participants (n=138; 58.7%) had varied responses with respect to difficulty in eating. Among those who had difficulty to eat, 35.1% females (n=33) had severe problem in eating as compared to 23.4% males (n=33).

DISCUSSION

This study examined the reported oral-health related symptoms among patients with cancer of the head and neck.

A higher percentage of men were found to be affected by head and neck cancer than women in the ratio of 1.5:1. This is consistent with the literature which reports that head and neck cancer is 2-5 times more prevalent in males than in females globally, depending on the geographical location 18. The results indicate that head and neck cancer was most common in the 61-70 (n=86; 36.6%) age group followed by the 51-60 age group (n=74; 31.4%). This finding is in contrast with previous studies which reported of the commonest head and neck cancer cases in the age group 51-60^{4,19}.

Table 2: Respondents' reported oral health related symptoms						
Questions	Responses	Male, n (%)	Female, n (%)	Total, n (%)	χ^2	p-values
Have you had pain in your jaw?	Not at all	74 (52.5)	51 (54.3)	125 (53.2)	5.835	0.120
	A little	26 (18.4)	10 (10.6)	36 (15.3)		
	Quite a bit	19 (13.5)	9 (9.6)	28 (11.9)		
	Very much	22 (15.6)	24 (25.5)	46 (19.6)		
Have you had soreness in your mouth?	Not at all	79 (56.0)	56 (59.6)	135 (57.4)	11.372	0.010*
	A little	36 (25.5)	9 (9.6)	45 (19.1)		
	Quite a bit	15 (10.6)	16 (17.0)	31 (13.2)		
	Very much	11 (7.8)	13 (13.8)	24 (10.2)		
Have you had problems swallowing liquids?	Not at all	92 (65.2)	59 (62.8)	151 (64.3)	2.068	0.558
	A little	26 (18.4)	15 (16.0)	41 (17.4)		
	Quite a bit	15 (10.6)	10 (10.6)	25 (10.6)		
	Very much	8 (5.7)	10 (10.6)	18 (7.7)		
Have you had problems swallowing pureed food?	Not at all	81 (57.4)	54 (57.4)	135 (57.4)	0.306	0.959
	A little	27 (19.1)	18 (19.1)	45 (19.1)		
	Quite a bit	16 (11.3)	9 (9.6)	25 (10.6)		
	Very much	17 (12.1)	13 (13.8)	30 (12.8)		
Have you had problems swallowing solid food?	Not at all	50 (35.5)	37 (39.4)	87 (37.0)	1.634	0.652
	A little	33 (23.4)	16 (17.0)	49 (20.9)		
	Quite a bit	21 (14.9)	13 (13.8)	34 (14.5)		
	Very much	37 (26.2)	28 (29.8)	65 (27.7)		
Have you had problems with your teeth?	Not at all	45 (31.9)	28 (29.8)	73 (31.1)	0.775	0.855
	A little	27 (19.1)	15 (16.0)	42 (17.9)		
	Quite a bit	35 (24.8)	27 (28.7)	62 (26.4)		
	Very much	34 (24.1)	24 (25.5)	58 (24.7)		
Have you had problems opening your mouth wide?	Not at all	60 (42.6)	34 (36.2)	94 (40.0)	5.929	0.115
	A little	16 (11.3)	19 (20.2)	35 (14.9)		
	Quite a bit	32 (22.7)	14 (14.9)	46 (19.6)		
	Very much	33 (23.4)	27 (28.7)	60 (25.5)		
Have you had a dry mouth?	Not at all	47 (33.3)	29 (30.9)	76 (32.3)	4.809	0.186
	A little	32 (22.7)	18 (19.1)	50 (21.3)		
	Quite a bit	30 (21.3)	14 (14.9)	44 (18.7)		
	Very much	32 (22.7)	33 (35.1)	65 (27.7)		
Have you had sticky sali-va?	Not at all	45 (31.9)	33 (35.1)	78 (33.2)	3.222	0.359
	A little	23 (16.3)	17 (18.1)	40 (17.0)		
	Quite a bit	31 (22.0)	12 (12.8)	43 (18.3)		
	Very much	42 (29.8)	32 (34.0)	74 (31.5)		
Have you had problems with your sense of taste?	Not at all	64 (45.4)	40 (42.6)	104 (44.3)	1.285	0.733
	A little	25 (17.7)	13 (13.8)	38 (16.2)		
	Quite a bit	25 (17.7)	20 (21.3)	45 (19.1)		
	Very much	27 (19.1)	21 (22.3)	48 (20.4)		
Have you had trouble eating?	Not at all	63 (44.7)	34 (36.2)	97 (41.3)	5.554	0.135
	A little	23 (16.3)	18 (9.1)	41 (17.4)		
	Quite a bit	22 (15.6)	9 (9.6)	31 (13.2)		
	Very much	33 (23.4)	33 (35.1)	66 (28.1)		

* means statistically significant, (p<0.05)

The reason for a higher predominance in the 61-70 age group in this study might be due to illiteracy and lack of awareness among older people about the side effects of lifestyle risk factors²⁰. Strong cultural beliefs that cancer is a "curse" or a "punishment" might also be another reason for preventing people from seeking treatment and thus presenting late. Further, we found that cancer of the oral cavity was more predominant among all the other head and neck cancer subsites (larynx, pharynx, nasal cavity, paranasal sinuses, salivary gland, ear, eye). This finding is consistent with the literature¹⁹. It was also the most common cancer among both gender, a finding which is equally

consistent^{4,20}. However, the results indicate that males were more affected by cancer of the oral cavity than females. This is in agreement with previous studies conducted among head and neck cancer patients which also found that cancer of the oral cavity was higher among males^{4,9}. However, the study by Shinde and Hashmi reported of a higher male to female ratio (1.9:1) of oral cavity cancers⁴, while the male to female ratio was lower 1.2:1 in our study.

Laryngeal cancer (n=53; 22.6%) was the second most prevalent cancer in our study and it was three times more common in males than in females (n=40 versus

n=13 respectively). The National Cancer Registry in South Africa also reported of a higher male predominance for this cancer type²¹. Further, it is also reported to be more prevalent in males than in females globally but with a higher sex ratio of 7:1²². Concerning unemployment, our study demonstrated that 46.4% of the participants were unemployed due to their present state of health as related by them. The majority of them originated from Ethekewini municipality. Added complication like unemployment is reported to be common in cancer²³. A study reported that 45,149 out of 236 993 (19.1%) of cancer participants suffered unemployment after active treatment²³. Our study however, indicated a much higher unemployment ratio.

Cancer of the head and neck or its multimodality treatment often leaves patients with several side effects and support needs. The support needs are purely subjective. The oral health of this population group is affected in a number of ways including difficulty to eat, dysphagia, odynophagia, gustatory and auditory disturbances due to a number of complications like oral mucositis, xerostomia, osteoradionecrosis, periodontal disease, trismus, hypersensitivity and infections, thus compromising the quality of life^{7,8}.

Soreness in the mouth, difficulty in swallowing and dry mouth are common perceived symptoms which patients often complain of. Cancer therapy can directly affect teeth, tongue and other structures of the oral cavity which very often alter the eating and swallowing patterns¹⁴. Soreness occurs due to oral mucositis which is characterised by atrophy of the oral mucosa resulting in ulceration and accompanied by dysphagia and pain²⁴. It is a dose-dependent toxicity and developing in the first week after the initiation of radiotherapy and having the potential to last approximately up to 3 months²⁵. Oral mucositis is one of the most common disturbing patient-reported oral toxicity, accounting for an incidence of 85%-100%²⁶.

Dysphagia is characterised by fibrosis of the muscles of deglutition and is a major stressful and challenging treatment sequelae which patients are concerned about and like to discuss with their doctors²⁷. A recent update suggests that the assessment of the swallowing pattern and swallowing therapy as a prophylaxis by a swallowing therapist prior to radiation exposure is essential²⁷.

Trismus, as reported by the majority of participants, is evident when the interincisal distance is less than 35 mm due contraction of the masticatory muscles after radiotherapy, chemotherapy or surgery of the head and neck region²⁸. The presence of temporomandibular joint, masseter and pterygoid muscles within the radiation field is a cause for trismus^{27,28}. Surgical intervention involving the retromolar trigone, buccal mucosa and tonsillar fossa is another etiological factor for trismus^{27,28}. Varied responses with respect to the degree of trismus were reported among the participants. One factor which determines the varying degree of severity of trismus is the stage of the malignancy. It is further reported that the difference in severity of trismus is also associated to the dose and field of radiation^{29,30}.

Higher radiation doses contribute to greater reduction of the interincisal distance²⁹. Trismus occurs at around two months after radiation, progresses rapidly over 9 months

before it starts to resolve²⁹. Trismus is treated by initiating exercise therapy shortly after treatment is over³⁰.

Sticky saliva and dry mouth (xerostomia) were perceived to different extent by the majority of the participants. Xerostomia is one of the most common reported side effect of radiotherapy. Xerostomia was perceived by more people from the older age group as compared to the younger counterpart. This observation corresponds to an earlier report which also found that the risk of xerostomia was greater as the age advances³¹. Xerostomia occurs when the unstimulated and stimulated flow rate of saliva are reduced well below the normal level of 0.3-0.4 ml/min and 1.5-2.0 ml/min respectively³². Reduction in the flow of saliva is significant in the first week of radiotherapy with 60-70 Gy irradiation³³. Radiation doses above 52 Gy causes severe dysfunction of the salivary gland while permanent salivary gland damage can occur with a minimum single radiation dosage of 20 Gy³³.

Our study shows that more than half of the study population (55.7%) perceived an altered taste ranging from "a little" (16.2%), to "quite a bit" (19.1%) to "very much" (20.4%) while the rest (44.3%) did not perceive any taste impairment at all. This might be due to the fact that recent diagnosis was made and treatment had not yet started or they were on follow up and radiotherapy or chemotherapy which are both responsible for taste impairment were not being administered³⁴. Taste alteration is also a significant patient-reported symptom in head and neck cancer³⁵. It is, however, dependent on the stage of the cancer and the type of treatment that patients are undergoing³⁶. Taste impairment is more evident by the 3rd or 4th week of radiotherapy with a minimal dose of 30 Gy³⁴. Taste alteration usually resolves completely after 2-4 months of treatment but can still linger on for more than a year in those who had had high dose irradiation³⁴.

Limitations of the study

This was a single site hence the results can only be generalised to the site. Moreover, there was no control group of patients with other cancers, while this could have helped to ascertain whether certain oral health-related conditions are unique to head and neck cancer patients. Despite these limitations, the study makes a substantive contribution to understanding patients' self-reported oral health status. The study can make important contributions to oral health planning in the province.

CONCLUSION

It is apparent from the findings that oral health-related complications are present to varying degrees in head and neck cancer. It is important to educate patients to seek treatment for these complications. Oral health care support including patient counselling is strongly recommended as it is pivotal to psychologically prepare them to cope with any side effect.

Conflict of interest

Both authors consent to publication and declare that there are no conflicting interests.

REFERENCES

1. Sammut L, Ward M, Patel N. Physical Activity and Quality of Life in Head and Neck Cancer Survivors :

- A Literature Review. *International Journal of Sports Medicine*. 2014;35(9):794–9.
2. Romesser PB, Riaz N, Ho AL, Wong RJ, Lee NY. *Cancer of the Head and Neck*. 2012. p. 1037–70.
 3. World Health Organization. *Pathology and Genetics of Head and Neck Tumours*. WHO Classification of Tumours. 2005. 1-435 p. Available from: <https://www.iarc.fr/en/publications/pdfs-online/pat-gen/bb9/BB9.pdf>.
 4. Shinde KJ, Hashmi SIH. Retrospective Study Of Malignant Lesions Of Head & Neck In Rural Area Of Ahmednagar District. *IOSR Journal of Dental and Medical Sciences*. 2013;4(2):12–9.
 5. Tulunay-Ugur OE, McClinton C, Young Z, Penagaricano JA, Maddox A-M, Vural E. Functional Outcomes of Chemoradiation in Patients with Head and Neck Cancer. *Otolaryngology-Head and Neck Surgery*. 2013;148(1):64–8. Available from: <http://journals.sagepub.com/doi/10.1177/0194599812459325>.
 6. Lieshout HFJ, Bots CP. The effect of radiotherapy on dental hard tissue—a systematic review. *Clinical Oral Investigations*. 2014;18(1):17–24.
 7. Mawardi H., Al-Mohaya M., Treister N. Oral health considerations in cancer survivors. *Saudi Medical Journal*. 2013;34(5):461–9. Available from: <https://www.scopus.com/inward/record.url?eid=2-s2.0-84878361172&partnerID=40&md5=69cc3777ed9f5329ae75e510b93db2ef>.
 8. Jawad H, Hodson NA, Nixon PJ. A review of dental treatment of head and neck cancer patients, before, during and after radiotherapy: part 1. *British Dental Journal*. 2015;218(2):65–8. Available from: <http://dx.doi.org/10.1038/sj.bdj.2015.28>.
 9. Shavi GR, Thakur B, Bhambal A, Jain S, Singh V, Shukla A. Oral Health Related Quality of Life in Patients of Head and Neck Cancer Attending Cancer Hospital of Bhopal City, India. *Journal of International Oral Health: JIOH*. 2015;7(8):21–7. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4588784&tool=pmcentrez&rendertype=abstract>.
 10. Jablonski RA. Oral Health and Hygiene Content in Nursing Fundamentals Textbooks. *Nursing Research and Practice*, vol. 2012, Article ID 372617, 7 pages. 2012; Available from: https://www.researchgate.net/publication/224919846_Oral_Health_and_Hygiene_Content_in_Nursing_Fundamentals_Textbooks.
 11. Bhayat A, Chikte U. The changing demographic profile of dentists and dental specialists in South Africa: 2002-2015. *International Dental Journal*. 2017;1–6. Available from: <http://doi.wiley.com/10.1111/idj.12332>.
 12. Ramphoma KJ. Oral Health in South Africa: Exploring the role of dental public health specialists. *South African Dental Journal*, 71(9), pp. 402–403. Available at: <http://www.scielo.org.za/pdf/sadj/v71n9/05.pdf>.
 13. Singh S, Myburgh NG, Lalloo R. Policy analysis of oral health promotion in South Africa. *Global Health Promotion*. 2010;17(1):16–24. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20357348>.
 14. Chi AC, Day TA, Neville BW. Oral Cavity and Oropharyngeal Squamous Cell Carcinoma—An Update. *CA Cancer J Clin*. 2015;65:401–21.
 15. Aaronson N, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez N, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: A quality-of-life instrument for use in international clinical trials in oncology. *Journal of the National Cancer Institute*. 1993;85(5):365–76.
 16. Bjordal K, de Graeff A, Fayers P, Hammerlid E, van Pottelsberghe C, Curran D, et al. A 12 country field study of the EORTC QLQ-C30 (version 3.0) and the head and neck cancer specific module (EORTC QLQ-H&N35) in head and neck patients. *European Journal of Cancer*. 2000;36(14):1796–807. Available from: <http://linkinghub.elsevier.com/retrieve/pii/S0959804900001866>
 17. Singer S, Ignacio J, Hofmeister A, Keszte Dirk W-CC, Fisher SE, Galalae R, et al. Performance of the EORTC questionnaire for the assessment of quality of life in head and neck cancer patients EORTC QLQ-H&N35: a methodological review. *Qual Life Res*. 2013;22(8):1927–41.
 18. Rettig EM, D'Souza G. Epidemiology of Head and Neck Cancer. *Surg Oncol Clin N Am*. 2015;24(3):379–96. Available from: <http://dx.doi.org/10.1016/j.soc.2015.03.001>.
 19. Alam M, Siddiqui S, Perween R. Epidemiological profile of head and neck cancer patients in Western Uttar Pradesh and analysis of distributions of risk factors in relation to site of tumor. *J Can Res Ther*. 2017;13:430–5. Available from: <http://www.cancerjournal.net/preprintarticle.asp?id=180687>.
 20. Joshi P, Dutta S, Chaturvedi P, Nair S. Head and Neck Cancers in Developing Countries. *Rambam Maimonides Medical Journal*. 2014;5(2):e0009:1–6. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4011474&tool=pmcentrez&rendertype=abstract>.
 21. National Cancer Registry. *Cancer in South Africa 2013 Full Report*. 2013. Available from: <http://www.nioh.ac.za/assets/files/2013NCR.pdf>.
 22. Parkin DM, Bray F, Ferlay J, Pisani P. *Global Cancer Statistics, 2002*. *CA Cancer Journal for Clinicians*. 2005;55(2):74–108.
 23. Carlsen K, Dalton SO, Diderichsen F, Johansen C. Risk for unemployment of cancer survivors: A Danish cohort study. *European Journal of Cancer*. 2008;44(13):1866–74.
 24. Stokman M, Burlage F, Spijkervet F. The effect of a calcium phosphate mouth rinse on (chemo) radiation induced oral mucositis in head and neck cancer patients: a prospective study. *International Journal of Dental Hygiene*. 2012;10(3):175–80. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23046006>.
 25. Maria O., Eliopoulos N, Muanza T. Radiation-Induced Oral Mucositis. *Frontiers in Oncology*. 2017; 7, 89. Available from: <http://journal.frontiersin.org/article/10.3389/fonc.2017.00089/full>.
 26. Pattanayak L, Panda N, Dash MK, Mohanty S, Samantaray S. Management of Chemoradiation-Induced Mucositis in Head and Neck Cancers With Oral Glutamine. *Journal of Global Oncology*. 2016;2(4):200–6. Available from: <http://jgo.ascopubs.org/cgi/doi/10.1200/JGO.2015.000786>.
 27. Starmer HM. Dysphagia in head and neck cancer: prevention and treatment. *Current Opinion in*

- Otolaryngology and Head and Neck Surgery. 2014;22:195–200.
28. Johnson J, Johansson M, Rydén A, Houlitz E, Finizia C. Impact of trismus on health-related quality of life and mental health. *Head and Neck*. 2015;37(11):1672–1679. Accepted article. Available from: <http://doi.wiley.com/10.1002/hed.23816>.
 29. Steiner F, Evans J, Marsh R, Rigby P, James S, Sutherland K, et al. Mouth opening and trismus in patients undergoing curative treatment for head and neck cancer. *International Journal of Oral and Maxillofacial Surgery*. 2015;44(3):292–6. Available from: <http://dx.doi.org/10.1016/j.ijom.2014.12.009>.
 30. Rapidis AD, Dijkstra PU, Roodenburg JLN, Rodrigo JP, Rinaldo A, Strojan P, et al. Trismus in patients with head and neck cancer: etiopathogenesis, diagnosis and management. *Clinical Otolaryngology*. 2015;40(6):516–26. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26098612><http://doi.wiley.com/10.1111/coa.12488>
 31. Beetz I, Schilstra C, Burlage F, Koken P, Doornaert P, Bijl H, et al. Development of NTCP models for head and neck cancer patients treated with three-dimensional conformal radiotherapy for xerostomia and sticky saliva: The role of dosimetric and clinical factors. *Radiotherapy and Oncology*. 2012;105(1):86–93. Available from: <http://dx.doi.org/10.1016/j.radonc.2011.05.010>.
 32. Villa A, Connell CL, Abati S. Diagnosis and management of xerostomia and hyposalivation. *Therapeutics and Clinical Risk Management*. 2015;11:45–51.
 33. Sultana N, Sham EM. Xerostomia : An overview. *International Journal of Dental Clinics*. 2011;3(2):58–61.
 34. Irune E, Dwivedi RC, Nutting CM, Harrington KJ. Treatment-related dysgeusia in head and neck cancer patients. *Cancer Treatment Reviews*. 2014;40:1106–17. Available from: <http://dx.doi.org/10.1016/j.ctrv.2014.06.011>.
 35. Najafzade N, Hemati S, Gookizade A, Berjis N, Hashemi M, Vejdani S, et al. Preventive effects of zinc sulfate on taste alterations in patients under irradiation for head and neck cancers: A randomized placebo-controlled trial. *Journal of Research in Medical Sciences: Official Journal of Isfahan University of Medical Sciences*. 2013;18(2):123–6. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3724372&tool=pmcentrez&endertype=abstract>.
 36. Murtaza B, Hichami A, Khan A., Ghiringhelli F, Khan N. Alteration in Taste Perception in Cancer: Causes and Strategies of Treatment. *Frontiers in Physiology*. 2017;8:134.

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References: 1. Mason SC. *J Clin Dent* 2009, 20(6):175-177. 2. Layer TM. *J Clin Dent* 2009, 20(6):199-202.

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Evaluating the oral health knowledge, attitude and practice among undergraduate students and staff at selected federal University in Imo state, Nigeria

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SC Onwubu¹, KC Ogwu², UP Onyenu³, GC Iwueke⁴, TH Mokothu⁵

ABSTRACT

Background

Oral health is an essential component of an individual's general health and overall well-being. Although past studies have evaluated oral health knowledge, attitude and practices (KAP), little is known about the level of KAP between students and staff of higher education institutions. This study aimed to evaluate oral health knowledge, attitudes, and practices among undergraduate students and staff at a selected University of Technology in Nigeria.

Methods

A multicentre cross-sectional survey was conducted between May – June 2021 with a sample of 747 consisting of 378 students and 369 staff, recruited from 8 faculties across the University. One-way ANOVA test was applied for the statistical evaluation of numerical measures. The association between knowledge,

attitudes and practice scores were assessed using Pearson correlation analyses ($\alpha=.0.05$).

Results

No significant differences were found in the oral health knowledge, attitude, and practices between the students and staff ($P>0.05$). Overall, the finding suggests that 84.3% of the respondents had a positive attitude toward oral health, 92.5% had high knowledge and 87.4% practised oral health was adequate. The respondents KAP differed by socio-demographic characteristics. The relationship between knowledge and practice was fair ($r = 0.358, p < 0.01$) while positive weak correlations were observed between attitude and practice ($r = 0.198, p < 0.01$), and between knowledge and attitude ($r = 0.173, p < 0.01$).

Conclusion

The salient feature of this study suggests that while there was a high level of knowledge among the respondents, the attitude and actual practice of oral healthcare does not commensurate with the level of knowledge. Nonetheless, it was found that knowledge had positive associations with the practice of oral health care. The findings suggest there is a need to improve the knowledge about oral health practice among both staff and students through a tailored design of community-based awareness to increase oral health practice.

Keywords: Attitude, Knowledge, practice, oral health, university

INTRODUCTION

Oral health is an essential component of an individual's general health and overall well-being, which is related to an individual's oral health knowledge and healthy oral hygiene habits¹. Abstract knowledge of oral health practices alone does not ensure the subsequent change in an individual's attitudes and behaviours - as they are usually acquired after conceptualizing oral health practices². Neglect of oral health, on the other

Author affiliations:

1. Stanley Chibuzor Onwubu: Chemistry, Durban University of Technology (DUT), Durban, South Africa.
ORCID: 0000-0002-4499-1534
2. Kingsley Chukwuka Ogwu : Dental Technology, Federal University of Technology (FUTO), Owerri, Imo State, Nigeria.
3. Uchenna Promise Onyenu : Dental Technology, Federal University of Technology (FUTO), Owerri, Imo State, Nigeria.
4. Getrude Chika Iwueke: Dental Technology, Federal University of Technology (FUTO), Owerri, Imo State, Nigeria.
5. Thabang Hendrica Mokothua: Chemistry, Durban University of Technology (DUT), Durban, South Africa.

Corresponding author:

Onwubu Stanley Chibuzor
Chemistry Department,
Durban University of Technology (DUT),
Durban, South Africa
Email: 21445599@dut4life.ac.za.

Author contributions:

- | | |
|----------------------------------|-----|
| 1. Stanley Chibuzor Onwubu | 25% |
| 2. Kingsley Chukwuka Ogwu | 25% |
| 3. Uchenna Promise Onyenu | 25% |
| 4. Getrude Chika Iwueke, Advisor | 15% |
| 5. Thabang Hendrica Mokothu | 10% |

hand, can lead to pain and suffering, which can affect an individual's quality of life and hinder productivity in the workplace^{3,4}. According to the World Health Organization (WHO), oral health problems are still not well controlled globally despite the considerable improvements in oral health measures among populations⁵. In Africa, for example, it is estimated that more than 480 million people suffer from oral diseases such as dental caries and periodontal, and tooth loss despite most of these diseases being preventable⁶. This state of oral health might be related to the rapid development of oral diseases following lifestyle changes such as consumption of a sugar-rich diet, lack of water fluoridation, and other socio-environmental factors^{7,8}.

The high incidence and prevalence of oral diseases globally qualify oral health as a serious public health issue. For instance, the cost of treating oral diseases imposes large economic burdens on families and healthcare systems, with particular concern over their rising prevalence in many low, middle-income countries (LMICs) associated with wider economic, social, and commercial changes⁴. Moreover, it is noted in the literature that the current westernised model of modern dentistry (high technology and treatment-focused) is unaffordable and inappropriate in many LMICs^{4,9}. Hence a radically different approach is essential to address the global challenge of oral diseases.

In 2003, the Fédération Dentaire Internationale World Dental Federation (FDI), WHO, and the International Association for Dental Research issued the document "Global Goals for Oral Health 2020" which contains proposals for new goals, objectives, and targets for the global oral health of increasing detail and complexity. The aforementioned proposal aimed to provide an instrument for local and national health care planners to determine realistic goals and standards for oral health⁷. Part of this requires a shift in dentistry from a treatment-oriented approach to more preventive oral healthcare¹⁰. As such, establishing a baseline of detailed information regarding oral health knowledge and healthy oral hygiene habits will help policymakers set attainable goals and track changes. Moreover, this baseline information will help strengthen oral health programs through the implementation of effective prevention measures.

Studies on oral health knowledge, attitudes, and practices have been conducted among university students in different countries. In 2014, Peltzer and Pengpid investigated oral health behaviour and associated factors among undergraduate university students from various disciplines in 26 low, middle-, and high-income countries. This study confirmed low rates of tooth brushing and dental attendance among university students in different cultures across Africa, Asia, and the Americans¹¹. In Nigeria, a study was conducted to compare oral health knowledge, attitudes, and behaviour of medical, pharmacy, and nursing university students. The investigators found that students' oral health knowledge, attitudes,

and behaviour were inadequate and needed to be improved¹². In 2017, Kumar and colleagues studied and compared oral health knowledge, attitudes, and practices among dental and medical students at a university in Eastern India. They reported that oral health knowledge and practices among females were better than that of males¹³. In Arab countries, several studies have been conducted to assess oral health knowledge, attitudes, and behaviours, especially among school students¹⁴. Another study assessed university dental undergraduate students and compared them with undergraduate students of other faculties¹⁵. The findings of these studies are expected, as, compared with non-dental students, dental students had already received education on oral health in their undergraduate curriculum.

The above-mentioned studies mainly focused on undergraduate students' oral health knowledge, attitude and practices, but the staff who shoulder the responsibilities of educating and building these students are not considered. The study, to the best of our knowledge, represents the first study of its kind that explored and evaluate oral health knowledge, attitude and practices among both staff and students of higher education institutions.

Moreover, in the Federal University of Technology Owerri, (FUTO), Nigeria, there is not any survey conducted or published that assessed and or compared the knowledge, attitude and practices of oral health care among staff and students. Therefore, the present study aimed to evaluate oral health knowledge, attitudes, and practices among undergraduate students and staff at the Federal University of Technology Owerri (FUTO).

Given these, the present study addresses the following objectives:

1. To assesses the level of oral knowledge, attitude and practice of undergraduate students and staff in a selected Federal University of Technology in Nigeria
2. To determine the association between the socio-demographic characteristics and the oral health knowledge, attitude and practice of undergraduates and staff.

RESEARCH METHODOLOGY

2.1 Research design

A quantitative multicentre cross-sectional design was undertaken to collect data from randomly selected undergraduate students and staff of the University of Technology Owerri, Imo State, Nigeria through the administration of a close-ended questionnaire. The main aim was to assess the level of oral health knowledge, attitude and practices among students and staff.

2.2 Study setting

The study was conducted among undergraduate students and staff of the Federal University of Technology (FUTO). FUTO is a top-ranking University of technology in Nigeria and indeed the nation's

pride. Established in 1981, the university has grown tremendously, stretching its academic disciplines and research across eight different schools and over fifty academic departments. FUTO is located 25 kilometres South of Owerri, Imo state. FUTO has over 22000 undergraduate students and a 10000 staff population which are distributed across the eight (8) running faculties namely; School of Engineering and Engineering Technology (SEET), School of Agriculture and Agricultural Technology (SAAT), School of Health Technology (SOHT), School of Physical Sciences (SOPS), School of Environmental Sciences (SOES), School of Biological Sciences (SOBS), School of Management Technology (SMAT), School of Information and Communication Technology (SICT).

2.3 Sampling technique and sample size

The sample size for this study was determined using the Raosoft sample size calculator with a 95% confidence level, 5% margin of error, 50% response distribution and a population size of 22000 for students and 10000 for staff. The sample size of 377 for students and 370 for staff was used in this study. The total number of students and staff from the various faculties included 747 with 378 from SEET, 141 from SAAT, 25 from SOHT, 80 from SOES, 97 from SOPS, 68 from SOBS, and 44 from SMAT.

All undergraduate students were considered for the study from 18 years and above. For the staff, both academic and non-academic staff (administrative and technical staff) which were divided into the status of junior personnel (JP) and senior personnel (SP) were included in the study. Students in 100level (First-year students) were excluded from the study as it is believed that most of them would be below 18 years and would have to seek the consent of their guardian before participating.

Fourth-year students (400 levels) were also excluded as they were not in school at the time this study was conducted and also postgraduate students. Students who are 18 years and above in their second, third, and fifth year of study, and registered at the time of data collection were included in the study. A multicenter study was carried out this study which entails using stratified sampling techniques in the selection of study participants. Each of the respondents was stratified into three groups, namely students academic staff and non-academic staff. On each day of the data collection, students and staff were randomly selected to fill out the questionnaires from across the eight (8) faculties.

The first 10 students we saw in each classroom entered were approached to fill the questionnaires and for staff, the first 5 seen in each staff room or office across the school were given the questionnaire to fill. This pattern was followed on each data collection day until the sample size was realized. On each data collection day, we did not visit the faculty visited the previous day. This was done so that the data gotten will be evenly distributed. Data collection took us two weeks from May to June 2021 to collect excluding Friday because of the low turnout of students and staff in school.

2.4 Instrument for data collection

A standardized pretested closed-ended questionnaire based on WHO Oral Health Surveys Basic Methods 5th Edition designed in the English language, for children 16 was adapted with few modifications made so as make the questions ideal for the targeted population. It comprises 31 questions which include 11 oral health knowledge questions, 9 Attitude questions and 11 oral hygiene practices questions with the first section containing the socio-demographic questions. The questions were asked to obtain information regarding the socio-demographic background of the participants.

2.5 Data analysis

The Data was presented on Microsoft Excel 2007 spreadsheet and subsequently entered into Statistical Package for Social Sciences spreadsheet (SPSS version 27.0, IBM Statistics, New York, USA) for analysis. For the items included in the knowledge and attitude sections of the questionnaire, each correct answer was scored "one" and wrong and do not know answers were scored "zero." In the practice section, "zero" and "one" scores were given according to the appropriateness of the option selected by the respondent. The individual scores were summed up to yield a total score. Respondents were divided into Good and Poor Knowledge groups in the study results. Participants who scored 0.5 or more on the total questions were categorized as belonging to the good knowledge group and those with a score of 0.4 and below were considered to be in the poor knowledge group.

The same measure was used for attitude and practice scores. Subjects for attitude were categorized into two groups also namely; Negative Attitude and Positive Attitude while for practice, Adequate and Inadequate Practice. Descriptive statistics were obtained, and mean percentage scores, standard deviation, and frequency distribution were calculated for the oral health knowledge, attitude, and practices item. The Student's T-test and ANOVA test was applied for the statistical evaluation of numerical measures. The association between knowledge, attitudes and practice scores were assessed using Pearson correlation analyses.

2.6 Validity and reliability of the instrument

All instruments of the study were critically reviewed by an oral health care expert. In addition, the adapted questionnaire (WHO, 2013), further expresses the validity of the instrument used. Prior to data collection, the study was piloted and pretested with selected students who did not form part of the main study.

2.7 Ethical consideration

Ethical approval for this research work that related to or deals with human subjects was requested and granted by the School of Health Technology Ethical Review Committee before data was collected (FUT/SOHT/2021/REC-DNT/1).

RESULTS

3.1 Socio-demographic characteristics

The socio-demographic characteristics of the respondents are given in Table 1. The data show that

Table 1: Sociodemographic characteristics of the study participants.

Characteristics	N(%)
Gender	
Males	473(63.3)
Females	274(36.7)
Age (yrs.)	
18-25	346(46.3)
26-35	153(20.5)
36-45	180(24.1)
45 & above	68(9.1)
Status	
Students	378(53.6)
Staff (JP)	233(31.2)
Staff (SP)	136(15.2)
Faculty	
SEET	236(31.6)
SAAT	141(18.9)
SOHT	25(3.3)
SOES	80(10.7)
SOPS	97(13.0)
SOBS	68(9.1)
SCIT	56(7.5)
SMAT	44(5.9)

majority of the respondents were males (63.3%), aged 16 - 25years (46.3%) mainly dominated by students (53.6%), and were from SEET (31.6%).

3.2 Respondents' knowledge of Oral Health

Table 2 depicts the knowledge among the respondents about oral health. The majority (85.4%) knew that teeth should be cleaned using a soft-bristle toothbrush, also

Table 2: Respondent's knowledge of oral health.

Characteristics/Variables	Wrong answer/ I don't know the answer (score 0) (%)	Correct answer (score 1) N(%)
Teeth should be cleaned using a soft-bristle toothbrush	109 (14.6)	638 (85.4)
Teeth brushing should be done for 2mins and at least twice per day	58 (7.8)	689 (92.2)
Teeth brushing should be done preferably before a meal in the morning and before going to bed in the evening	82 (11.0)	665 (89.0)
Flossing should be done at least once daily	298 (39.9)	449 (60.1)
Tobacco chewing and smoking may cause oral problems	127 (17.0)	620 (83.0)
Fluoride-containing toothpaste helps in the prevention of tooth decay	196 (26.2)	551 (73.8)
Consuming sugary diets like soda may cause tooth decay	106 (14.2)	641 (85.8)
It is normally my gum bleeds when I brush	198 (26.5)	549 (73.5)
Brushing and flossing cannot be substituted with simple mouth wash and rinse	318 (42.6)	429 (57.4)

Table 3: Distribution of knowledge

Variable	Frequency	Percentage (%)
Poor knowledge	56	7.5
High knowledge	691	92.5
Total	747	100.0

90.2% knew that tooth brushing should be done for 2mins at least twice per day. Teeth brushing should be done preferably before a meal in the evening, 89% knew that and 60.1% knew flossing should be done at least once daily. 83% knows that tobacco chewing and smoking may cause oral problems and 73.8% knew that using fluoride-containing toothpaste helps in the prevention of tooth decay. Consuming sugary diets like soda may cause tooth decay, 85.8% knew this. 73.5% knew it isn't normal for their gum to bleed when brushing. Brushing and flossing cannot be substituted with simple mouthwash and rinse, only 57.4% knew this.

3.2.1 Distribution of Knowledge

The distribution table for knowledge indicates a high knowledge rate of 92.5% among the respondents (Table 3).

Table 4: Respondents' Attitude to oral health

Characteristics/ Variables	Wrong answer/ I don't know the answer (score 0) (%)	Correct answer (score 1) N(%)
Teeth should be cleaned using a soft-bristle toothbrush	109 (14.6)	638 (85.4)
Teeth brushing should be done for 2mins and at least twice per day	58 (7.8)	689 (92.2)
Teeth brushing should be done preferably before a meal in the morning and before going to bed in the evening	82 (11.0)	665 (89.0)
Flossing should be done at least once daily	298 (39.9)	449 (60.1)
Tobacco chewing and smoking may cause oral problems	127 (17.0)	620 (83.0)
Fluoride-containing toothpaste helps in the prevention of tooth decay	196 (26.2)	551 (73.8)
Consuming sugary diets like soda may cause tooth decay	106 (14.2)	641 (85.8)
It is normally my gum bleeds when I brush	198 (26.5)	549 (73.5)
Brushing and flossing cannot be substituted with simple mouth wash and rinse	318 (42.6)	429 (57.4)
Do you think that herbal remedy is more important and cheaper?	255 (34.1)	492 (65.9)
A functional dental clinic is important in the Dental department.	667 (89.3)	80 (10.7)

3.3 Respondents' Attitude towards Oral Health

Table 4 shows the oral health attitude of the participants. The majority (88.9%) believe that dental problem can affect general health, participants perceived that regular visit to the dentist is necessary (69.9%), 49.4% thinks it's a big loss to their health to remove a tooth, immediate replacement of missing natural teeth by artificial teeth is necessary (37.2%), 83.9% believes chewing tobacco/smoking is a bad habit and that dentist care only about treatment and not prevention (73.4%). Do you think that the treatment of toothache is important as any other part of the body? (90.4%) supports that assertion and 73% are afraid of going to the dentist because they think is expensive (81.5%). The herbal remedy is more important and cheaper (34.1%). Having a functional dental clinic is important in the dental department (89.3%).

3.3.1 Distribution of Attitude

Table 5 shows the distribution of attitude and it indicates that a good number of the respondents have a positive attitude towards their oral health (84.3%).

Variable	Frequency	Percentage (%)
Negative attitude	117	15.7
Positive attitude	630	84.3
Total	747	100.0

3.4 Respondents' Practice of Oral Health

Table 6 depicts the respondents' oral health practices. The table shows that the majority (82.3%) spend at least 2 minutes brushing their teeth, 56.2% brush twice daily and 78.4% used soft bristle toothbrushes for cleaning their teeth. Also, the table shows that the majority of the participants (85.3%) use toothbrushes and fluoridated toothpaste and only 10.7% visit the dentist for at least 6 months for routine dental checkups. Most (75.8%) rinse their mouth after meals and only 46.3% avoid consuming sugary soda. Only 12% go for scaling and polishing every 6 months and the majority brush their teeth horizontally only, 90.6% brush their teeth up and down and a great number (94.4%) of the participants do not use only chewing sticks for brushing.

3.4.1 Distribution of Oral Health Practice

The data in Table 7 shows the distribution of the respondents' oral health practices. The oral health practice was found to be adequate (87.4%).

Practice	Frequency	Percentage (%)
Inadequate	94	12.8
Adequate	653	87.4
Total	747	100.0

3.5 Association between socio-demographic characteristics and mean kap scores

The association between the respondents' socio-demographic characteristics and the mean KAP score is presented in Table 8. The ANOVA value measured for the age indicates that there is a statistically significant difference among the respondents in terms of their

Characteristics	Wrong answer/ I don't know answer (score 0) N (%)	Correct answer (score 1) N (%)
I spent at least 2mins brushing my teeth	132 (17.7)	615 (82.3)
I cleaned my teeth at least twice daily	327 (43.8)	420 (56.2)
I used a soft bristle toothbrush for cleaning my teeth	161 (21.6)	586 (78.4)
I use a toothbrush and fluoridated toothpaste	110 (14.7)	637 (85.3)
I visit my dentist at least every 6months for routine dental checkups	667 (89.30)	80 (10.7)
I rinsed my mouth after meals	181 (24.2)	566 (75.8)
I avoid consuming sugary soda	401 (53.7)	346 (46.3)
I visit the dental clinic every 6months for professional cleaning (scaling and polishing)	657 (88.0)	90 (12)
I brush my teeth horizontally only	174 (23.3)	573 (76.7)
I brush my teeth up and down	70 (9.4)	677 (90.6)
I use a chewing stick only for brushing	42 (5.6)	705 (94.4)

knowledge of oral health ($P=0.005$). No difference was however found between the respondents' gender and their attitude and practice of oral health ($P>0.05$).

The ANOVA value measured for the gender indicates that there is a statistically significant difference among the respondents in terms of their knowledge of oral health ($p<0.005$), attitude ($p=0.001$), and practice ($P=0.004$). The mean value measured suggests that the female respondents have higher knowledge ($M=0.8\pm 0.2$), attitude ($M=0.7\pm 0.1$), and practice ($M=0.7\pm 0.2$) of oral health when compared to the males.

In terms of status, the ANOVA value measured indicates that there was no significant difference in the respondents' knowledge, attitude, and practice of oral health ($P>0.05$). In terms of the faculty of the respondents, the ANOVA value indicates that there is a statistically significant in the respondents' knowledge ($p<0.001$) and attitude ($p<0.001$), but no difference was found for their practice ($P>0.05$). The mean value measured suggests that the SOHT respondents have higher knowledge ($M=0.9\pm 0.1$) while those from SOES (0.7 ± 0.1), SOBS (0.7 ± 0.1), and SCIT (0.7 ± 0.1) have a more positive attitude towards oral health.

3.6 Correlation between knowledge, attitude and practices

Correlation were interpreted using the following criteria 0 - 0.25 = weak correlation, 0.25 - 0.5 = fair correlation, 0.5 - 0.75 = good correlation, and greater than 0.75 = excellent correlation (Cohen, 1988). The data in Table

Variable	Knowledge	p-value	Attitude	p-value	Practice	p-value
Age	16-25	346	0.8 + 0.2		0.6 + 0.2	0.6 + 0.2
	26-35	153	0.7 + 0.2	0.005	0.6 + 0.2	0.6 + 0.2
	36-45	180	0.8 + 0.2		0.6 + 0.1	0.6 + 0.2
	45&above	68	0.8 + 0.1		0.6 + 0.2	0.7 + 0.1
						0.359
Gender	Male	473	0.7 + 0.2	0.000	0.6 + 0.2	0.6 + 0.2
	Female	274	0.8 + 0.2		0.7 + 0.1	0.7 + 0.2
Status	Student	378	0.8 + 0.2		0.6 + 0.2	0.6 + 0.2
	Staff (JP)	136	0.8 + 0.2	0.489	0.6 + 0.1	0.7 + 0.2
	Staff (SP)	233	0.8 + 0.2		0.7 + 0.2	0.6 + 0.2
						0.782
Faculty	SEET	236	0.8 + 0.2		0.6 + 0.2	0.6 + 0.2
	SAAT	147	0.8 + 0.2		0.6 + 0.1	0.7 + 0.2
	SOHT	25	0.9 + 0.1		0.6 + 0.2	0.6 + 0.2
	SOES	80	0.7 + 0.2	0.000	0.7 + 0.2	0.6 + 0.1
	SOPS	97	0.8 + 0.2		0.6 + 0.2	0.6 + 0.2
	SOBS	68	0.8 + 0.2		0.7 + 0.2	0.6 + 0.1
	SCIT	56	0.8 + 0.2		0.7 + 0.2	0.6 + 0.1
	SMAT	44	0.8 + 0.2		0.6 + 0.2	0.6 + 0.2
						0.116

9 revealed a weak association between knowledge - attitude ($r = 0.173$, $p < 0.0001$), and attitude - practice ($r = 0.198$, $p < 0.0001$). For knowledge - practice ($r = 0.358$, $P < 0.0001$) there was a fair positive linear correlation. This suggests that a good knowledge of oral health positively associates with the appropriate practice of oral health care.

Variable	Correlation coefficient	p-value
Knowledge-Attitude	0.173	0.000
Knowledge-Practice	0.358	0.000
Attitude-Practice	0.198	0.000
Pearson correlation significant at 0.01 level (2 tailed)		

DISCUSSION

Many KAP surveys concerning oral health have earlier been conducted in the University of Port Harcourt, River State Nigeria but concentrated on medical, pharmacy and Nursing students 12 and overseas¹⁷⁻¹⁹. In developing countries, there is a high prevalence of oral disease in their communities²⁰. This can be due to neglect, scarcity of resources, poor knowledge and negative attitudes. This multicenter cross-sectional study assesses the knowledge, attitude and practices of (747) students and staff who were randomly selected from the right (8) faculties in FUTO.

The finding of this study suggests that the majority of the respondents knew the use, frequency and time of using a toothbrush, as a tooth-cleaning aid. This was higher than most studies reported in India and globally^{17, 21}. More than half of the respondents were aware of the role of fluoride in preventing dental decay in contrast to only 29.6%, in a study on Saudi students in 2015¹⁴. The knowledge of the surveyed candidates in regards to the use of dental floss in preventing dental decay was

55.2%, which was somewhat lower than compared of Iranian students, which was 78.8%, in a study in 2015²². The finding suggests that the majority (83%) of the respondents knew that tobacco chewing and smoking may cause oral problems. This is important given that a good knowledge of oral health is necessary to pursue healthy oral practices^{23, 24}. Moreover, the respondents' knowledge of oral health measured in this study (92.5%) was higher when compared to the 55.7% reported at Qassim University, Saudi Arabia²⁵. Possible reasons that can be attributed to this difference in response are a demographic variation of the study population, study location and as well as the study tool used for data collection. The results notwithstanding, it is important that the population should be educated on all aspects of oral health rather than on a single or few issues.

The attitude among the participants regarding oral health was diverse. In a study done by Jaber, Khan²⁵ among male students at Qassim University Saudi Arabia, the results showed that students perceived that regular visits to the dentist were necessary (81.5%). This was per a similar study by²⁶. However, in our study, our data is slightly lower (69.9%). This may be attributed to poor favourable conditions like no university dental clinic, no dental clinic at the primary health centre, negative impression about dentists, their supposed belief that dental care is expensive or that the only government-owned hospital with a dental clinic is far from the campus.

Equally concerning, although 69.9% of the surveyed participants stated that regular dental visit was necessary, only 12% of them, however, practice it. This shows that the awareness of oral health doesn't necessarily influence good dental practice. It was also uncovered that the majority of the respondents (73%) are afraid of visiting the dentist. This perhaps could be because of their phobia of needles or pain felt during extraction of tooth/teeth or they are supposed to

believe in the cost of Dental care. This is concerning as fear of the dentist can have serious repercussions on an individual's oral health and therefore constitute a barrier to dental visits²⁷.

In literature, it is evident that the easiest oral care is to practice daily brushing and flossing - as this help reduce the incidence of dental diseases²⁴. In this study, it was found only 56.2% at least clean their teeth twice daily. Nonetheless, our findings are slightly higher than the 52.6% reported by Jaber, Khan²⁵ but still lower than the 65% reported by Kassak, Dagher²⁸. This is concerning and suggests that not everyone adheres to the golden rule of cleaning the teeth at least twice daily. The majority brushed with a toothbrush and fluoridated toothpaste (85.3%) which is similar to those reported by Jaber, Khan²⁵. The high use of fluoridated toothpaste may be related to the fact that it is a common and important ingredient found in toothpaste²⁹. Besides, fluoride used helps in decreasing caries risk and is effective in aiding enamel remineralisation³⁰, and thus could be beneficial in maintaining good oral health.

Part of the study objective was to determine the association between the respondents' socio-demographic characteristics and the oral health knowledge, attitude and practice of oral healthcare. There was no statistical significance in their status, meaning no difference was noticed in the KAP scores of both students and staff. It was, however, found that the gender and faculty of the respondents differ significantly in their mean KAP scores (Table 8). The female respondents, for example, had better knowledge, attitude toward oral health and better oral care practice than males. This is similar to most studies that have shown females consistently achieving better scores in the KAP survey regarding oral health^{28, 31}, and could be attributed to the fact that the females are more concerned about body and facial image. Consequently, they would seek regular dental care and take more care of their oral health to maintain a good appearance³¹.

With reference to the respondents' faculty, SOHT scored highest in the knowledge and attitude section with a statistically significant difference (Table 8). This is the same with the study in Saudi Arabia done among university students by Al Subait, Alousaimi¹⁴. This indicates a high level of awareness among the school of health respondents. It could be expected that respondents in the health discipline are conscious of general health including dental health which could have informed their knowledge.

Moreover, the study found that better knowledge can lead to positive oral health practices. This will help in the prevention and management of oral diseases. There are certain advantages to the study. Targeting youths seem to be most appropriate for procuring information about the oral health status of a place as they disclose information about what is being taught/learned from the school, parents and surroundings regarding oral health and what kind of attitude and habits have been groomed or are grooming which will eventually be carried in the next generation in the particular area¹⁸.

4.1 Limitations and directions for future studies

We acknowledge that the data collection method may have certain limitations. Bias could be introduced as the participants tend to give socially desirable responses like overestimating the frequency of tooth brushing and underestimating negative behaviour such as consumption of sugar and tobacco. This was minimized by piloting and pretesting the questionnaire to help establish the practicality and its applicability. The survey was focused mainly on obtaining the level of knowledge, attitude and practice in relation to the oral health of students and staff in FUTO. Further studies should be done to examine the perception of university students regarding the link between oral health hygiene and susceptibility to diseases such as oral cancer, periodontal disease, and caries. To more accurately measure participants' knowledge of good oral health practices, questions identifying the consumption of alcohol, energy drinks and soft drinks should be included in the survey.

4.2 Recommendations

As a result of the findings and conclusion reached the researchers proposed the following recommendations:

1. Health practitioners need to change the public perception of oral health. Many people do not consider oral health important to their overall health and fail to understand the role it plays in preventing future diseases. If health practitioners effectively communicate the importance of oral health and its impact on the body, it will encourage people to visit the dentist and thus prevent future diseases. It behoves health care professionals to encourage people to maintain good oral health practices by brushing and flossing their teeth daily, as well as visiting a dentist for an annual check-up. It is vital to establish a line of communication between dentists and medical doctors to ensure an individual's oral and physical health is concomitantly examined to minimize the onset of future health problems.
2. Introducing good oral health practices to young adults early in their educational career can promote overall health, particularly as they age. To accomplish this, it is necessary to integrate good oral health education into the health curriculum developed for secondary school and university students. Optimally it is best to begin teaching oral health practices to children as early as preschool age. At this young age, parents need to be actively involved in teaching their young children about the necessity to brush and floss their teeth regularly. For this study, given the diverse population of the university, it is essential to direct educational efforts toward members of underrepresented and economically insecure populations to ensure they understand the importance of visiting a dentist on an annual basis.

CONCLUSIONS

From the study conducted an overwhelming majority of the survey respondents had good knowledge, positive attitude and adequate practice with respect to oral health. Nevertheless, it was observed from the attitude section that not all of the respondents believe that

regular visit to the dentist is important. These moderate statistics show that there is an underlying problem. Moreover, many respondents believe that dental treatment is expensive thereby making them depend on other remedies like the use of herbal treatment. Overall, the study demonstrates that good knowledge of oral health positively stimulates appropriate practices of oral health. As such, there is a need to improve the knowledge about oral health practice among both staff and students through a tailored design of community-based awareness to increase oral health practice.

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Declaration

No conflict of interest declared

REFERENCES

- Sabbah W, Tsakos G, Chandola T, et al. Social gradients in oral and general health. *J Dent Res* 2007; 86: 992-996.
- Farsi NJ, Merdad Y, Mirdad M, et al. Oral health knowledge, attitudes, and behaviors among university students in Jeddah, Saudi Arabia. *Clin. Cosmet. Investig. Dent* 2020; 12: 515.
- Petersen PE, Bourgeois D, Ogawa H, et al. The global burden of oral diseases and risks to oral health. *Bull. World Health Organ.* 2005; 83: 661-669.
- Peres MA, Macpherson LM, Weyant RJ, et al. Oral diseases: a global public health challenge. *Lancet* 2019; 394: 249-260.
5. Regional Committee for Africa. Regional oral health strategy 2016-2025: addressing oral diseases as part of NCDs (Document AFR/RC66/5). World Health Organization. Regional Office for Africa. 2016.
- WHO. World Oral Health Day 2022. 2022. WHO Regional Office for Africa.
- Hobdell M, Clarkson J, Petersen P, et al. Global goals for oral health 2020. *Int Dent J* 2003; 53: 285-288.
- Onwubu SC, Mdluli PS and Singh S. Evaluating the buffering and acid-resistant properties of eggshell-titanium dioxide composite against erosive acids. *J. Appl. Biomater. Funct. Mater* 2019; 17: 2280800018809914.
- Kathmandu RY. The burden of restorative dental treatment for children in Third World countries. *Int Dent J* 2002; 52: 1-9.
- Glick M, Williams DM, Kleinman DV, et al. A new definition for oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health. *Br Dent J* 2016; 221: 792-793.
- Peltzer K and Pengpid S. Oral health behaviour and social and health factors in university students from 26 low, middle and high income countries. *Int. J. Environ. Res. Public Health* 2014; 11: 12247-12260.
- Bashiru BO and Omotola OE. Oral health knowledge, attitude and behavior of medical, pharmacy and nursing students at the University of Port Harcourt, Nigeria. *J. Oral Res. Rev* 2016; 8: 66.
- Kumar H, Behura SS, Ramachandra S, et al. Oral health knowledge, attitude, and practices among dental and medical students in Eastern India—A comparative study. *J. Int. Soc. Prev. Community Dent* 2017; 7: 58.
- Al Subait AA, Alousaimi M, Geeverghese A, et al. Oral health knowledge, attitude and behavior among students of age 10–18 years old attending Jenadriyah festival Riyadh; a cross-sectional study. *Saudi J Dent Res* 2016; 7: 45-50.
- Peker I and Alkurt MT. Oral health attitudes and behavior among a group of Turkish dental students. *Eur. J. Dent* 2009; 3: 24-31.
- Petersen PE, Baez RJ and World Health Organization. Oral health surveys: basic methods. 5th ed.: World Health Organization., 2013.
- Zhu L, Petersen P, Wang H, et al. Oral health knowledge, attitudes and behavior of children and adolescents in China. *Int Dent J* 2003; 5: 289-298.
- Vadiakas G, Oulis C, Tsinidou K, et al. Socio-behavioural factors influencing oral health of 12 and 15 year old Greek adolescents. A national pathfinder survey. *Eur Arch Paediatr Dent* 2011; 12: 139-145.
- Broadbent J, Thomson W and Poulton R. Progression of dental caries and tooth loss between the third and fourth decades of life: a birth cohort study. *Caries Res* 2006; 40: 459-465.
- Abid A, Maatouk F, Berrezouga L, et al. Prevalence and severity of oral diseases in the Africa and Middle East Region. *Adv. Dent. Res* 2015; 27: 10-17.
- Suprabha BS, Rao A, Shenoy R, et al. Utility of knowledge, attitude, and practice survey, and prevalence of dental caries among 11-to 13-year-old children in an urban community in India. *Glob. Health Action* 2013; 6: 20750.
- Rad M, Shahravan A and Haghdoost AA. Oral health knowledge, attitude, and practice in 12-year-old schoolchildren in Iran. *J Int Soc Prev Community Dent* 2015; 5: 419.
- Mitrakul K, Laovoravit V, Vanichanuwat V, et al. Factors associated with parent capability on child's oral health care. *Southeast Asian J Trop Med Public Health* 2012; 43: 249.
- Sambunjak D, Nickerson JW, Poklepovic T, et al. Flossing for the management of periodontal diseases and dental caries in adults. *Cochrane Database Syst Rev* 2019.
- Jaber MF, Khan A, Elmosaad Y, et al. Oral health knowledge, attitude and practices among male Qassim university students. *Int J Community Med Public Health* 2017; 4: 2729-2735.
- Wahengbam PP, Kshetrimayum N, Wahengbam BS, et al. Assessment of oral health knowledge, attitude and self-care practice among adolescents—a state wide cross-sectional study in Manipur, North Eastern India. *J. Clin. Diagnostic Res* 2016; 10: ZC65.
- Beaton L, Freeman R and Humphris G. Why are people afraid of the dentist? Observations and

- explanations. Med Princ Pract 2014; 23: 295-301.
28. Kassak KM, Dagher R and Doughan B. Oral hygiene and lifestyle correlates among new undergraduate university students in Lebanon. J Am Coll Health 2001; 50: 15-20.
 29. Harris NO and Garcia-Godoy F. Primary preventive dentistry. 8th ed.: Upper Saddle River, NJ: Pearson Education, 2014.
 30. Clark-Perry D and Levin L. Comparison of new formulas of stannous fluoride toothpastes with other commercially available fluoridated toothpastes: A systematic review and meta-analysis of randomised controlled trials. Int Dent J 2020; 70: 418-426.
 31. Tada A and Hanada N. Sexual differences in oral health behaviour and factors associated with oral health behaviour in Japanese young adults. Public Health 2004; 118: 104-109.

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Dentinogenic Ghost Cell Tumour, a rare case of an African young female patient: *Review of literature and report of a case*

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M Lamola¹, MMJ Masilela², TO Adedoja³

ABSTRACT

Dentinogenic ghost cell tumour (DGCT) is a very rare aggressive benign odontogenic tumour with high recurrence rate and a potential to transform into malignancy. It can render facial disfigurement. The tumour is most frequently encountered in males than females with a ratio of 2:1. The peak incidence is in patients aged 40 - 60 years and the posterior mandible is slightly more affected than the maxilla. Segmental resection is a recommended surgical treatment and long-term postsurgical follow up is essential. This paper discusses a case of a 20-year-old African female patient who was diagnosed with a DGCT.

Keywords: Dentinogenic ghost cell tumour, Ghost cells, Maxilla

INTRODUCTION

Dentinogenic ghost cell tumour (DGCT), is described as a benign but locally infiltrating odontogenic neoplasm of mixed epithelial and ectomesenchymal origin. It is the rarest of the ghost cell lesions accounting for <3% of all cases. As at 2017, only 47 cases have been reported in the literature with more than 50% of them occurring in Asian patients¹. In 1962, the tumour was regarded as

a solid variant of Calcifying Odontogenic Cyst (COC)² DGCT is, by virtue of histological presentation, characterized by ameloblastomatous odontogenic epithelium with aberrant keratinization in the form of ghost cells and is in association with dentinoid or osteodentin material. It can present either as a central (intraosseous) or peripheral (extraosseous) lesion. The tumour shows male predilection with a male to female ratio of 2:1. The peak incidence of occurrence is 40 – 60 years with an age range of 11-79 years¹. The aim of this article is to report a case of DGCT that was diagnosed in a relatively young African female patient and at an infrequent site.

CASE REPORT

We describe a case of a 20 - year - old African female who presented with a painless progressive swelling of the right maxilla of approximately 2 years duration. The swelling was associated with buccal and moderate palatal expansion and it extended from tooth 12 to the right maxillary tuberosity (Fig.1). The associated teeth were not significantly mobile. CT scan revealed a heterogenous, expansive, unilocular radiolucent lesion with many calcifications occupying the right maxilla (Fig. 2). The mass measured 44.9 x 41 x 35mm³.

The histopathological examination of the specimen revealed a solid odontogenic tumour characterized by numerous scattered islands of varying sizes of which some had undergone cystic degeneration. The cystic spaces were lined by ameloblastomatous epithelium that contains numerous ghost cells. The ghost cells were in greater proportion compared to the hyperchromatic epithelial cells. There was evidence of dentinoid material and increased basement membrane production within some islands and the stroma was fibrous (Fig.3). The epithelium and ghost cells stained diffusely and strongly positive for AE1/AE3 and most ghost cells stained strongly positive for β -catenin (Fig. 4). The proliferative index as detected by Ki-67 was virtually 0%. The features were consistent with those of a Dentinogenic ghost cell tumour.

DISCUSSION

DGCT is an uncommon odontogenic tumour that was previously classified as a solid variant of COC² however

Author affiliations:

1. M Lamola: BDS. Limpopo Department of Health, WF Knobel Hospital, General Dentistry. South Africa. Orcid: 0000-0003-2136-990X
2. MMJ Masilela: BDS, PG Dipl Dent (Oral Pathology), MDent (Oral Pathology). Sefako Makgatho Health Sciences University, Department of Oral and Maxillofacial Surgery, Pietersburg Academic Hospital, Oral Pathology Unit. South Africa. Orcid: 0000-0001-9702-5797
3. TO Adedoja: BDS, FDS RCSEd, FWACS, Cert. Implantology. Mankweng Hospital, General Dentistry. South Africa. Orcid: 0000-0003-2441-5430

Corresponding author:

Dr Masilela MMJ

Sefako Makgatho Health Sciences University, Department of Oral and Maxillofacial Surgery, Pietersburg Academic Hospital, Oral Pathology Unit. South Africa.

Email: mmjmams@yahoo.com

Cell: 0824104225

Author contributions:

- | | |
|------------------|-----|
| 1. M Lamola: | 40% |
| 2. MMJ Masilela: | 40% |
| 3. TO Adedoja: | 20% |



Figure 1: Intra-oral swelling with evidence of palatal and prominent buccal expansion with displacement of tooth 13

currently accepted as an entity. A comprehensive review was undertaken where 75 cases of DGCT were identified in a total of 48 articles that were published until July 2018. The articles demonstrated important details necessary to confirm the diagnosis of DGCT; however only 57 cases were analysed as a result of exclusion of 4 articles that lacked information on age and gender of the patients.³

In an analysis of 215 COCs, it was found that COC represents 1-2% of all odontogenic tumours and of these only 2-14% were solid tumours, considered to be DGCT.^{4,5} DGCT is the rarest of the ghost cell lesions and it accounts for approximately <3% of all ghost cell lesions and is also considered to be one of the rare odontogenic tumours.¹ This is supported by the findings reported in several studies worldwide. Comprehensive retrospective studies on odontogenic tumours were performed in various countries and in South Africa and Africa, there were no cases of DGCT reported.^{6,7,8,9} The largest study performed in Chinese population revealed nine (9) DGCT out of 1642 cases of odontogenic tumours¹⁰ and one (1) case out of 250 odontogenic tumour cases was reported in Indian.¹¹ The tumour is found to be common in Asians.^{1,3} To the best of our knowledge, this is the first case to be reported in South Africa.

DGCT is believed to be derived from odontogenic epithelial cell remnants within the gingiva and /or the jaws¹². The etiology is still unknown, however mutation in β -catenin was implicated to play a vital role in the tumorigenesis of DGCT by a process of inappropriate differentiation coordinated by the Wntless integrated (Wnt) pathway.^{4,13} Others reported that mutations in *CTNNB1* gene, which encodes β -catenin, are the major drivers of COCs, and are associated with the formation of ghost cells, however, the status of *CTNNB1* mutations in DGCT and the malignancy which DGCT

may transform into, known as Ghost cell odontogenic carcinoma, remains largely unknown.¹⁴ Our present case revealed presence of β -catenin in association with the ghost cells which supports the statement mentioned by Yukimori et al. This could suggest that there is mutation of *CTNNB1* in DGCT.

DGCT is predominantly seen in middle aged groups. Intraosseous DGCT tends to have a patient age range of 12–75 years with a mean of 40 years,^{3,15,16} whereas extraosseous lesions usually occur in the sixth decades of life, with an age range of 10–92 years.¹⁷ Few cases were reported in the second decade of life^{18,19} and the youngest reported case was of a patient who was 2 - day old.²⁰ These tumours have strong male predilection.^{3,10} Of the 7 individual cases reported, four were in males^{5,18,19,20} and three in females²¹⁻²³. All the females were in the fifth and sixth decade of life. The recently published cases of DGCT in younger patients in the second decade of life were all in males.^{18,19} This makes our case peculiar because DGCT is encountered in a young female who is in the third decade of life.

The frequent site of occurrence is the posterior mandible and maxilla with slight predilection for mandible.^{1,3} Of the three cases reported in the literature post Pinheiro et al's bibliometric review of DGCT, two were in the mandible^{18,21} and one in maxilla¹⁹. While maxilla is regarded as an infrequent site of occurrence; we report a case that was encountered in the maxilla.

DGCT varies in size from 1 cm to more than 10 cm in diameter and is usually asymptomatic. The clinical signs of intraosseous DGCT variants may include expansion



Figure 2: CT scan image showing an expansive, unilocular radiolucent lesion with many calcifications occupying the right maxilla.

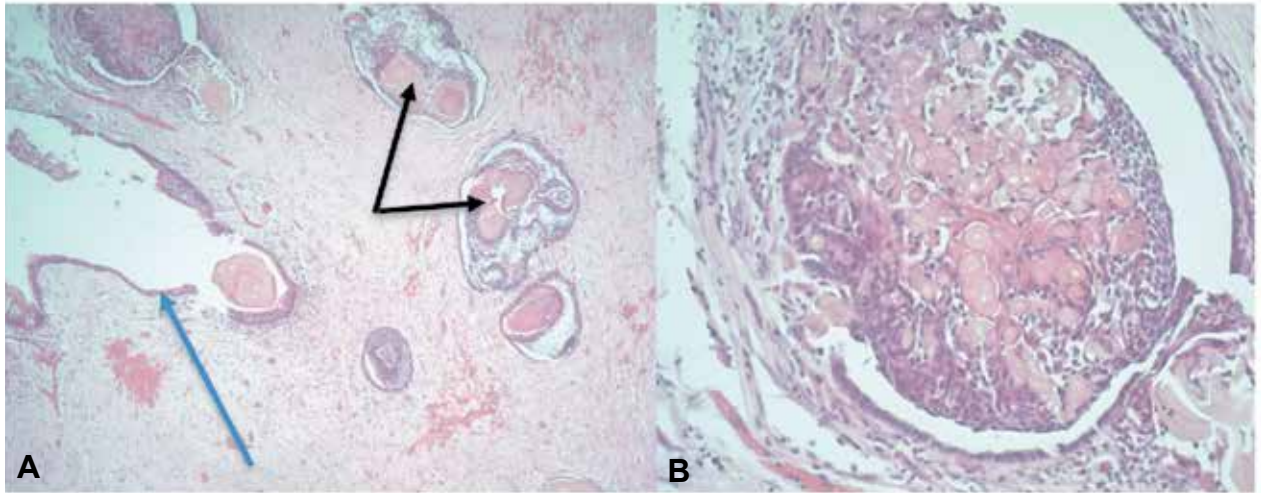


Figure 3: A Cystic lesion lined by ameloblastomatous epithelium (blue arrow) and multiple solid islands in the wall. (black arrows) **B** Higher power view showing ghost cells and osteodentin

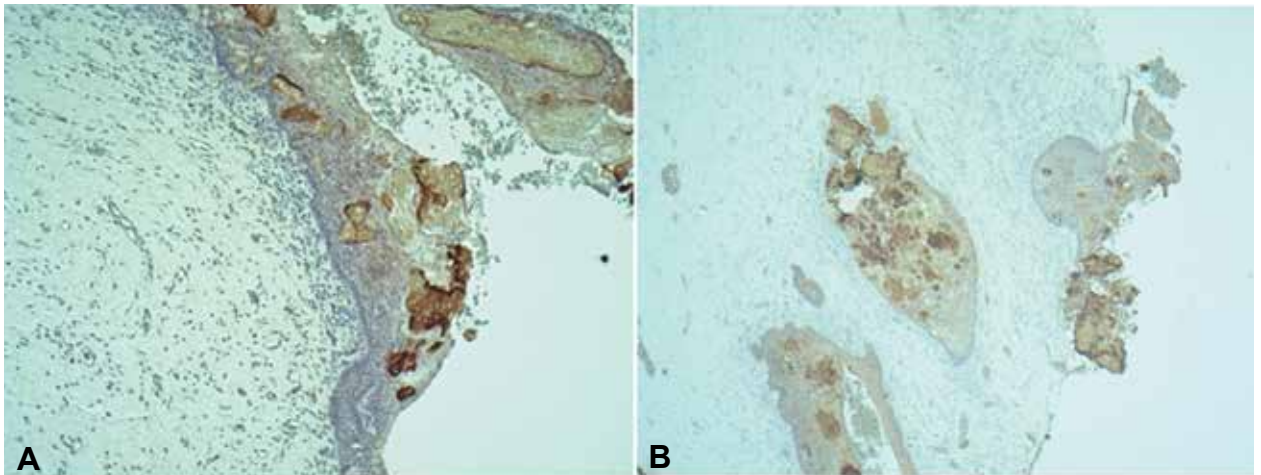


Figure 4: A Ghost cells stained positive for β -catenin. **B** Epithelial cells and ghost cells staining for AE1/AE3

of the jaw, clinically visible swelling and obliteration of the maxillary sinus or infiltration of the soft tissues. Swelling can be painful or painless and occasionally accompanied by pus discharge, tooth displacement or mobility.^{1,3,22,24,25} In the present case, the patient presented with a painless maxillary lesion with a significant expansion extending from tooth 13 to the maxillary tuberosity causing gross facial disfigurement.

Radiographic findings of the present case were consistent with the previously reported cases of DGCT in which it appeared as a unilocular mixed radiolucent-radiopaque lesion with root resorption of an associated premolar. However, DGCT presenting as a completely radiolucent lesion has been reported.¹ The appearance of either radiolucency or mixed radiolucent-radiopacity of the lesion directly depends on the degree of calcification.²² Majority of cases are unilocular but multilocular lesions may be observed.²³ These tumours are typically well-defined, often expansile and may result in resorption and divergence of roots of adjacent teeth.²⁴ Radiologic differential diagnosis of the current case (with mixed radiolucent-radiopacity) includes COC, Adenomatoid Odontogenic Tumour (AOT), Calcifying Odontogenic Epithelial Tumour (CEOT) and Ossifying Fibroma. The final diagnosis of the differentials

can only be established on histology. Histopathologically, DGCT is characterized by sheets and islands of basaloid hyperchromatic cells associated with ghost cells and dentinoid/ osteodentin-like material. When the ghost cells come in contact with the connective tissue, they elicit an inflammatory foreign body reaction with multinucleated giant cells. Microcysts may be identified within the sheet of cells, however, there may be larger cystic spaces lined by ameloblastomatous epithelium. Mitotic figures are rare.¹

The ghost cells are described as swollen, ellipsoidal keratinized epithelial cells characterized by loss of nuclei and preservation of basic cellular outlines. There are different theories on the origin of these ghost cells such as: transformation of epithelial cells, metaplastic transformation of odontogenic epithelium, squamous metaplasia with secondary calcification due to ischemia, degeneration of epithelial cells or as a result of apoptotic process.^{18,25}

The presence of ghost cells alone is however not pathognomonic of DGCT, since they can also be identified in other neoplasms such as Odontomas, Ameloblastomas and Ameloblastic fibroodontomas. The proportion of ghost cells of > 1-2% and the presence of

dentinoid material are important features in establishing the diagnosis of DGCT.¹

Several theories have also been documented regarding the presence of osteodentin or dentinoid material. Some authors considered this to represent an inflammatory response of the body towards masses of ghost cells.²⁶ Others believe that the masses of “ghost cells” induce granulation tissue to lay down juxtraepithelial osteoid which may calcify.²⁷ Meanwhile others were of the opinion that dentinoid represents a metaplastic change in the connective tissue without the participation of granulation tissue.²⁸

Some authors considered dentinoid to be of mesodermal origin based on the finding that it is usually not found in the luminal proliferations unless there is a disintegration of the basement membrane with outgrowth of connective tissue between the epithelial ghost cells.^{14,18}

Treatment of intraosseous lesions requires segmental resection as compared to conservative surgery (i.e. enucleation, curettage or simple excision). Segmental resection was found to yield less recurrence rates (33%) compared to conservative surgery which yielded high recurrence rates (73%).¹ Long-term follow-up is recommended as recurrences have been reported not only following local excision/enucleation but also 1-5 years after segmental mandibular resection and partial maxillectomy.^{12,15} Extraosseous lesions require simple excision and recurrences are rare.^{15,29}

This case was treated with an excision and peripheral osteotomy of more than 10mm normal bone which is judged to be adequate for a benign infiltrating tumour like DGCT. The need for long term follow up was emphasized to the patient.

In terms of prognosis, central DGCTs are aggressive neoplasms that show locally invasive behaviour and recurrence rates of up to 71%.³⁰ Compared to central lesions, peripheral DGCTs are less aggressive in behaviour and are not thought to recur.^{5,29}

Malignant transformation of DGCT into Ghost cell odontogenic carcinoma (GCOC) has also been reported.¹⁸ It is important to distinguish the DGCT from GCOC because both lesions may exhibit ghost cells and infiltrative growth; however, GCOC displays nuclear pleomorphism and hyperchromasia, mitotic activity and necrosis microscopically. Expression of p53 and a high proliferative index favours the diagnosis of GCOC as it is known that the expression of these markers increases upon transformation. There were no malignant cytomorphological changes and there was virtually no increase in proliferation in our case as detected by a proliferative marker, Ki-67.³¹ This is firm evidence that our case is a benign neoplasm. Six-month post-surgical excision, there is no evidence of recurrence and this patient has been placed on long-term follow up.

CONCLUSION

DGCT is an aggressive tumour with significant tendency to recur and a potential for malignant transformation.

Segmental resection is the recommended surgical treatment and long-term postsurgical follow up is essential. The etiology of these lesions still needs to be further investigated and more cases are required elucidating the peculiar nature of this tumour.

Ethics

An informed consent was not obtained from the patient or relatives due to reasons explained to the Ethics committee and the Editor. A letter from the Ethics committee is attached.

Conflict of interest

None

REFERENCES

1. Carlos R, Ledesma-Montes C. Dentinogenic ghost cell tumour in The fourth edition of the head and neck World Health Organization. Adel K El-Naggar, John KC Chan, Jennifer R. Grandis, Takashi Takata, Pieter J Slootweg, WHO classification of head and neck tumours. LYON. IARC press, 2017: 226-227
2. Gorlin RJ, Pindborg JJ, Odont, Clausen FP, Vickers RA. The calcifying odontogenic cyst-a possible analogue of the cutaneous calcifying epithelioma of Malherbe. An analysis of fifteen cases. *Oral Surg Oral Med Oral Pathol.* 1962; 15: 1235-43
3. Pinheiro TN, de Souza APF, Bacchi CE, Consolaro A. Dentinogenic ghost cell tumor: A bibliometric review of literature. *Journal of Oral Disease Markers.* 2019; 3: 9-17
4. Buchner A. The central (intraosseous) calcifying odontogenic cyst: An analysis of 215 cases. *J Oral Maxillofac Surg.* 1991; 49: 330-9.
5. Walia C, Kashyap B, Roy S. Disorganized histomorphology: Dentinogenic ghost cell tumor. *J Oral Maxillofac Pathol.* 2017; 21: 154 –77.
6. Mamabolo MM, Noffke C, Raubenheimer E. Odontogenic tumours in the first two decades of life in a rural African population sample: A 26 year retrospective analysis. *Dentomaxillofacial Radiology.* 2011; 40: 331-37
7. Okoh DS, Akinshipo AO, Butali A, Omitola OG, Sigbeku OF, Soyele OO et al. Descriptive Epidemiology of Odontogenic Tumors in Nigeria: An African Oral Pathology Research Consortium Multicenter Study. *Niger J Clin Prac.* 2020; 23: 1695-701
8. Singh K, Simon ENM, Mwalutambi S, Owibingire SS. A prospective Study on Odontogenic Tumours among Patients Attending Muhibili National Hospital, Dar Es Salaam, Tanzania. *Oral Rehabilitation and Dentistry.* 2020; 3(1): 2-6
9. Ogunjana OM, Effiom OA, Odukoya O. Pattern of distribution of odontogenic tumours in Sub-Saharan African. *International Dental Journal.* 2017; 67: 308-17
10. Jing W, Xuan M, Lin Y, Wu L, Liu L, Zheng X et al. Odontogenic tumours: a retrospective study of 1642 cases in a Chinese population. *Int. J. Oral Maxillofac Surg* 2007; 36:20-25
11. Ahire MS, Tupkari JV, Chettiankandyb TJ, Thakur A, Agrawal RR. Odontogenic tumors: A 35-year retrospective study of 250 cases in an Indian

- (Maharashtra) teaching institute. *Indian J Cancer*. 2018; 55: 265-72
12. Regezi: *Oral Pathology: Clinical Pathologic Correlations*, 5th ed. An Imprint of Elsevier. WB Saunders, 2008: 745
 13. Kim SA, Ahn SG, Kim SG, Park JC, Lee SH, Kim J, et al. Investigation of the beta-catenin gene in a case of Dentinogenic ghost cell tumour. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2007; 103: 97-101
 14. Yukimori A, Oikawa Y, Morita K, Nguyen CTK, Harada H, Yamaguchi S. Genetic basis of calcifying cystic odontogenic tumors. *PLOS One*. 2017; 12: e0180224.
 15. Barnes L, Eveson JW, Reichart P, Sidransky D. *World Health Organization Classification of Tumours. Pathology and Genetics of Head and Neck Tumours*. Lyon: IARC Press, 2005: 314.
 16. Juneja M, George J. Dentinogenic ghost cell tumor: a case report and review of the literature. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2009; 107: e17-22.
 17. Praetorius F. Dentinogenic ghost cell tumour. In: Barnes L. editor. *Surgical Pathology of the Head and Neck*, Third Edition. CRC Press, 2009:1272-5.
 18. Agrawal Y, Naidu GS, Makkad RS, Nagi R, Jain S, Gadewar DR et al. Dentinogenic ghost cell tumour – a rare case report with review of literature. *Quant Imaging Med Surg* 2017;7(5):598-604
 19. Patankar SR, Khetan P, Choudhari SK, Suryavanshi H. Dentinogenic ghost cell tumour: A case report. *World J Clin Oncol*. 2019; 10(4): 192-200
 20. Bafna SS, Joy T, Tupkari JV, Landge JS. Dentinogenic ghost cell tumor. *J Oral Maxillofac Pathol*. 2016; 20: 163
 21. Reddy V, Wadhwan V, Singh R, Bansal V. Dentinogenic ghost cell tumour: Case report of a rare central variant and literature review. *J Oral Maxillofac Pathol*. 2022; 26(1): 568-572
 22. Garcia BG, Ruiz Masera JJ, Zafra Camacho FM, Gutierrez CC. Intraosseous dentinogenic ghost cell tumor: Case report and treatment review. *Rev Esp Cir Oral Maxillofac*. 2015; 37: 243-6.
 23. Salgado I, Vilares M, Nogueira R, Rito M, Rosa F. Dentinogenic ghost cell tumour – Case report of a rare entity. *International Journal of Surgery Case Reports*. 2021; 81:105651
 24. Konstantakis D, Kosyfaki P, Ebhardt H, Schmelzeisen R, Voss PJ. Intraosseous dentinogenic ghost cell tumor: A clinical report and literature update. *J Craniomaxillofac Surg*. 2014;42:e305-11
 25. Gupta S, Signh S, Anjum R, Sharma R. Dentinogenic ghost cell tumor of the maxilla: A case report and review of literature. *J Oral Maxillofac pathol*. 2019; 23 (3): 478.
 26. Praetorius F, Hjørting-Hansen E, Gorlin RJ, Vickers RA. Calcifying odontogenic cyst. Range, variations and neoplastic potential. *Acta Odontol Scand*. 1981; 39: 227-40.
 27. Sonawane K, Singaraju M, Gupta I, Singaraju S. Histopathologic diversity of Gorlin's cyst: a study of four cases and review of literature. *J Contemp Dent Pract* 2011; 12: 392-397
 28. Singhaniya SB, Barpande SR, Bhavthankar JD. Dentinogenic ghost cell tumor. *J Oral Maxillofac Pathol*. 2009; 13: 97-100
 29. Kasahara K, Iizuka T, Kobayashi I, Totsuka Y, Kohgo T. A recurrent case of odontogenic ghost cell tumour of the mandible. *Int J Oral Maxillofac Surg*. 2002; 31: 684-7.
 30. Sun G, Huang X, Hu Q, Yang X, Tang E. The diagnosis and treatment of Dentinogenic ghost cell tumor. *Int J Oral Maxillofac Surg*. 2009; 38: 1179-83.
 31. de Arruda JAA, Monteiro JLGC, Abreu LG, de Oliveira Silva LV, Schuch LF, de Noronha MS, Callou G, Moreno A, Mesquita RA. Calcifying odontogenic cyst, dentinogenic ghost cell tumor, and ghost cell odontogenic carcinoma: A systematic review. *J Oral Pathol Med*. 2018; 47: 721-730

Actinomycosis osteomyelitis of the mandible in a 71-year-old patient: A Case Report

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N Khan¹, G Mhlanga²

ABSTRACT

We herein present the treatment of an actinomycosis osteomyelitis case. A 71-year-old female with a dental history of multiple tooth extractions two years prior who subsequently developed chronic osteomyelitis. Previous treatment included 10 sessions of hyperbaric oxygen and pentoxifylline tocopherol protocol as well as debridement of the lesion that had resulted in a subsequent midline pathological fracture of the mandible. The fracture was treated by intra-bony wiring. The clinical extra-oral presentation was that of severe pain, recurrent swelling of the submandibular areas bilaterally and draining fistulae. Our treatment included antibiotic therapy: guided by Microscopy Culture and Sensitivity and a segmental mandibulectomy with the placement of a reconstruction plate. The outcome of the therapeutic management was successful. Histopathology results confirmed chronic osteomyelitis with bacterial colonies in keeping with actinomycosis. At the six-week post-operative appointment, the patient was healing well.

Keywords: Osteomyelitis, Actinomycosis, Segmental mandibulectomy

BACKGROUND

Osteomyelitis is inflammation of bone and marrow.¹ It frequently occurs as a primary isolated focus of disease or can be secondary to systemic infection.¹ Although any microorganism may cause osteomyelitis, bacteria is the most common etiologic agent.² The infection caused by the microorganism compromises the blood supply to the bone.³ By compromising the blood supply to the bone, it also hinders the inflammatory response needed to clear the disease, promoting disease progression.³ In the head and neck region, infections of the mandible

can be introduced through an extraction socket or direct trauma to the mandible resulting in an open fracture.⁴ Actinomycosis is a normal commensal microorganism of the oral cavity, thus when the mandible is exposed, either from the extraction socket or trauma, it can enter and cause osteomyelitis.⁴ Mandibular actinomycosis infections commonly present with firm soft tissue swellings and multiple abscesses, making it difficult to distinguish from inflammatory conditions, neoplastic processes or trauma.⁴

Three main types of osteomyelitis are acute, primary chronic, and chronic osteomyelitis. Acute and chronic osteomyelitis are similar in presentation, however, separated by the duration of time since the onset of the disease. The former has a duration of fewer than 4 weeks and latter lasts for more than 4 weeks.⁵ Chronic osteomyelitis is common in communities with poor socio-economic conditions presenting with poor oral hygiene.⁶ Chronic osteomyelitis is a debilitating condition, requiring adequate antimicrobial treatment, and or surgical management.⁷ Due to bacteria being the most common cause of osteomyelitis, empiric antibiotic therapy is often selected.⁸ However, definitive antimicrobial therapy should be based on final microscopy culture and sensitivity (MC&S) results.⁹ MC&S results also help in avoiding multidrug resistance and lead to a favourable treatment outcome.⁸

CASE PRESENTATION

A 71-year-old female with hypertension and osteoarthritis was referred to the Maxillo-Facial and Oral Surgery Department at the Oral and Dental Hospital. She presented with multiple sinus tracts of the anterior mandible. Her dental history revealed multiple tooth extractions two years prior with subsequent development of chronic osteomyelitis. Before the presentation, she received sessions of hyperbaric oxygen complimented by a pentoxifylline tocopherol protocol. Subsequently, she developed a pathologic fracture which was treated and reduced with an internal fixation wire. On examination, there was bilateral submandibular soft tissue swellings and draining fistulae. Intraorally, necrotic exposed bone was noted in the anterior mandible with exposed wire. Upon palpation, the surrounding tissues were friable and tender (Figure 1).

Investigations

Special investigations included an Orthopantomogram (OPG) radiograph which showed multiple areas of ill-defined, moth-eaten mixed radiolucent/radiopaque

Author affiliations:

1. Dr Nazia Khan : Department of Maxillo-Facial and Oral Surgery, University of Pretoria. ORCID: 0000-0002-4110-6595
2. Dr Gugulethu Mhlanga: Department of Maxillo-Facial and Oral Surgery, University of Pretoria. ORCID: 0000-0002-0663-7235

Corresponding author:

Dr. Nazia Khan
Department of Maxillofacial and Oral Surgery,
University of Pretoria, South Africa
E-mail: Nazia.khan@up.ac.za
Te: +27798784996

Author contributions:

1. Dr Nazia Khan: 50%
2. Dr Gugulethu Mhlanga: 50%



Figure 1. Intraoral image preoperatively



Figure 2. Orthopantomogram of patient

lesions extending from the left parasymphysis area of the mandible to the symphysis (Figure 2). A pathological fracture was noted in the midline of the mandible that had been reduced and fixed with wire. Microscopy, culture, and sensitivity (MC&S) results that accompanied the patient from a private laboratory, showed multiple drug resistance. The list included resistance to penicillin and beta-lactamase.

Treatment

A segmental mandibulectomy of the necrotic bone (Figure 3) with the placement of a construction plate was the treatment of choice (Figure 4). The specimen was sent for histopathological analysis and tissue was also submitted for MC&S (Figure 5).

Histopathological examination confirmed chronic osteomyelitis with Actinomyces bacterial colonies. MC&S confirmed bacterial organisms sensitive to Vancomycin. Vancomycin 1g IV was given as a daily dose in the hospital for 2 weeks. Trough levels were measured to ensure antibiotic levels were in the therapeutic range.



Figure 3 Pathological area of mandible exposed



Figure 4. PA mandible with reconstruction plate in situ

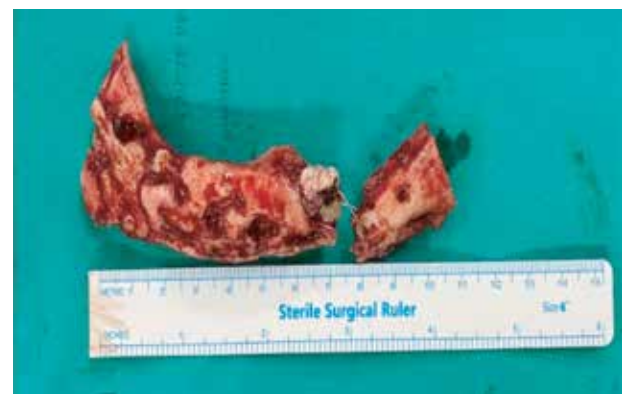


Figure 5. Specimen sent for histopathological analysis

DISCUSSION

Actinomyces is a commensal of the oral cavity however, a history of trauma from either dental extractions or facial fractures, especially of the mandible, can result in disease as seen in this case. If a patient presents with radiopaque lesions of the mandible with multiple fistulas and a pathological fracture, mandibular osteomyelitis should be considered. The management should include a biopsy and MC&S to confirm the possible diagnosis. Bacterial colonies form distinct actinomycotic granules, referred to as sulphur granules. These granules are composed of dense aggregates of filamentous bacteria.¹⁰

Treatment of cervicofacial actinomyces includes a surgical approach in combination with IV antibiotics.¹¹ First-line antibiotics include parenteral administration of penicillin G (50-75mg/kg/day IV in four daily divided doses) for 4 to 6 weeks. This may be followed by peroral penicillin V (30-60mg/kg/day administered in four divided doses) until complete resolution of the disease is noted.¹² Older literature advocated long-term antibiotic usage of 6 to 12 months duration.¹² In this case, the patient had multiple mandibular debridements along with various antibiotics, hyperbaric oxygen

therapy, and tocopherol therapy, all with no resolution of the disease. She then had multidrug resistance and was hospitalised for surgical treatment as well as with Vancomycin 1g IV daily for 2-weeks in the hospital. At the six-week follow-up appointment, the bone had healed well with no evidence of sepsis on examination and her function was restored.

Learning objective

Due to impoverished, poor socio-economic conditions, one must consider the possibility of actinomycosis osteomyelitis after a non-healing extraction socket or other Maxillo-Facial trauma. Mandibular actinomycosis may have a similar presentation to neoplastic processes, as noted by the presence of multiple fistulas, thus should be included in the list of differential diagnoses. Of critical importance, treatment must include microbial culture and sensitivity to optimize antimicrobial usage. Thus, avoiding multidrug resistance and leading to a favourable treatment outcome.

Patient consent

Patient consent was obtained verbally and in writing and submitted and approved by RESCOM and ethics prior to publication.

Disclosure of interest-The authors declare that they have no competing interests.

REFERENCES

1. Kumar V, Abbas AK, Aster JC. Robbins basic pathology e-book. Elsevier Health Sciences; 2017 Mar 8. p 773
2. Urs AB, Singh H, Mohanty S, Sharma P. Fungal osteomyelitis of maxillofacial bones: rare presentation. *Journal of oral and maxillofacial pathology*. 2016 Sep;20(3):546.
3. Mercuri LG. Acute osteomyelitis of the jaws. *Oral and maxillofacial surgery clinics of North America*. 1991 May 1;3(2):355-65.
4. Sasaki Y, Kaneda T, Uyeda JW, Okada H, Sekiya K, Suemitsu M, Sakai O. Actinomycosis in the mandible: CT and MR findings. *American Journal of Neuroradiology*. 2014 Feb 1;35(2):390-4.
5. Agarwal A, Kumar N, Tyagi A, De N. Primary chronic osteomyelitis in the mandible: a conservative approach. *Case Reports*. 2014 Apr 3;2014:bcr2013202448.
6. Gaetti-Jardim E, Landucci LF, de Oliveira KL, Costa I, Ranieri RV, Okamoto AC, Schweitzer CM. Microbiota associated with infections of the jaws. *International journal of dentistry*. 2012 Jul 8;2012.
7. Pincus DJ, Armstrong MB, Thaller SR. Osteomyelitis of the craniofacial skeleton. *Seminars in plastic surgery* 2009 May (Vol. 23, No. 02, pp. 073-079).
8. Dym H, Zeidan J. Microbiology of acute and chronic osteomyelitis and antibiotic treatment. *Dental Clinics*. 2017 Apr 1;61(2):271-82.
9. Miloro M. Peterson's principles of oral maxillofacial surgery. 3rd ed. New York: McGraw-Hill Medical; 2011.
10. Lerner PI. The lumpy jaw: Cervicofacial actinomycosis. *Infectious disease clinics of North America*. 1988 Mar 1;2(1):203-20.
11. Moghimi M, Salentijn E, Debets-Ossenkop Y, Karagozoglou KH, Forouzanfar T. Treatment of

- cervicofacial actinomycosis: a report of 19 cases and review of literature. *Medicina oral, patologia oral y cirugia bucal*. 2013 Jul;18(4): e627.
12. Oostman O, Smego RA. Cervicofacial actinomycosis: diagnosis and management. *Current infectious disease reports*. 2005 Jun;7(3):170-4.

What's new for the clinician– summaries of recently published papers

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Prof V Yengopal, Dean, Faculty of Dentistry, University of the Western Cape

1. Is there an association between coffee consumption and periodontitis?

Periodontitis is a chronic oral disease characterized by inflammation of the gingiva and/or destruction of the connective tissue and alveolar bone that support the teeth. Subgingival microorganisms that adhere to and grow in the periodontal pocket, along with excessive and aggressive immune response against these microorganisms, are considered to cause periodontitis. Therefore, the primary purpose of periodontal treatment is to control subgingival microorganisms.

In addition to removal of the etiological agent of periodontitis, the control of risk factors of periodontitis is also essential to maintain periodontal health. Several studies have established that factors such as tobacco use, excessive alcohol consumption, diabetes mellitus, dyslipidemia, and environmental and genetic exposure, may be involved in periodontitis. Coffee is one of the most consumed drinks in the world. Also, coffee consumption has been reported to be inversely associated with markers of inflammation and endothelial dysfunction.¹ Struppek and colleagues from Germany (2022)¹ reported on a study that sought to assess the strength of the association between coffee consumption and periodontitis using state-of-the-art, comprehensive phenotyping.

MATERIALS AND METHODS

The Data from this study was derived from The Hamburg City Health Study in Germany. Participants between 45 and 74 years of age from the general population of Hamburg were recruited. Written informed consent was obtained from all participants. Inclusion criteria included a completed periodontal examination and documentation on coffee consumption data. Exclusion criteria included individuals requiring endocarditis prophylaxis.

Coffee consumption was assessed using a previously validated food frequency questionnaire (FFQ) that included cups of coffee consumed per day for the last 12 months,

type of coffee (caffeinated or decaffeinated), and additives (no additives, sweetener, milk, evaporated milk, sugar, or honey). Multiple answers were possible for type of coffee and additives. Frequency of coffee consumption was classified as low (0–2 cups/day), moderate (3–6 cups/day), and strong (≥ 7 or more cups/day).

Oral and periodontal examination was carried out by trained and calibrated study nurses. The decayed, missing, and filled teeth (DMFT) index was recorded and periodontal examination was done with a PCP-12 probe. Probing depths (PD) and gingival recessions (GR) were recorded in 6 sites (mesio-oral, oral, disto-oral, mesio-buccal, buccal, disto-buccal) for each tooth in millimeters. Clinical attachment loss (CAL) was calculated ($CAL = PD + GR$). Bleeding on probing (BOP) and Plaque Index (PI) was recorded accordingly. The severity of periodontitis was categorised as none/mild, moderate and severe.

The additional variables, such age, sex, education (based on international standard classification of education), and smoking (non-smoker, former smoker [quit smoking at least 6 month ago], current smoker), were assessed via self-reported questionnaire. In the study centre, the following variables were measured: body mass index (BMI in kg/m²), diabetes mellitus (taking medication of the A10 group (ATC-Code), fasting glucose > 126 mg/dl, non-fasting glucose > 200 mg/dl, positive self-disclosure), coronary artery disease (CAD was defined as suffering from one or more of the following conditions: status post myocardial infarction, percutaneous coronary intervention (PCI) or history of coronary bypass surgery), hypertension (was defined as a systolic blood pressure ≥ 140 mmHg, a diastolic blood pressure ≥ 90 mmHg, or the use of one or more of the following antihypertensive drugs: ACE inhibitors, angiotensin II receptor blockers, beta blockers, calcium channel blockers, renin inhibitors, or loop diuretics), and laboratory parameters (serum high-sensitive IL-6 and high-sensitive CRP).

RESULTS

The overall cohort consisted of 10,000 participants with 48.9% being men with a median age of 63 years. Of the participants, 63.3% of them were low (0–2 cups/

Prof V Yengopal: BChD, BScHons, MChD, PhD, Dean, Faculty of Dentistry, University of the Western Cape, South Africa.
ORCID Number: 0000-0003-4284-3367
Email: vyengopal@uwc.ac.za

day), 33.3% moderate (3–6 cups/day), and 3.5% strong (≥ 7 cups/day) coffee drinkers. The Periodontal cohort consisted of 6,209 participants, presenting either none/mild ($n=1,453$, 39.6% men, 2.4% strong coffee drinkers), moderate ($n=3,580$, 49.3% men, 3.3% strong coffee drinkers), or severe ($n=1,176$, 60.9% men, 5.0% strong coffee drinkers) periodontitis. Participants with severe periodontitis were more often men (60.9%) with median age of 66 years, 4.1% exhibit a lower education, and 25.1% were currently smoking. Furthermore, 11.3% were diabetic and 72.5% suffered from hypertension. Five percent of participants with severe periodontitis drunk ≥ 7 cups of coffee per day.

Ordinal logistic regression analyses revealed significant association between strong coffee consumption and periodontitis in the unadjusted (OR: 1.52; 95% CI: 1.10, 2.09; $p > 0.001$) and adjusted (age, sex, smoking, diabetes, and hypertension) model (OR: 1.51; CI: 1.07, 2.12; $p > 0.001$) in comparison with low coffee consumption. Conversely, moderate (3–6 cups/day) coffee consumption was neither associated in the unadjusted nor in the fully adjusted model with periodontitis, compared with low coffee consumption.

CONCLUSION

The researchers found that strong but not moderate coffee consumption was significantly associated with periodontitis, compared to participants with low coffee consumption. Implications of findings: The huge sample size provides good evidence of an association between strong coffee consumption and periodontitis

REFERENCE

1. Struppek J, Walther C, Bunte K, Zyriax BC, Wenzel JP, Senftinger J, Nikorowitsch J, Heydecke G, Seedorf U, Beikler T, Borof K. The association between coffee consumption and periodontitis: a cross-sectional study of a northern German population. *Clinical oral investigations*. 2022 Mar;26(3):2421-7

CPD questionnaire on page 638



The Continuous Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.

2. Is perioperative antibiotic prophylaxis in the case of routine surgical removal of the third molar still justified?

Surgical removal of the third molar is one of the most common interventions in oral surgery and postoperative complaints occur quite frequently. Many clinicians routinely prescribe antibiotics pre-operatively to reduce the chances of post-op infection although there is no consensus on whether this is the best protocol to adopt.

Worldwide drug misuse and overuse are some of the reasons we are currently facing AMR (antimicrobial resistance)¹. The declining efficacy of antimicrobial medication has become a reality in the form of superbugs, such as methicillin-resistant staphylococcus aureus or extremely drug-resistant tuberculosis¹. The World Health Organization (WHO) defined a “Global action plan on antimicrobial resistance” with a focus on five strategic objectives: the improvement of awareness and understanding of antimicrobial resistance (AMR), increase in surveillance and research, decrease in the incidence of infections, pursuit of sustainable financing, and optimization of the application of antimicrobial drugs. Kirnbauer and colleagues (2022)¹ reported on a noninferiority trial of a placebo medication in conventional surgical removal of the noninflamed wisdom teeth, while focusing on surgical site infections (SSIs), swelling, trismus, and the patient’s subjective well-being compared with perioperative antibiotic prophylaxis with amoxicillin.

MATERIALS AND METHODS

This study was conducted as a randomized, double-blinded, placebo-controlled single-centre trial in a split-mouth design.

A priori sample size calculation was performed and 110 observations were planned. Unfortunately, there were 9% dropouts; thus, a final number of 50 participants with 100 surgeries was reached. Patients aged 16 years or older who were referred for surgical removal of four impacted or slightly impacted wisdom teeth were considered for inclusion. Inclusion criteria were as follows: four impacted or partially impacted third molars (18, 28, 38, 48) of average degree of difficulty; absence of actual local infection; normal state of health (American Society of Anaesthesiologists classification, ASA 1); non or light smoker (<10 cigarettes/day); absence of allergies or intolerances to local anaesthetics, amoxicillin, or penicillin; no use of antibiotics within the previous 3 months; a lack of factors negatively influencing soft tissue healing and bone metabolism (e.g., antiresorptive medication, head, and neck radiotherapy); and no pregnancy and breastfeeding in female participants. Patients with general contraindications to wisdom tooth extraction surgery and those who did not meet the above criteria were excluded.

The participants were randomly assigned to their treatment ID and subsequent blinded medication package (two containers each with first event group, EG; second control group, CG; or inverse. A person not involved in the clinical procedure was responsible for strictly keeping the blinded medication packages and the allocation list locked. As a result, the surgeons, patients, and postoperative assessors were blinded.

At the first study visit, general clinical parameters were assessed with a standardized health questionnaire. Patients were checked using panoramic radiography to radiological inclusion criteria of four (partially) impacted third molars of medium degree of difficulty according to the classification of Pell and Gregory and Winter for lower wisdom teeth. A cone-beam computed tomography scan was performed with a close association between the roots and the inferior alveolar nerve canal. Additionally, all patients underwent a radiation-free face scan for digital surface imaging with the same device. Furthermore, assessment of the maximum interincisal distance, as well as an analogue face measurement with a tape measure (lateral corner of the eye–jaw angle; tragus–lateral corner of the mouth, tragus–pogonion, summarized in millimetre, mm), was performed as preoperative baseline values.

An hour before the start of wisdom tooth removal on the day of the first and second surgery, all patients received 40 mg of methylprednisolone orally and their study medication (26 hard gelatin capsules in a resealable container). The study medication was prepared at the local hospital pharmacy using Amoxilan 1000-mg tablets, newly packaged into hard gelatin capsules containing 250 mg amoxicillin each. Eight capsules were taken immediately, and on the following 3 days, six capsules (3 × 2 every 8 h). The EG received 250 mg amoxicillin per capsule (2 g amoxicillin on the day of surgery, 1.5 g amoxicillin on each on the following 3 days), while the CG received capsules filled with pharmacological inactive lactose monohydrate as placebo medication. The hospital pharmacy delivered two containers for each treatment ID with allocation to the first and second intervention that each patient randomly received both the amoxicillin and placebo once in varying order.

Three well-experienced oral surgeons performed the third molar surgery under strict hygiene guidelines in a surgical room, including sterile surgical laundry, sterile gloves, and preoperative facial wash of the patient. Each procedure followed a standardized protocol. First, the upper third molar was removed with elevators after full-thickness mucoperiosteal flap elevation, reflection, and osteotomy. Second, a full-thickness mucoperiosteal envelope flap was built at the lower jaw after incision (blade no. 15) along the ramus with lateral extension from the second molar. Osteotomy and, if necessary, tooth section were performed using a surgical handpiece with descending round burs and a conical mill under continuous sterile cooling liquid.

After surgery, the patients got detailed instructions concerning postoperative behaviour, study medication intake, and daily self-assessment. In the event of an emergency, all patients were given contact information to call for advice 24 h a day, 7 days a week. A minimum interval of 3 months between the first and second surgery was observed to prevent influence by the active ingredient. Patients were reordered on postoperative day 1 (d 1) and day 7 (d 7) for follow-up, including medication compliance, digital face scan, analogue face measurements (swelling;

lateral corner of the eye–jaw angle; tragus–lateral corner of the mouth, tragus–pogonion, summarized in millimetre; trismus: maximum interincisal distance, recorded in millimetre), and intraoral clinical investigation concerning potential SSIs. Surgical site infection (SSI) was defined as local inflammation, indicating solely wound irrigation, or the presence of an abscess, which required antibiotic treatment and incision and drainage with gauze. Alveolar osteitis was not recorded. Postoperative investigations were double-blinded by an experienced and trained staff different from the blinded surgeon.

For the digital analyses of the swelling, face scan datasets imported into the coDiagnostiX software. To measure the volume of swelling, measurements were superimposed using the preoperative and both postoperative (d 1; d 7) scans using stable anatomic landmarks, such as the forehead, bridge, tip of the nose, and both eye sockets. Afterwards, the volume between preoperative and first postoperative (d 1) as well as preoperative and second postoperative (d 7) scans at both sides was segmented manually within the coDiagnostiX software. For the analysis of patient-centred outcomes, the bleeding, swelling, and pain parameters were postoperatively self-assessed from days 0–7 and documented on a 10-cm visual analogue scale (VAS) extending from 0 (no pain) to 10 (very severe pain). Furthermore, the need for additional pain medication was self-documented dichotomously (yes=Y/no=N) until postoperative day 7.

RESULTS

The experimental protocols were implemented as planned, with no modifications. Fifty patients with 100 interventions (split-mouth design: 50 interventions in experimental group (EG), 50 interventions in control group (CG) were included in the final analyses.

With regard to the primary outcome variable, an overall surgical site infection (SSI) rate (local inflammation or abscess) of 11% ($n=11/100$ cases) occurred, which means that an inflammatory rate of 6% ($n=3$) in the experimental group and 16% ($n=8$) in the control group, with no significant difference occurred between the groups ($p=0.200$). Abscesses with purulent secretion developed in two cases out of 100 observations, one in the EG and one in the CG.

The analogue measurements of swelling reflected an increase on day 1 and a decrease until day 7 in both groups without a significant difference between them ($p=0.942$; $p=0.574$), whereas values on day 7 were slightly higher compared with the baseline measurements. Concerning the digital assessment of swelling, neither at the first nor the second postoperative appointment did the face scan evaluation show any significant difference between experimental and control groups ($p=0.727$; $p=0.449$). The trismus parameter showed a similar trend with a decrease in the interincisal distance on day 1 and an increase until day 7 without a significant difference between EG and CG ($p=0.399$; $p=0.570$).

The three patient-centred outcome variables (bleeding, swelling, and pain) continuously decreased until postoperative day 7. However, a significant difference was observed with bleeding in the EG (day 0: $p=0.012$) postoperatively.

The self-assessment of pain medication intake resulted in no significant difference between the EG and CG at any postoperative time point.

CONCLUSION

This study demonstrated that prophylactic perioperative antibiotic treatment is not preferable to a placebo medicine, based on objective clinical and subjective patient outcome data.

Implications for practice

This trial has shown that preoperative prophylactic antibiotics for routine surgical removal of third molars in clean-contaminated sites, where no sign of local inflammation is present, generally seems unnecessary. To prevent overtreatment of patients and help reduce the worldwide consumption of antimicrobials, dentists should carefully weigh the individual risks and benefits before using antibiotics.

REFERENCE

1. Kirnbauer B, Jakse N, Truschnegg A, Dzidic I, Mukaddam K, Payer M. Is perioperative antibiotic prophylaxis in the case of routine surgical removal of the third molar still justified? A randomized, double-blind, placebo-controlled clinical trial with a split-mouth design. *Clinical Oral Investigations*. 2022 Oct;26(10):6409-21.

How to deal with patients who have unreasonable demands

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LM Sykes¹, TV Ntseke², F Gani³, MF Dasoo⁴

ABSTRACT

Dentists may find themselves ethically challenged when a patient demands treatment that they do not consider to be clinically indicated or in the patient's best interest. This paper debates possible ways in which such a situation could be handled by looking at the patient-related physical, and clinician-related ethical consequences of each. One option may be to concede to the patient's demands, but then have to live with the moral anguish and fear of the long-term repercussions. Another would be to refer the patient to a colleague in the hopes that they could change the patient's mind. A third approach may be to try educate the patient and hope this will lead them to accept the proposed treatment. Different approaches can be used, depending on the situation and the nature of the doctor-patient relationship. Some patients respond well to being given clear factual based information.

Others understand better with visual illustrations or by seeing before and after photographs. A slightly risky, but at times successful strategy is to use "what if" scenarios. The trick is to win the patient over in a convivial manner without offending them or insulting their intelligence. The ultimate aim is for the patient to receive the best possible treatment, and at the same time for the clinician to know they have acted according to the principles of best clinical practice as well as their own moral and ethical standards.

Author affiliations:

1. Leanne M Sykes: *BSc, BDS, MDent, FCD(SA), IRENSA, Dip Forensic Path, Dip ESMEA*, Head of Department of Prosthodontics, University of Pretoria. Orcid: 0000-0002-2002-6238
2. Tshegofatso V Ntseke: *BDT, BDS*, Department of Prosthodontics, University of Pretoria.
3. Fatima Gani: *BDS, MSc*, Department of Prosthodontics, University of Pretoria.
4. Mohamed F Dasoo: Final year students, Department of Prosthodontics, University of Pretoria.

Corresponding author:

Leanne Sykes
Email: Leanne.sykes@up.ac.za

Author contributions:

- | | |
|--------------------------|-----|
| 1. Leanne M Sykes: | 65% |
| 2. Tshegofatso V Ntseke: | 15% |
| 3. Fatima Gani: | 15% |
| 4. Mohamed Dasoo: | 5% |

INTRODUCTION

A 56-year-old patient presented to the clinic requesting a removable partial denture to restore the missing front teeth because he works with people. He was advised that he needed to replace missing teeth in all the edentulous spaces in his maxilla. Intra oral examination revealed a mouth with evidence of generalized failing dentition. All of his teeth were heavily restored, most of the restorations were unaesthetic and faulty, and there were residual roots in the 36 and 48 areas. Clinical



Figure 1. Panoramic radiograph taken in 2021



Figure 2. Panoramic radiograph taken in August 2022

records noted that broken down teeth and residual roots had been extracted from the 14 to 17 and 24 and 25 regions in the previous year (Figure 1).

He was adamant that no more teeth or roots be taken out. A new panoramic radiograph (Figure 2) revealed that in addition to all of the clinically evident defects, there was also generalized bone loss, peri-apical radiolucent areas around the 18, 13, 12 and 22 and that the crowns on the 26 and 27 were implant retained. Both fixtures had bone loss and probing depths of between 4mm and 7mm (distal of the 27), which appeared to be progressing. His mandibular anterior teeth all had badly discoloured and chipped veneers, with poorly fitting margins.

The patient was advised to have the 18, 22 and roots 36, 48 removed, and to have a periodontal assessment of the viability of the implants. Thereafter the necessary restorations would be done prior to fabricating a maxillary removable partial denture. He adamantly refused this suggestion and demanded that he only wanted a denture and that it must be made immediately because he “needed teeth for his work” despite the fact that his file stated that he was unemployed. No amount of explanations and advice regarding the incipient danger of leaving un-addressed pathology could sway his opinion. He became aggressive and said it was “his mouth and that the dentist must just do what he wanted to have done”. The clinician informed him that it would be clinically harmful, professionally reckless, and unethical to place dentures in his mouth and ignore all of the underlying pathology.

Ethical issues

The situation that will be discussed in this paper is not the same as that of a patient who wants complex treatment

but cannot afford it. Nor the type of scenario referred to in a previous paper¹ where the issue of failure to treat was discussed. In the former, the oral condition may be suitable for the restorative work, but circumstances hinder service provision. In the latter, the oral condition may not be optimal but the patient has no pain, is comfortable, and able to function adequately, and there are no signs of underlying infections or pathology, thus no dental interventions are undertaken.

In this case there is clear evidence of both incipient and overt pathology, yet the patient instructed the dentist to ignore these and only carry out the work he wanted. A handy guide for dentists to use before embarking on any treatment is to answer the following questions as suggested by Hartshorne & Hasegawa (2003) which can apply to both over and under-servicing².

Is the chosen treatment necessary?

- Is the proposed treatment based on good scientific and / or clinical evidence?
- Will the treatment benefit the patient?
- If treatment is omitted will it cause the patient any harm?
- Is treatment being done to serve the patient or for the clinicians own financial interest?
- Has the patient given informed consent?
- Perhaps, we need to add: Is the treatment, clinically justified and ethically correct?

Based on the above scenario and treatment consideration, there are various possible ways in which this situation may be handled, and will vary according to the circumstances as well as the personalities of the parties involved. Some possible options will be debated.

1. The dentist may concede to the patient's demands and perform only that treatment which the patients wants done immediately. At first glance this seems like the

easiest option. It requires very little treatment planning or preparatory work, can be carried out in a few short visits and will result in a happy patient. Some may defend their decision on the grounds that they had acceded to the patient's right to autonomy. They may also believe they will be free from blame providing the patient signed consent. However, can this stance be ethically justified? It goes against the core standards of good clinical and professional care.

A morally conscious dentist would not feel comfortable with this choice of treatment, and may carry the burden of guilt with them long after the patient has left their rooms. They may also suffer from fear and anxiety as they anticipate the inevitable adverse repercussions. They may also worry about how they will manage the situation when problems arise, or even worse, if the patient then went to another dentist with their complications.

This colleague, not knowing the full background history, would immediately have a poor opinion of the treating doctor and may even lay an accusation of malpractice. Clearly by choosing this option, the clinician is not providing beneficial therapy, nor removing harm, so in effect is not adhering to the principles of beneficence and non-maleficence³. This could be interpreted as a lack of ethical competency (moral competency), defined as "the sum of personal characteristics and capabilities of taking action according to the rules, principles and familiarities with ethical guidelines and laws"⁴.

Ultimately, the question to be asked is whether the added stress and mental anguish is worth the extra income. Legally, if the dentist agrees to the patient's unreasonable demands, even though they go against the rules of best clinical practice, would a signed consent form from the patient be a sufficient disclaimer if the treatment failed and the iatrogenic damage became evident. One may argue that the practitioner should have known better, and should thus have to face any legal ramifications. In addition, from a practical / business perspective, if the dentist concedes to the patient's demands and fabricates a denture, what would be considered a reasonable time period for which they should assume responsibility for the treatment? Furthermore, who would carry the financial costs for the follow up work needed if and when the denture failed? Medical aids have varying rules regarding the time frames for which they will pay for dentures. The patient would have to be alerted to the possibility that they will have to pay out of pocket if a new denture is needed in the near future.

2. A second option is to fall back on the "There is a patient for every dentist and a dentist for every patient argument" and tell the patient to go find a dentist who suits them better, and who is willing to carry out the procedures they desire. This solution will result in the clinician losing the patient (that may not be a great loss), and they could also lose other members of the patient's family or friends, depending on how the patient relays the story to them. The dentist can have a clear conscience that they have not acted unethically, however, have they acted in the patient's best interest? They can be almost certain the patient will shop around until they

find someone willing to treat them, and in so doing will ultimately suffer the same consequences of ill-advised therapy. In this situation, the dentist has done nothing wrong, but at the same time has not done anything to prevent the patient from suffering harm. Is that, or should that be his / her concern? Based on the integral model of patient care, they placed more emphasis on adhering to the ethical principles of beneficence and non-maleficence than on patient autonomy.

One would hope that they were not merely avoiding and deflecting a problem, but were ethically cognizant enough to realize that they could not handle the situation adequately. They may have hoped that a different practitioner would be able to engage with the patient in a different manner, and to ultimately still educate and counsel the patient into making an informed, evidence based and beneficial choice⁵. Should the patient display any signs of active infection, sepsis or pain, then the clinician would be obligated to address these immediately, irrespective of whether or not they were going to carry the case forwards.

There are a few subtle differences between private practice and public health services that should be noted. In the former setting it may be easier to refer the patient to another dentist should no amicably acceptable agreement be reached between the two parties. In the public health sector, the Patient's Rights Charter⁶ and the Batho Pele⁷ principles dictate that no patient can be denied access to health care services. However, is it ethical to give in to a patient who demands to have immediate attention, or one who wants treatment that goes against the clinician's opinion of best clinical practice? Such patients not only skip the waiting lists, but also make use of public funds and limited resources that may have been better used for a needier or deserving patient, who has a better long-term prognosis. These are issues that many doctors working in state facilities have to grapple with on a daily basis.

3. Ideally the dentist should try getting the patient to understand the situation fully. To this end they need to explain the current condition, offer possible treatment options, list the associated benefits and risks of each option (including time and financial cost implications), the anticipated long-term success rates for each, and "rescue" procedures that can be implemented in the event that the chosen plan fails. This would allow the patient to make an informed decision based on the best available evidence, using a "Shared decision making" approach. Their choice would be based on accurate and realistic expectations, and a better understanding of their situation, and be more aligned with their needs rather than their demands⁸.

However, this may be difficult to do if the interaction has already become heated. Sometimes it helps to move the conversation to another room where the atmosphere will still be perceived as being calm. The short reprieve during the move can also give both parties breathing space and help calm the mood. This gesture also illustrates to the patient that the clinician is willing to take time away from their busy chairside activities in order

to focus on them more fully. Each practitioner will have their own way of presenting the treatment options. Some may use academic terms and explanations, some may describe the clinical procedures and steps, while others could make use of photographs and illustrations.

When all attempts at a logical discussion have failed, the dentist could resort to using various “what if” scenarios. This is risky and success will depend on how well they have gauged the patient’s temperament. Subtle examples may work for some people, while overtly outlandish scenarios can help drive home the message in others. The trick is to not offend the patient’s intelligence with stories that are too bizarre (think of the popular television character Judge Judy). For example, a subtle illustration would be to tell them about patients who request to have their front teeth extracted/decorated/ mutilated because this is considered aesthetic in their community.

However, they ignore the damage and destruction these procedures have on the dentition. A more dramatic analogy could be to ask them, “What if a patient goes to a doctor and says please cut off my right hand because I want to get a disability pension”. Would you do this?” Sometimes such bizarre examples help lighten the tension and let the patient see that the advice is in their best interest and not because the dentist is being dogmatic or paternalistic.

CONCLUSION

Clinicians need to aim for a win-win situation where they will have fulfilled many roles including that of educating, counselling, acting in an ethical manner and also providing professional clinical treatment of the highest possible standards. At the same time the patient leaves satisfied that they were involved in the decision-making and have been provided with the most suitable treatment for their situation, and the dentist has peace of mind knowing they have done their best in this given situation.

REFERENCES

1. LM Sykes, A Jagathpal, C Bradfield, M Cronje. Is failure to treat a treatment failure? SADJ. October 2021;76(9):498-500.
2. Hartshorne J & Hasegawa TK. Over-servicing in dental proactive – ethical perspectives. SADJ. 2003;58(9):364-369.
3. Beauchamp TL & Childress JF. 1983. Principles of Biomedical ethics. Oxford University Press. ed. Oxford University
4. Ahmed A, Ali HS, Mahmoud MA. Prioritizing well-being of patients through consideration of ethical principles in Healthcare settings: Concepts and Practices. Sys Rev Pharm. 2020;11(5):643-648.
5. Varkey B. Principles of Clinical Ethics and Their Application to Practice. Med Princ Pract. 2021;30:17- 28.
6. National Patient's Rights charter, Health Professions Council of South Africa, Guidelines for good practice in the Health care professions, Booklet 3, Pretoria, May 2008.
7. Batho Pele principles, Health Professions Council of South Africa website, Annexure G, pg 135- 136,
8. Elwyn G, Frosch D, Thomson R, et al. Shared decision-making: A Model for Clinical Practice. J Gen Intern Med. 2012; 27(10):1361-1367
<http://www.hpcsablogs.co.za/wp-content/>

Maxillofacial Radiology 205

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C Smit¹, L Robinson²

CASE

A 5-year-old healthy female patient presented with a one-year history of a slow-growing swelling of the right mandible. The patient reported that the swelling was slightly tender. Intraoral examination revealed a grossly carious lower right primary molar (tooth 85). A panoramic radiograph showed bony expansion of the inferior mandibular border with a lamellated or 'onion-skin' appearance. The trabecular bone in the vicinity had a sclerotic appearance. What is your diagnostic hypothesis?



Fig. 1: Panoramic radiograph

INTERPRETATION

Chronic osteomyelitis with an associated periosteal reaction has been described under a multitude of different terms including Garrè's osteomyelitis, proliferative periostitis and periostitis ossificans.¹ Carl Garrè's publication of periosteal

new bone formation in a so-called 'onion-skin' pattern has forever linked his name to this condition.¹⁻³ Interestingly, Wood et al found that Garrè did not actually describe this type of osteomyelitis in his original publication.⁴ The term Garrè's osteomyelitis has however remained and is now synonymous with the more widely accepted term chronic osteomyelitis with proliferative periostitis.

Chronic osteomyelitis with proliferative periostitis usually affects young patients with a mean age of 13 years and a near equal gender predilection.^{1,2} Most cases arise in the molar-premolar region of the mandible, involving the lower border or buccal aspect in most instances.^{1,2} Common causative factors of this condition include dental caries with associated periapical inflammation, periodontal infection, fractures, and other nonodontogenic infections of the jaw bones.¹ The new subperiosteal bone formation represents a bony reaction to persistent low-grade inflammation in the region. The reason for the propensity of this condition

Author affiliations:

1. Chané Smit: *BChD, MSc (Maxillofacial and Oral Radiology)*, Department of Oral and Maxillofacial Pathology, University of Pretoria. ORCID: 0000-0003-4047-6356
2. Liam Robinson: *BChD, PDD (Maxillofacial Radiology), PDD (Forensic Odontology), MChD (Oral Path), FC Path (SA) Oral Path*, Department of Oral and Maxillofacial Pathology, University of Pretoria. ORCID: 0000-0002-0549-7824

Corresponding author: Chané Smit

Department of Oral and Maxillofacial Pathology, University of Pretoria.
Tel +27 (0)12 319 2311
Email: chane.smit@up.ac.za

Authors contribution:

Chané Smit: 50%
Liam Robinson: 50%

in young patients is likely related to the ease with which the periosteum may be separated from the bone. Additionally, this age group has a greater susceptibility to caries in the region of involvement.²

Radiographic examination shows bony laminations parallel to each other and to the cortical surface of the involved bone. The cortical bone is usually thickened and the adjacent jawbone usually appears normal.¹⁻³ Appropriate imaging may show an associated soft tissue swelling, resulting in facial asymmetry.^{1,3} The histopathological features are distinct, characterised by periosteal histopathologic layering of vital bone parallel to each other and the inferior surface of the bone.¹

The radiographic differential diagnoses list includes both benign and malignant conditions including osteosarcoma, Ewing's sarcoma, infantile cortical hyperostosis, callus formation, bony exostosis, and osteomas.^{1,3} Signs of malignant bony changes should be viewed with caution and necessitates an appropriate biopsy.²

Removal of the causative agent results in resolution of the infection with the eventual remodeling of the bone.^{1,2} Surgical recontouring may be performed in cases without spontaneous regression.³

Authors declaration

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Conflict of Interest

The authors declare that they have no conflict of interest.

Ethics approval

This study was approved by the University of Pretoria, Faculty of Health Sciences Research Ethics Committee (Reference no.: 587/2022). All procedures followed the ethical standards of the Helsinki Declaration of 1975, as revised in 2008.

REFERENCES

1. Tong AC, Ng IO, Yeung KA. Osteomyelitis with proliferative periostitis: an unusual case. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 2006 Nov 1;102(5):14-19.
2. Nortje CJ, Wood RE, Grotepass F. Periostitis ossificans versus Garré's osteomyelitis: Part II: Radiologic analysis of 93 cases in the jaws. *Oral surgery, oral medicine, oral pathology*. 1988 Aug 1;66(2):249-260.
3. Belli E, Matteini C, Andreano T. Sclerosing osteomyelitis of Garré periostitis ossificans. *Journal of Craniofacial Surgery*. 2002 Nov 1;13(6):765-768.
4. Wood RE, Nortjé CJ, Grotepass F, Schmidt S, Harris AM. Periostitis ossificans versus Garré's osteomyelitis. Part I. What did Garré really say?. *Oral surgery, oral medicine, oral pathology*. 1988 Jun 1;65(6):773-777.

CPD questionnaire



This edition is accredited for a total of 3 CEUs:
1 ethical plus 2 general CEUs

GENERAL

In-vitro comparison of bonding time and strength of adhesive pre-coated and standard metal orthodontic brackets

- Choose the CORRECT answer.
 - The APC Flash-Free adhesive system was introduced in 1990.
 - Transbond XT bond shear bond strength is significantly lower than APC Flash-Free.
 - Thermocycling results in a decrease in shear bond strength.
 - According to Reynolds, the minimum shear bond strength required for clinical success should be in the range of 4 to 7 MPa.

Social Media and Dentistry

- Which of the following options is CORRECT. Social media sites are useful in dentistry when used for:
 - As a teaching and learning platform for students and practicing clinicians
 - Improving service strategies and marketing
 - Uploading pictures depicting clinical scenarios with intention to gloat about a clinician's skills, work, or capabilities
 - A & B
 - None of the above

Select the CORRECT statement. A clinician may upload a patient case and photos online when:

- Select the CORRECT statement. Stress amongst dental students:
 - It is an interesting case and the patient's details are blocked out
 - For teaching and educational purposes
 - To share and discuss with their fellow colleagues and/ or specialist
 - When the patient has given informed consent
 - All of the above
- Which of the following statements is CORRECT. The most common social media platform(s) used are:
 - Instagram
 - Facebook
 - LinkedIn
 - Twitter
 - Options B, C & D are correct

- Choose the CORRECT answer. Social media used as a marketing tool is useful because it:
 - Is a cost-effective way to advertise to gain more patients
 - Gives potential patients reassurance that their condition can be successfully treated
 - Allows advertising of special deals/promotions offered by a dental practice
 - Allows effective online social communities to build strong professional relationships with clients/patients
 - All of the above
- Select the CORRECT statement. Social media when employed as an educational tool is useful because it:
 - Encourages interactive learning amongst students and academic staff, and dentists
 - Can be used to engage with its target audience and is used for health promotion
 - Can influence the minds of people in need of good dental treatment
 - Allows dental students and practicing clinicians to keep up to date with the current literature and new advancing technology and techniques
 - All of the above

Self-reported oral health status: Perspectives of patients undergoing therapy for cancer of the head and neck region, in the eThekweni District, KZN

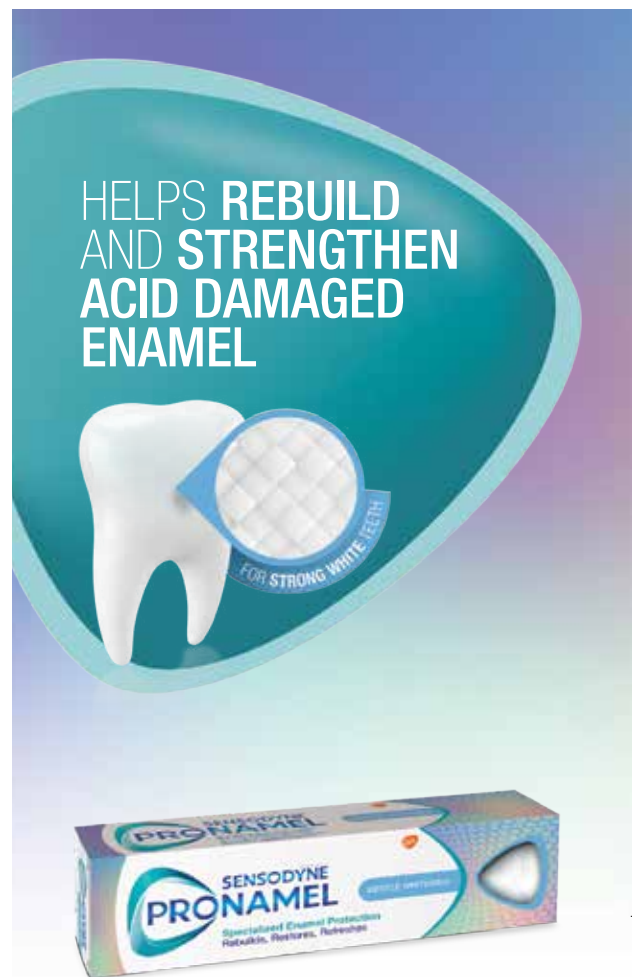
- Select the CORRECT statement. Head and neck cancer includes:
 - Pharynx, larynx, paranasal sinuses and nasal cavity and minor and major salivary glands
 - Pharynx, larynx, paranasal sinuses and nasal cavity and minor and major salivary glands, oral cavity ear, skin and neck
 - Pharynx, larynx, minor and major salivary glands, oral cavity ear, skin and neck
 - None of the above
- Choose the CORRECT answer. Oral assessment and support for patients with cancer of the head and neck can contribute to
 - Overall quality of life
 - Better health outcomes
 - Early identification for oral health intervention
 - All of the above

9. Select the CORRECT answer. The study findings indicated that
- Laryngeal cancer was three times more common in males (n=40; 17%) than in females (n=13; 5.5%).
 - Laryngeal cancer was three times more common in females (n=40; 17%) than in males (n=13; 5.5%).
 - Laryngeal cancer was less common in younger males (n=40; 17%) than in females (n=13; 5.5%).
 - None of the above
10. Which is the CORRECT answer. The most common cancer reported in this study was
- Laryngeal cancer
 - Oral cancer
 - Oesophageal cancer
 - All of the above
11. Choose the CORRECT answer. Some of the perceived symptoms included
- Dry mouth (xerostomia),
 - Sticky saliva,
 - Altered taste,
 - Difficulty in opening the mouth
 - All of the above
- Evaluating the oral health knowledge, attitude and practice among undergraduate students and staff at selected Federal University in Imo State, Nigeria**
12. Select the CORRECT option. Teeth should be cleaned using
- Hard toothbrush
 - Cotton wool
 - Soft-bristle toothbrush
 - Soap and water
13. Which answer is CORRECT. Oral check-up should be done every
- 2 years
 - 1 year
 - 6 months
 - 1 month
14. Which option is CORRECT. Which among this constitute a barrier to dental visit
- Fear of dentist
 - Fear of hospitals
 - Fear of nurse
 - Fear of drugs
15. Select the CORRECT answer. Oral disease is more prevalent in the following
- Developed countries
 - Developing countries
 - Countries in Europe
 - Countries in America
16. Which of the following is CORRECT. Which of the following is the function of fluoride in toothpaste
- Prevent tooth decay
 - Serves as a flavoring agent
 - Use to humectant
 - Use as a colouring agent
- What's new for the clinician – summaries of recently published papers**
17. Select the CORRECT option. The Struppek et al study used data from an existing study. This is referred to as
- Primary data collection
 - Secondary data collection
 - Tertiary data collection.
 - Quaternary data collection
18. Choose the CORRECT finding from the Struppek et al study
- Researchers found a significant association between low coffee consumption and periodontitis
 - Researchers found a significant association between moderate coffee consumption and periodontitis
 - Researchers found a significant association between strong coffee consumption and periodontitis
 - Researchers found no association between coffee consumption and periodontitis
19. Select the CORRECT answer. In the Kirnbauer et al split-mouth trial, choose the correct protocol in terms of who received antibiotics
- Patients received both the antibiotics and the placebo 3 months apart
 - Some patients received only antibiotics
 - Some patients received only placebo
 - Patients received both the antibiotics and the placebo 6 months apart
20. Which of the following options is CORRECT. In the Kirnbauer et al trial, the overall surgical site infection (SSI) rate was
- 6% in the experimental group and 16% in the control group ($p < 0.05$)
 - 6% in the experimental group and 16% in the control group ($p > 0.05$)
 - 16% in the experimental group and 6% in the control group ($p < 0.05$)
 - 16% in the experimental group and 6% in the control group ($p < 0.05$)

CPD questionnaire

Ethics: How to deal with patients who have unreasonable demands.

21. Choose the CORRECT answer: Under servicing in dentistry refers to:
- Carrying out treatment that is not necessary
 - Only doing emergency treatment
 - Doing treatment that is not clinically justified
 - Doing less treatment than the patient wants
 - Doing less treatment than the patient needs
22. Which of the following is CORRECT. Autonomy refers to:
- The patients right to get the treatment they want
 - The patients right to be treated immediately
 - The patients right to not pay for emergency treatment
 - The patients right to decide whether to accept proposed treatment
 - All of the above
23. Select the CORRECT option. Good clinical practice requires a dentist to:
- Carry out treatment of a high standard
 - Not do treatment that may cause harm
 - Actively remove possible harm
 - Only a and b
 - All of the above
24. Choose the CORRECT answer. A dentist who does not agree with a patient's desires may:
- Not refuse to treat them
 - Refer them to another clinician
 - Not charge for a consultation if no work was done
 - Ignore them and still do the work they think is needed
 - Refer them to the dental school
25. Which of the following is CORRECT. Patient education does not necessarily include discussing:
- Advantages and disadvantages of each option
 - Long term prognosis of each option
 - Time and cost implications of each option
 - How painful each option will be
 - Possible consequences of no treatment



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 3. Final approval of the version to be published, AND
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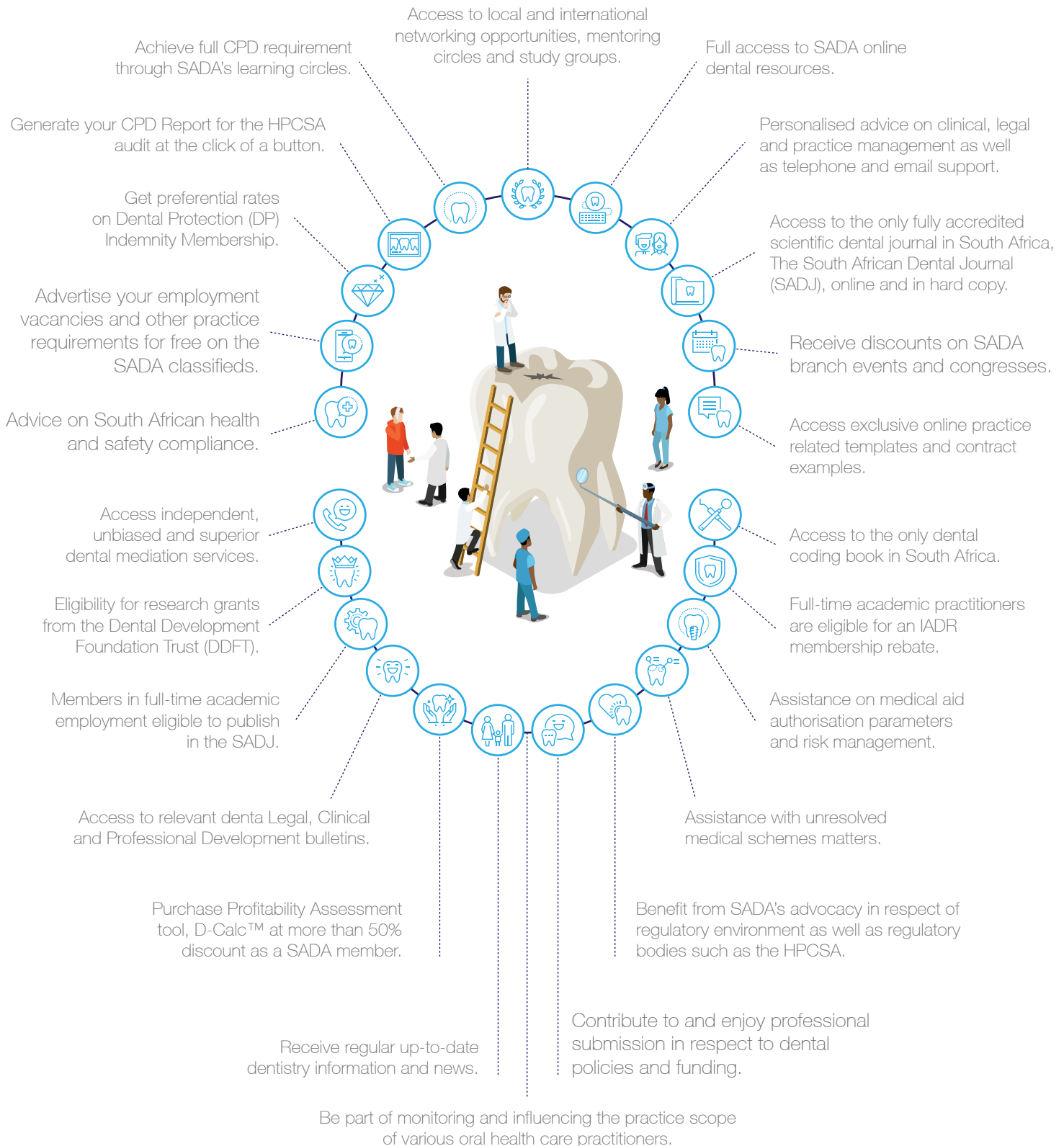
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