Turtles and tortoises, both reptiles, belong to the family Testudines or Chelonia, the significant difference being that tortoises are strictly land animals, the turtles mainly living in water. Teeth … they have none, but an egg tooth, a caruncle, helps the infants to escape from the egg… and disappears a few months later. All have beaks with sharp edges… and the Leatherback sea turtle (Dermochelys coriacea) has a terrifying array of sharp spines called papillae lining the mouth and oesophagus… not real teeth but still frightening to behold and very effective in holding slippery prey like jellyfish.

Source: Encyclopaedia Brittanica
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Most people would see this as a straight line. The rare ones have the ability to turn it into a heartbeat.
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Mens sana in corpore sano

Head Office has made a far reaching decision… all staff are registering to take part in the 702 Walk the Talk scheduled for 23rd July. Encouraged by the CEO, there is much debate about which shoes to wear, how long a walk to select… KC Makhubele is leading the pack and no doubt his squash playing activities will ensure a fine performance on the walk. For the rest of us… well, perhaps better walking shoes may help!

Mens sana in corpore sano …. a healthy mind in a healthy body.

The issue truly revolves around this maxim which we have inherited from … NOT Rome! Would it have associations with the ancient Greek Games? NO. Fascinating it is to realise that the use of the motto with the focus on exercise has its origins in England! John Hulley found a sentence written by the poet Juvenal: “Orandum est ut sit mens sana in corpore sano.” The sentiment seemed appropriate and John used the last five words as a motto for his Liverpool Athletic club. That was in 1861. Juvenal had not in fact been considering sport at all, the full sentence may be translated as “ A man should pray for a healthy mind in a healthy body. ” So the abbreviated sentence has now assumed a relevance to sports enthusiasts all over the world. It was particularly apt for the nineteenth century educationalists at English boarding schools where there was dual emphasis on not only the intellectual aspects but also a thorough exposure to physical training.

Prince Phillip attended a School which exemplified the philosophy “health mind, healthy body”. Gordonstoun School in Elgin, Northern Scotland, still claims with pride that their emphatic programme of academie and challenging physical demands is designed to satisfy their motto: Plus est en vous…. There is more in you. That spirit and motivation thoroughly imbues the profession of Dentistry. We are fortunate indeed to be engaged in an occupation which so completely combines the physical and the intellectual. The attributes of excellence in Dentistry depend upon a high degree of comprehension of the intricacies of the physiology, the anatomy, the psychology, the psyche of our patients. But that must be supported by a physical commitment by the Dentist to attain comprehensive skills in manual dexterity. The efficacy of that combination contributes to the enormous satisfaction of knowing that a case has been managed with full attention having being given to the interwoven aspects of planning and delivery.

An outstanding opportunity to enhance capabilities in both these spheres will be grasped by attendance at the forthcoming Congress of the Dental Association of South Africa, August 4 to 6 in Cape Town. The programme is comprehensive, well befitting the maxim that the skilled exercise of the physical delivery of treatment is to be matched by an in-depth knowledge of the concepts, the structure, the nature of the techniques, materials and philosophies. The extreme pace at which technology in Dentistry has advanced, and continues to do so, demands of every practitioner the need to maintain contact. The paradox is that whilst more procedures become computer controlled, whilst the dental laboratories become more involved in each case, the clinician continues to hold prime responsibility. That responsibility can be met only by the practitioner who is well versed in all aspects, who holds both the knowledge and the skills. Congress attendance contributes effectively to ensure those attributes.

Whilst the 2017 Congress offers opportunities for delving into the intricacies of virtually every aspect of Clinical Dentistry, there are no sessions dedicated to physical fitness. Is that a problem? It is that issue which is central to this Editorial for this is perhaps the easier side of the equation for individuals to satisfy. We have progressed to a sit down practice… were our forebears more healthy because they pumped a pedal-driven drill whilst standing?
There are simple options to help gain degrees of fitness.

- Walk!! Recommended 10,000 steps a day!! Impossible you say… purchase a pedometer to discover!
- Walk faster
- Eschew motor vehicles and walk
- Do not sit for longer than 30 minutes at a time
- Keep moving.. when on the telephone (easy with a mobile)!… when at the computer, stretch, move the head from side to side
- Breathe deeply .. have you seen the Blitsbokke at their half-time breathing?
- Use the stairs

Yes, KC, our CEO, has it right…. Mens sana in corpore sano

But let’s look further at Juvenal.. he was a satiric poet but here are some of his thoughtful words:

It is to be prayed that the mind be sound in a sound body.
Ask for a brave soul that lacks the fear of death,
which places the length of life amongst nature’s blessings,
which is able to bear whatever kind of sufferings,
does not know anger, lusts for nothing and believes
the hardships and savage labours of Hercules better than
the satisfactions, feasts, and feather bed of an Eastern king.
I will reveal what you are able to give yourself:
For certain, the one footpath of a tranquil life through virtue.
Juvenal. The Sixteen Satires.

Will we see you at Walk the Talk?

---

**OBITUARY**

**Dr Harry G de Wet**

10 September 1963 - 21 May 2017

Sadly Dr Harry de Wet passed away on Sunday 21st May in a light aircraft crash.

Harry was the beloved husband of Gail, a devoted and proud father of Chris and Natalie, a colleague and friend to Dr Piotr Kalebka, Leanni Shaefner, Robynne Linklater and Dr Steven Kingsley and a respected and well-loved dentist to his patients.

Affectionately known as "The Gentle Giant". Harry was devoted to his patients and would always go the extra mile for them, even working on public holidays or flying back from family holidays to see to an emergency.

Harry qualified with a BDS from Wits in 1988 and later a qualification in Implantology from the University of Stellenbosch.

He served two years in the Defence Force before moving into private practice, where he became known for his clinical excellence in general dentistry, orthodontics and implantology.

Whenever possible, Harry would escape the busy dental surgery for the African bush or to indulge in his absolute passion, ..flying his Piper Arrow or his beloved Yak, known by many of us as his mistress.

Harry epitomised the sentiment of the words of the poem *Impressions of Pilot* by Gary Claude Stoker:

"Flight is freedom in its purest form"

He will be sorely missed by his family, friends, colleagues and his staff.

**MAY HIS SPIRIT SOAR FREELY WITH THE EAGLES.**

Robynne Linklater

---
The last two months has seen frantic activity at Head Office with National Council meeting and my visits to some Branches where I had an incredible opportunity of meeting and addressing members at Branch level. I have started dealing with most issues that have been raised at these meetings.

The debate around the National Health Insurance (NHI) has been in the spotlight with unions condemning recent overtures made by the National Department of Health about consideration of a multi-payer system. This follows hot on the heels with the Director-General Ms Precious Matsoso meeting with leaders of the medical industry, to solicit them as part of the NHI process instead of the single fund (NHI Fund).

The Department of Health appears to have done a U-turn on its plan to scrap Medical Aid Schemes, saying they should instead work with the State when it rolls out National Health Insurance. This is in stark contrast to the White Paper of NHI that provided a hard line view that they should provide complementary cover only and would not be permitted to provide cover for conditions covered under the NHI. It would appear that the DG is requesting schemes to investigate NHI options cover in their plans. Until a proper funding model is released by Government, where the role of Medical Schemes will be clarified, we will not know. Government has also not given any indication on when it will finalise the NHI funding model.

In the meeting, the DG of Health made different suggestions on how the Government may have to work with the private sector, such as subsidising medical aid options for people who could not afford them. Finer details of a partnership, however, were not discussed.

The month of April 2017 also saw the Professional Board for Dental Therapy and Oral Hygiene issue amendments to the regulations, providing now for registration of currently unregistered and unqualified dental assistants within six months of 7 April 2017 and prescribing that they should write the Board examinations within two years from date of registration. A detailed SADA communique was sent to members with application forms, study preparation guide and links to past examination papers. Members will be reminded every month for the next six months, to ensure advantage is taken of this period. Members are urged and requested to use this opportunity to have their dental assistants registered.

The demarcation regulations came into force on 1 April 2017; this is intended to clearly define the business of a Medical Scheme versus that of Health Insurance. The regulations are seen by many as a preparation for the full introduction of NHI. Many insurance products such as limited gap cover and hospital plans were intended to allow poorer people access to healthcare after the introduction of the Medical Schemes Act, 1998.

The demarcation regulations are an interference in mutually agreed private contracts between freely consenting adults and insurers to minimise the risks of huge medical bills when catastrophe strikes. We have already decreasing dental benefits from most plans offered by Medical Schemes which choose to pay for basic dentistry and limited specialised procedures. The distinction between the two is primarily based on funding and not on any clinical rationale.

The SA Dental Technicians Council also introduced the new Dental Technology Professions Bill which overhauls the entire Dental Technicians Act and introduces enabling provisions for the introduction of denturists. It will severely limit the rights of dentists to choose technicians, to determine the use of technology to manufacture artificial prostheses, and will limit the business models available to the dental profession. It also seeks to limit the right of dental traders to trade freely by requiring their registration and will limit import and export of artificial teeth, prostheses etc. The Bill also gives the technicians the right to claim from patients and Medical Schemes without the dentist being clinically satisfied with the prostheses. We are not entirely certain whether there are enough edentulous patients to make denturism sustainable in the longer term or whether it will indeed assist the poorest as is being advocated.
A journalistic achievement of the highest order

Consider this, the mandate is to produce an intelligible, informative and authoritative report on a clinical scenario, and a deadline is set of perhaps three weeks. Now do that once, then again, and yet again, and the next realisation is that there have been 150 deadlines met, 150 cases reported, 150 sets of radiographs and clinical photographs, 150 cameo presentations of enormous clinical import for practitioners. In a nutshell, that is the story of our series on Maxillo-Facial and Oral Radiography.

Curly Nortje, Christoffel Johannes Nortje, has in this issue, May 2017, scored a century and a half of continuous contribution, month by month, to the Maxillo-Facial and Oral Radiological series. And what a series it has been, covering the broadest spectrum of diseases and conditions affecting the oral and maxillo-facial region. Professor Nortje has delivered to us his wealth of experience and expertise, based on an extensive commitment to his special area of interest. In turn he has sparked the interest of countless colleagues, who have become so much more aware of the need for careful radiological investigations and knowledgeable diagnosis. The MFO Radiology Case arrives timely each month, the CPD questions invariably attached, and Professor Nortje ensures that a high standard is maintained in all aspects. He is indubitably a world expert and fortunate indeed is South African Dentistry to have such acumen available in every issue of the SADJ.

This is an absolutely remarkable effort... if not unique. I am confident that when Curly first embarked on this series he had no concept of what commitment he was making. We are all the beneficiaries of his marvellous dedication.

The Journal records sincere appreciation to Professor Nortje and our congratulations on reaching such a significant milestone. We look forward to many more Maxillo-Facial and Oral Radiology cases.

I am personally most indebted to Curly, he is indeed a stalwart supporter!

Editor
**SUMMARY**

**Introduction:** Pacifiers used by toddlers and young children are susceptible to contamination by microorganisms. Effective methods of disinfection are required to prevent oral infections. There are limited studies on pacifier disinfection in South Africa.

**Aim:** To investigate the efficacy of four pacifier disinfecting agents.

**Methods:** Two groups of 80 pacifiers each were contaminated with a standardized suspension of either *Staphylococcus epidermidis* or *Candida parapsilosis*. Each group was subdivided into four sub-groups, and severally disinfected with 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse (chlorhexidine), Brushtox®, apple cider vinegar and sterile distilled water (control), followed by microbiological analysis. Data were analyzed using the Kruskal Wallis Anova test.

**Results:** Chlorhexidine and Brushtox® were statistically similar in eliminating the fungi from pacifiers (p>0.05). Statistically significant differences were noted between the effects of chlorhexidine and Brushtox® compared with that of apple cider vinegar for both test organisms (p=0.0001). Statistically significant differences were observed in the efficacies of disinfection between chlorhexidine, Brushtox®, apple cider vinegar and sterile distilled water (p=0.00089).

**Conclusion:** Chlorhexidine and Brushtox® were equally effective in eliminating both *S. epidermidis* and *C. parapsilosis* from silicone pacifiers. Apple cider vinegar was the least effective disinfecting solution.

ACRONYMS

- **PBS:** Phosphate buffered saline
- **SDA:** Sabouraud dextrose agar

**Key words:** Pacifier, *Candida parapsilosis*, *Staphylococcus epidermidis*, 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse, Brushtox®, Apple cider vinegar.

**INTRODUCTION**

Pacifiers are used to calm crying babies. However, prolonged contact between the pacifier nipple and the oral microflora leads to the development of microbial biofilms. In addition, children usually drop their pacifiers to the floor, exposing them to a wide range of microorganisms. Children who suck pacifiers over a long period of time are deemed more likely to develop dental caries and periodontal disease.

The use of pacifiers has been associated with inflammation of the middle ear in children, childhood caries, viral and yeast infections. The advantages of using pacifiers include improving sleep and reducing the risk of sudden death in the first six months of life. In addition, pacifier use helps in controlling pain from minor procedures, especially in infants up to six months of age.

*Candida parapsilosis* is one of the fungi most frequently isolated from human hands. The organism is a well-known cause of nosocomial bloodstream infections in children and is associated with a 10% mortality rate and 17–50% of fungemia in children. A study by Silva *et al.* examined epithelial infection with *C. parapsilosis* on reconstituted human oral epithelium. The organism was found to induce significant tissue damage to the oral epithelium.

*C. parapsilosis* can form biofilms on pacifiers and has been shown to be the most frequently-isolated organism from pacifiers after *Staphylococcus* genera. Isolates of *C. parapsilosis* have been found to form biofilms on both latex and silicone pacifiers, with the latter more resistant to this colonization.

*Staphylococci* have been reported to colonize the oral cavity and dental plaque, which may serve as...
potential reservoirs for transmission to other body sites. Staphylococcus epidermidis was the second most prevalent bacterium in the saliva of hospitalized individuals. This organism was previously regarded as a harmless commensal microorganism on the human skin; however it has been reported as an important opportunistic pathogen most prevalent in the periodontal pocket and oral cavity in patients with chronic periodontitis. S. epidermidis has also been reported as a predominant agent associated with Infective Endocarditis.

When the microbial contamination of pacifiers was assessed, Staphylococcus was found to be the dominant genera present, with S. epidermidis being one of the species isolated. Aerobic microorganisms, including small quantities of S. epidermidis, have been identified on the surface of the pacifiers of children with acute otitis media, and also on previously used pacifiers.

Used pacifiers can retain various kinds of microorganisms. However, there are limited studies worldwide on pacifier disinfection methods and on their efficacy in reducing contamination. Pacifiers confer many advantages and the aim should not be to discourage their use, but rather to ensure that they are rendered disinfected and safe to use. None of the previous studies have tested the efficacy of apple cider vinegar in the disinfection of pacifiers. Apple cider vinegar is a solution of acetic acid produced by fermentation of apples and has easy application, low cost and low toxicity.

The aim of this study was to investigate the efficacy of 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse solution, Brushtox® and apple cider vinegar removed S. epidermidis from all of the pacifiers. The Brushtox® and chlorhexidine were both successful in removing C. parapsilosis from all of the pacifiers. All pacifiers contaminated with C. parapsilosis and treated with apple cider vinegar remained contaminated (Figure 1). The control sample, treated with sterile water, remained contaminated.

The chlorhexidine and Brushtox® were statistically similar in the elimination of C. parapsilosis and S. epidermidis from pacifiers (p>0.05). There were statistically significant differences when chlorhexidine and Brushtox® were compared with apple cider vinegar in their relative efficacy in disinfecting pacifiers contaminated with S. epidermidis and C. parapsilosis (p<0.0001). Statistically significant differences were observed in disinfection efficacy between all the solutions when the control, sterile distilled water, was included in the analysis. (Table 1).

**MATERIALS AND METHODS**

**Study population and methodology**

The study was conducted at the University of the Witwatersrand, Johannesburg, South Africa, approval having been obtained from the Human Research Ethics Committee (Medical) (Certificate WJ-CJ-130916-2). C. parapsilosis (ATCC 22019) and S. epidermidis (ATCC 12228) were used in the study. One hundred and sixty new silicone pacifiers (Golden Baby, CKT Tek Co. Ltd, New Taipei, Taiwan) were used, divided into two groups of 80. The two groups were soaked, respectively, in standardised inocula (150x10^6 cfu/ml) of either C. parapsilosis and S. epidermidis for 5 minutes. The contaminated pacifiers were randomly divided into four sub-groups of 20 each. These were severely sprayed on three occasions with 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse solution (Sunstar Americas, Inc, Ontario, Canada), or with Brushtox® (Dentox Ltd., Warwick, England), or 5% apple cider vinegar (Instant Trading Co. (Pty) Ltd, Durban, South Africa) or sterile distilled water.

**Microbiological evaluation**

Aseptic conditions were followed in transferring and suspending the contaminated pacifiers in 20ml of sterile phosphate buffered saline (PBS) for two minutes, followed by vortexing for microbial cell detachment. Dilutions of 10^-1, 10^-2 and 10^-3 were prepared in sterile PBS from the initial suspension, and 0.1 ml of each dilution was plated on 5% blood agar to recover S. epidermidis and on Sabouraud Dextrose agar (SDA) for C. parapsilosis recovery. The SDA and 5% blood agar plates were incubated at 37°C for 48 hours. On conclusion, the number of colonies in each plate represented a measure of the presence of organisms.

**Data analysis**

Data were analysed using the Kruskal-Wallis ANOVA test. Statistical significance was set at the 5% significance level.

**RESULTS**

The 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse solution, Brushtox® and apple cider vinegar removed S. epidermidis from, respectively, 70%, 50% and 65% of the pacifiers. The Brushtox® and chlorhexidine were both successful in removing C. parapsilosis from all of the pacifiers. All pacifiers contaminated with C. parapsilosis and treated with apple cider vinegar remained contaminated (Figure 1). The control sample, treated with sterile water, remained contaminated.

The chlorhexidine and Brushtox® were statistically similar in the elimination of C. parapsilosis and S. epidermidis from pacifiers (p>0.05). There were statistically significant differences when chlorhexidine and Brushtox® were compared with apple cider vinegar in their relative efficacy in disinfecting pacifiers contaminated with S. epidermidis and C. parapsilosis (p<0.0001). Statistically significant differences were observed in disinfection efficacy between all the solutions when the control, sterile distilled water, was included in the analysis. (Table 1).
Oral Rinse solution and Brushtox® were equally effective in removing Streptococcus mutans. A recent study confirmed previous reports that chlorhexidine gluconate was effective in removing this organism from toothbrushes used by kindergarten children.24 In contrast, a recent study reported that chlorhexidine gluconate was effective in removing C. parapsilosis from toothbrushes and has now been shown to also be effective in disinfecting silicone pacifiers. Our results are in agreement with previous studies, where C. parapsilosis was found capable of adhering to silicone pacifiers.2,13

This is another cause for concern as this organism can cause fungemia in children11 and induce significant tissue damage on the oral epithelium.12

Apple cider vinegar is a solution of acetic acid produced by fermentation of apples. This solution is cheap as compared with 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse and Brushtox®, and is widely available in South African markets. The current study shows apple cider vinegar to be the least effective solution when compared with 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse and Brushtox® for eliminating both S. epidermidis and C. parapsilosis.

All pacifiers treated with sterile water exhibited a high number of C. parapsilosis and S. epidermidis colonies. This study corroborates findings of previous studies where sterile water was found to be not at all effective in eliminating pacifier contamination.1,2,21,23,31

The current study used new pacifiers, which may be a limitation, as used, worn out pacifiers may have provided more appropriate environments for microorganisms to flourish.

CONCLUSIONS

Brushtox® was as effective as the 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse solution in eliminating C. parapsilosis and S. epidermidis from silicone pacifiers, whilst apple cider vinegar was the least effective disinfecting solution.

There is considerable importance in the effective disinfection of pacifiers.28

DISCUSSION

Pacifiers become contaminated with various microorganisms which may lead to systemic and oral diseases.3,11,16 However, currently little attention has been given to the disinfection of pacifiers.20-23

In this study the efficacy of 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse, Brushtox® and apple cider vinegar were investigated for the disinfection of pacifiers contaminated with S. epidermidis and C. parapsilosis.

S. epidermidis has been detected on pacifiers and the current study confirms previous reports that S. epidermidis can adhere to silicone pacifiers.18,19 However studies on removal of this organism from pacifiers are not documented, hence comparisons are not possible. In the study under report, chlorhexidine was as effective as Brushtox® in removing S. epidermidis from pacifiers. This finding is in accord with a recent study, in which it was shown that chlorhexidine gluconate was effective in removing S. epidermidis from toothbrushes used by kindergarten children.24 In contrast, a recent study reported S. epidermidis strains that were resistant to chlorhexidine.25

The chemical was found to be effective in also removing Streptococcus mutans from silicone pacifiers.21,22 These results highlight reasons for concern, since this organism is associated with chronic periodontitis and infective endocarditis. Chlorhexidine is considered the gold standard rinsing agent for controlling dental plaque,26 and the current study and above-mentioned studies confirm its efficacy also in the disinfection of pacifiers.

Studies on the use of disinfection methods for the removal of C. parapsilosis from pacifiers are also not documented. In attempting to address this gap, this study found that the 0.12% GUM® Paroex™ Chlorhexidine Gluconate Oral Rinse solution and Brushtox® were equally effective in removing C. parapsilosis from pacifiers. This finding differs with a recent in vivo study where Brushox® was less effective than 0.12% chlorhexidine for the disinfection of pacifiers contaminated with Streptococcus mutans.27 A study by Nelson-Filho et al., also reported Brushox® to have lower efficacy when compared with Periogard chlorhexidine solution against the formation of S. mutans colonies on the toothbrush bristles.28 Brushox® is an antiseptic toothbrush cleanser for disinfecting contaminated toothbrushes28 and has now been shown to also be effective in disinfecting silicone pacifiers.28

Conflict of interest: None declared.
References


ABSTRACT

The majority of the uninsured population in the Western Cape, estimated at about 4.5 million, are dependent on public dental clinics. Dental caries remains the most common chronic disease world-wide. Caries experience among 6-year-old children in the province increased from 82% to 84% in the period 2002 – 2015. Oral health programmes to promote good oral health at schools and clinics are very limited. A cross-sectional study investigated 128 dental clinics in the Western Cape to determine the availability of the basic oral health care package, which includes promotion of oral health, preventing oral disease and basic oral health treatment. Less than a third (31.5%) offered the basic treatment package and slightly less than two thirds (65%) were only offering dental extractions. Despite clear policy guidelines, public dental care delivery in Western Cape is seen to be not adherent to the guidelines, norms and standards. There is an unavailability of dentists outside the main clinics and it appears there is a minimal focus on oral disease prevention and promotion of good oral health. Dental caries must be recognized as an epidemic in the Western Cape, and basic oral health care should be made available.

BACKGROUND

About 4.5 million persons in the Western Cape have no dental insurance and must rely on public dental clinics simply because they do not have the financial means to consult a private dentist. There are approximately 130 public dental clinics in the Western Cape at which it may be expected that a basic oral health package should be offered. This service would include promotion of oral health, preventing oral disease and basic oral health treatment including an oral examination, bitewing radiographs, simple 1-3-surface restorations, and dental extractions. The majority of the clinics may not be sufficiently equipped to offer even that basic package.

Nevertheless, several good policy documents point the way for improved oral health delivery in the public sector. These include the Norms and Standards for Oral Health Care in SA, National Oral Health Strategy and the National Oral Health Policy.

INTRODUCTION

Dental caries remains worldwide the most common chronic disease. According to the last National Children Oral Health Survey conducted in 1999 – 2002 the caries experience among 6-year-olds stood at 82.3%. This figure was much higher than the national mean of 50%.

Recent data from the Oral Health Service in the Province indicates that the caries experience amongst this age group has increased to 84%. It is a priority for a dentist in the public sector to attend to patients with pain and sepsis. These patients are finally driven to seek help, and at that stage, the most feasible treatment option is to extract the tooth in order to relieve the pain. There are many pre-school children who suffer from tooth ache associated with dental caries and in some instances they are treated under general anaesthetic. A study conducted in the Western Cape by Peerbhay & Barrie (2012) showed that only 0.0001% of all treatment done in the public sector on pre-school patients under general anaesthesia were for dental restorations while 99.94% were for extractions. The mean number of teeth being extracted per patient was 10.

Children with poor oral health are 2.3 times more likely to perform poorly in school and yet oral health programmes to promote good oral health in the school setting and at clinics are very limited. Indeed, there is an uncertainty regarding the degree of availability of these services in the public sector.

This paper reports on a study conducted in 2014 which aimed at establishing the availability of the basic oral health care package in the Western Cape.
MATERIAL AND METHODS

A cross-sectional study was conducted to describe the availability of the basic oral care package in the Western Cape (Figure 1). The study included 128 dental clinics (93% of all clinics) and interviews were conducted with 60 dentists, that is 88% of all dentists employed by Government of the Western Cape. Available National and Provincial policy guidelines were used as a reference point to determine which procedures should be included in the basic package. Telephones were used to administer a questionnaire in the collection of data. The most recent census data was used to calculate dentist population ratios.

Aim

To determine the availability of basic oral health care offered through the Provincial Dental Clinics in the Western Cape.

Objectives

- To determine the proportion of clinics that offer the basic oral health care package
- To calculate oral health professional: population ratio for each district
- To determine the number of days per month the clinic is visited by a dentist
- To ascertain work time distribution of dentists
- To investigate oral health promotional programmes and oral disease prevention activities offered in the public sector
- To investigate reasons for difficulties in delivery of services.

Data analysis

Data was recorded on a customized data capture sheet on Microsoft Word 2010® and the statistical analysis was completed on Microsoft Excel 2010® and Epi Info 7. A variety of statistical tests was used e.g. Student’s t-test for means and Chi-square test for proportions. Statistical level of significance was determined as p < 0.05.

Ethical considerations

- The research proposal was approved by the Senate and Faculty Research Ethics Committee of the University of the Western Cape (13/3/4) as well as by the Research Ethics Committee of the Government of the Western Cape (RP 042/2014).
- Participation was on a voluntary basis.
- The identity of the participants remained anonymous at all times.
- A signed informed consent form was obtained from all participants.

RESULTS

The proportion of clinics offering the basic oral health treatment package

Less than a third (31.5%) of all clinics offered the basic treatment package (Figure 2) and just under two thirds (65%) were offering dental extractions only. Less than half (43%) were able to offer a scale & polish and/or fillings while bitewing radiographs could be taken at only 30% of clinics. Fissure sealants which are essential to dental caries prevention were done at only 37% of clinics. The Metro health district had the best record in the province with almost half of the clinics being able to offer the basic package compared with only 17% in the West Coast district.

There was an association between the ability to offer the basic package and clinic type (p < 0.005). Main clinics were defined as a clinic at which the dentist was based and the presence of the dentist could be guaranteed at least for a portion of the day. Satellite clinics were usually more remote and visited infrequently by a dentist; once a week, twice a week or on a monthly basis. Main clinics were 4.5 times more likely to offer the basic package compared with Satellite clinics (Risk Ratio = 4.5). Only 15% of Satellite clinics could offer the basic package compared with 68% of Main clinics (Figure 3).
There was an association between the ability to offer the basic package and geographic location of the clinic (p < 0.009). Metro clinics were located in the Metro Health District which resembles the City of Cape Town. Rural clinics were defined as clinics situated outside the Metro Health District. Metro clinics were 2.5 times more likely to offer the basic package compared with Satellite clinics (Risk Ratio = 4.5). Only a quarter of Rural clinics could offer the basic package while at least half of all the Metro clinics could deliver those services (Figure 4).

**Dentist: population ratio**

In the present study, the dentist: population ratio for the Western Cape was calculated for each district (Table 1). The ratio for the whole province was 1: 71 875 (Table 1). The two districts having the highest proportions of population were Metro (1: 80 429) and Eden (1: 72 069). These ratios are all far from the recommended ratios as stipulated in the National Oral Health Strategy (2005), that document recommending figures of 1:60 000. The current study found that there is a shortage of 13 dentists, 18 Oral Hygienists and 43 dental assistants in the Province.

### Table 1: Dentist: Population ratios in the Western Cape

<table>
<thead>
<tr>
<th>District</th>
<th>Dentists</th>
<th>Uninsured population</th>
<th>Dentist : Population ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro</td>
<td>38</td>
<td>3 056 296</td>
<td>1 : 80 429</td>
</tr>
<tr>
<td>West Coast</td>
<td>5</td>
<td>263 385</td>
<td>1 : 52 677</td>
</tr>
<tr>
<td>Cape Winelands</td>
<td>10</td>
<td>596 646</td>
<td>1 : 59 565</td>
</tr>
<tr>
<td>Overberg</td>
<td>4</td>
<td>198 613</td>
<td>1 : 49 653</td>
</tr>
<tr>
<td>Eden</td>
<td>7</td>
<td>504 483</td>
<td>1 : 72 069</td>
</tr>
<tr>
<td>Central Karoo</td>
<td>1</td>
<td>53 422</td>
<td>1 : 53 422</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>4 671 844</td>
<td>1 : 71 875</td>
</tr>
</tbody>
</table>

**Availability of dentists at public clinics**

The availability of dentists at various clinics was ascertained by recording the number of days in a month that a dentist was physically present at the clinic (a maximum of 20 days). The mean number of days that a dentist is present overall at clinics is 7.3 days (SD = 7.8) per month. There was a significant difference between professional attendances at Main and Satellite clinics (p < 0.0005). At Main clinics, a dentist was present for 16.6 days compared with Satellite clinics where dentists were present for only 3.2 days per month.

**Working time distribution**

Working time was measured by the number of hours in a normal working day (8 hours/100%) that the dentist rendered services at the relevant Main clinic (where the dentist was based). Working time was further categorized into performing dental extractions, fillings, other clinical services, administrative duties, or driving to nearby schools or clinics.

The mean time per day which was dedicated to dental restorations was 2.06 hours which represented 26% of a working day and in this instance there was no significant difference between Metro and Rural clinics. Half of the time (3.78 hours) in a working day was dedicated to performing dental extractions and there was a significant difference between Metro and Rural clinics (p < 0.05). Dentists from districts dedicated a larger proportion of the working day to extractions compared with the Metro clinics. The mean time per day allocated to administrative duties was 1.34 hours and there was no significant difference in this aspect of work between dentists from Metro and Rural clinics. The mean time per week which was taken up in driving to surrounding clinics and schools was 1.8 hours and there was a significant difference between dentists from Metro and Rural clinics (p < 0.0005). Dentists who were working in the Rural districts spent more time driving to schools and Satellite clinics compared with dentists in the Metro clinics.

**Oral promotion & prevention**

Almost two thirds of dentists visited schools at least once a year to render oral health services which were mostly dental screening. Only 20% of dentists visited baby clinics annually while 15% visited creches (Figure 5). The “Road to Health” chart/booklet for infants and young children is a national instrument which is used to monitor growth and development of an infant and young child. On certain days a special clinic (baby clinic) is scheduled for infants and toddlers to monitor their growth and development. Page 20 in the booklet is dedicated to oral health and can be completed by a dentist, dental therapist or an oral hygienist. The majority of dentists have knowledge of the oral health page but only 47% actually completed it at least once per year.
Factors contributing to unavailability of the basic package

Whilst the majority of dentists do have access to a government vehicle to use in visits to Satellite clinics and surrounding crèches, these are not always readily available.

The time required to repair or replace dental equipment is an essential component in the consistent provision of the basic oral health care package. The mean equipment repair time was three weeks and the mean time of acquiring new dental equipment was seven months. There was no significant difference between metro and rural clinics regarding equipment replacement/repairing times (p > 0.05).

Waiting times for appointments for dental treatment under general anaesthesia, dental restorations and general waiting time for patients at the dental clinic were also included in the study. The mean waiting time for a dental patient from arrival at the clinic until contact with a clinician was 1.5 hours. The waiting time for an appointment for treatment under general anaesthesia (GA) for a child was three months. The mean waiting time for an appointment for dental fillings was three weeks.

According to the study, dentists indicated that the basic package could not be offered at clinics for various reasons. A major obstacle was unavailable equipment including dental chair light, suction, dental material, film and radiograph developer. A shortage of oral health staff and poor working environments were further problems, given that at some clinics dentists were working on a plastic or ordinary desk chair and sharing a surgery with other professionals, resulting in a lack of privacy.

The most common main complaint of patients was pain and sepsis, resulting in the majority of treatments being dental extractions. However, some participants also mentioned that the community demanded extractions instead of restorations.

Time constraints due to high numbers of patients or extensive travel distances also played some role in limiting the variety of dental care which could be offered.

DISCUSSION

Activities involving oral health promotion and prevention of oral disease are essential components of basic oral health care as stipulated by National Oral Health Policy documents.

A comprehensive oral health plan had been approved by the Provincial Minister in 2007.1 In this planning document, specific recommendations for basic oral health care were made in terms of instrumentation, equipment and infrastructure requirements for public dental care. As yet, it has not been implemented due to limited resources.1 In March, 2014, a policy document, “Healthcare 2030 – The Road to Wellness”, was issued by the Provincial Government of the Western Cape.11 The Oral Health chapter in this document alludes to the importance of oral conditions, the oral health services platform which require strengthening, a focus shift from curative services towards preventive and promotion services and the role of the Oral Health Centre in the provision of outreach and support to District Health services. There is also mention of the community-based services designed to support Integrated School Health Programmes and home-based care services.12 These platforms should be used to drive supervised tooth brushing strategies, in conjunction with services from the Department of Basic Education as well as Social Development.

The present study also showed that the line of reporting from dentists to their managers also seemed problematic. Participants indicated that they report to the Primary Health Care Practitioner of a health sub-district. This person is usually a nurse who is not familiar with oral health procedures and the scope of clinical practice of the different oral health professionals. Procurement for dental instrumentation and equipment is channelled through this officer and often dentists experience frustration as the requirements and standards of a public dental clinic are not always appreciated. Dental statistics and work load requirements are also managed by the Primary Health Care Practitioner. This often leads to further frustration among dentists when headcounts and the number of extractions are regarded as the main indicators for the delivery of oral health services. There is considerable scientific evidence that these statistics are inaccurate indicators for measuring the quality of oral health services.13 Logically, oral health services should surely be managed by an oral health professional.

The dentist: population ratio in South Africa is extremely low compared with other middle income countries.14 The National Policy for Oral Health in South Africa suggested that the dentist: population ratio should be 1 : 15 000, as calculated from the National Oral Health Survey 1988/1989.14 That ratio has changed dramatically to a suggestion that there should be one dentist for 60 000 people.2 According to the most recent National Policy documents the oral health professional: population ratios should be as follows:

- Oral Hygienist: Population 1: 100 000
- Dental Therapist: Population 1: 60 000
- Dentist: Dental Therapist 1: 5
- Dental Therapist: Oral Hygienist 5 : 1

These ratios are questionable since no scientific evidence justified the recommended ratios. The question should also be asked whether these ratios are still applicable to the public sector today, recognising the effects of urbanisation and the rising prevalence of dental caries. Ratios of oral health clinician: population should preferably be calculated through utilising the needs/ services and demand-based approach. These calculations are dependent on DMFT-scores which are specific for different age groups.15 A serious case can be made for the need to appoint a specialist in Community Dentistry to assist the Provincial Government with policy development, economic evaluation, epidemiological surveillance, statistical analyses and the management of oral health services. The lack of specialist services outside the Oral Health Centre is contributing to escalating waiting lists, the inability to apply epidemiological and statistical trends and the escalating burden of oral disease in the Western Cape. Other dental specialist groups such as Orthodontics, Oral Pathology, Prosthodontics, Periodontics and Maxillo-Facial and Oral Surgery are also restricted to the Oral Health Centre. These specialists have a main focus on tertiary clinical services, research and post-graduate teaching and learning. Consideration should therefore be given to the ap-
pointment of dental specialists at selected regional and district hospitals to enable the provision of equitable oral health specialist care to public patients.

**CONCLUSION**

The majority of public dental clinics in the Western Cape are unable to offer basic oral health care and about two thirds of clinics restrict services to extractions. The most recent Provincial Policy document, “The Road to Wellness” and the National Oral Health Strategy document describe the picture of oral health care for the future as well as proposing the structure and system to address oral health inequities. However despite these clear policy guidelines, public dental care in Western Cape is found to be not adhering to these norms and standards. The socioeconomic and psychological factors of oral disease are also being ignored. Infrequent visits at Satellite clinics by dentists emphasize unavailability of professionals outside the Main clinics. Infrequent visits to schools and crèches and the poor completion rate of the oral health page in the Road to Health booklet highlight a minimal focus on oral disease prevention and on the promotion of good oral health.

Basic Oral health should be regarded as a human right deserved by each South African, not only the 16% of the population who have access to private health care. Managers and decision makers should implement existing health strategies to prevent oral disease and promote good oral health.

The availability of basic oral care is essential, exemplified by the rising prevalence of dental caries amongst children. Furthermore, it is time that dental caries must be recognized as an epidemic in the Western Cape. It is a disease affecting the majority of society and it restricts the quality of life. Recognition of oral health issues and making basic oral health care generally available is essential to address the oral health problems in the Western Cape.

**References**

ABSTRACT

Introduction: Preventive dental services are required to reduce the burden of caries and oral disease in children.

Objective: To assess the efficacy of three, as opposed to one, oral health education lessons in influencing the oral health related behaviour and knowledge in Grade 5 learners.

Study Design: Cluster randomized controlled trial.

Methods:
Participants: Ten public primary schools (5 intervention, 5 control) in Verulam; 337 grade 5 learners in each arm.
Control arm: Viewing of an oral health education video.
Intervention arm: As above repeated at three month intervals over nine months.
Randomisation: At cluster level; schools randomly assigned to intervention and control arm after consent was obtained from individual participants; therefore participants remained blinded to which arm of the study they were assigned.

Results: A significant improvement in oral health knowledge and practice was noted for both groups after the intervention (p < 0.05). However, the intervention group returned significantly better results compared with the control for all categories except toothbrush ownership, brushing frequency and knowledge of when to replace toothbrushes.

Conclusion: Repeated education resulted in significant improvements in the knowledge and oral health behaviour of learners compared with the responses after one oral health lesson.

INTRODUCTION

Dental caries is the most common childhood disease, affecting between 60 and 90% of all five-year olds throughout the world, negatively impacting on the quality of life of the child, restricting activities, reducing ability to learn and increasing the frequency of absenteeism from schools.1,2 Children with caries may need emergency dental visits or even hospitalization, which impacts on the parents’ financial wellbeing, including time taken off work.2

The shortage of oral health professionals and fully equipped dental facilities in the public sector limits the availability of treatment services.3 Emergency relief of pain and sepsis is the most commonly performed clinical procedure at primary oral health care facilities.3,4 The burden of unmet treatment need can be significantly lowered by efforts to promote oral health and prevent the development of caries.4 Insufficient emphasis is placed on basic primary preventative oral health care and oral health education which would reduce the need for curative treatment among children at primary school age.1 In 2001, the South African (SA) Department of Health (DoH) proposed that at least 50% of all primary schools should be participants in organized preventive programmes by 2004.5 However, school-based oral health education programmes are erratic in distribution and implementation, and lack regular follow up and formal evaluation.3,6

According to data of the Health Professions Council of South Africa (HPCSA) there were 5320 registered dentists in 2010, but only 828 (15%) were working in the public sector.5,7 However, only 9.7 million (18%) of the 51 million people in SA8 were insured by private medical aids and therefore had access to private dental care.9,10
Most South Africans then are obliged to rely on the public sector for dental care, with a ratio of 1 dentist per 50 000 population compared with 1 dentist per 1800 population in the private sector. The inequitable distribution of dentists exacerbates the severity of the impact on the community of oral disease.

High income countries that have invested in preventive dental services have shown a reduction in the prevalence of oral disease and consequently report savings in curative dental expenditure. Most low and middle income countries (LMICs) however have made less investment in oral health care and resources are primarily allocated to emergency relief of pain related to oral disease. In some LMICs it is estimated that the cost of conservative treatment of dental caries alone would exceed the total health care budget available for children. Poor communities are unlikely to prioritize oral health care unless adequately educated on the associated values and benefits.

In SA, school attendance is compulsory from grade 1 to 9, or until age 15 years. School enrolment in grades 1 to 7 in 2012 was 99% of children of eligible age. The classroom therefore provides an ideal platform to deliver oral health education. Scholars are the most receptive age-group when seeking to improve sustainable oral health related behaviours. The earlier these habits are instilled, the more likely they are to last life-long. However, oral health messages need to be reinforced if a long lasting impact is to be ensured. Learners are also important channels for the further dissemination of health promotion messages to their families and community. A single oral health education intervention by a dentist or oral health worker was shown to improve oral hygiene practice for up to six months.

The purpose of this study is to assess the efficacy of reinforced oral health education lessons on oral health related behaviour and knowledge in grade 5 learners as opposed to the effect of a single oral health education lesson.

METHODS

A cluster randomized controlled trial was used in government-funded primary schools in the town of Verulam, South Africa.

Multi-stage sampling was conducted. A simple random sample of 10 of the 13 eligible schools was chosen. The principals of these 10 selected schools provided ‘gate-keeper’ permission for participation in the study. The sample was then randomised to five intervention and five control schools. All schools had either two or three Grade 5 classes. In schools with two Grade 5 classes, both classes were enrolled, and in schools with three Grade 5 classes, two of these were randomly selected. Age and sex were not selection criteria.

A total of 339 learners from five schools were enrolled into the control group and 337 learners from five schools comprised the intervention group.

The minimum effective sample size required for this cluster randomized trial to retain equivalent power to an individually randomized trial was 628. The intra-class correlation coefficient (determined from the pilot study) and the average cluster size were used to calculate the design effect. The effective sample size was calculated by dividing the total possible number that could be enrolled into the study by the design effect.

Intervention

The grade 5 learners of the five intervention schools were instructed on basic oral health education by viewing a five minute video produced by Colgate®, covering instruction on correct brushing and flossing techniques, basic knowledge on toothpaste use, when and how often to brush, when to replace toothbrushes and when to visit a dentist. The video was screened on a television set or a projector was used, depending on the school’s facilities. Either the investigator or the teacher handled the projection as no special skills or training were required for this method of administering oral health education. In the intervention group, the video showing was repeated at three month intervals over a period of nine months; i.e. August 2013, November 2013 and February 2014. A register was taken on each intervention day to ensure all enrolled learners were present at every screening of the video.

Learners in the control schools received instruction on oral health education, via the same video, once only at the start of the study.

No discussion was held following any viewing of the video to avoid any bias.

Data collection

The same standardized, anonymous questionnaire was used at baseline and at the end of the study (nine months later) for both the control and intervention groups to collect data on basic demographics of learners, oral health knowledge and practices. Pre-intervention data was collected from both groups in August 2013 and post-intervention data was gathered in May 2014. The intervention group exposed to repeated viewing received the last intervention in February 2014.

Data analysis

Nominal and categorical data were captured and analysed using Microsoft Excel. Frequencies for demographic variables, oral health knowledge and behaviour were calculated. Outcomes were measured as the mean difference between groups (mean of control schools post intervention minus mean of intervention schools post intervention). The paired t test was used to assess whether any of the mean differences between the control and intervention for each variable were statistically significant (p < 0.05).

Ethical considerations and permissions

The Biomedical Research Ethics Committee of the University of KwaZulu-Natal granted ethical approval for the study (BE308/12). Authority was obtained from the KwaZulu-Natal Department of Education to approach the principals of selected schools to seek their ‘gate-keeper’ permission for their schools to participate in the study. Parents/guardians of all learners from the selected classes were sent participant information letters explaining the nature and purpose of the study prior to commencement of the study. Learners who returned signed consent from their parents were enrolled. Consent was obtained prior to allocation therefore ensuring concealment of randomization. All learners in the selected classes provided verbal assent to participate in the study.
RESULTS

The study sample comprised 676 learners from Grade 5 classes in ten primary schools, enrolled from amongst a total of 1075 learners in 13 eligible schools in the study area. Two learners from the control were lost to follow up due to non-attendance on the intervention day. There was no loss to follow up in the intervention group. The final analysed study sample consisted of 674 learners, 337 control and 337 intervention, and these numbers were commensurate with the minimum effective sample size (Figure 1).

The baseline characteristics of the 337 participants in the control and 337 participants intervention group were compared (Table 1). There were 169 (51%) females analyzed in the control group from five schools and 188 (56%) females in the intervention group from five schools. There was no significant difference in gender distribution between the control and intervention groups (p = 0.12).

The age range of learners in Grade 5 at baseline in the control group was from 10 to 14 years and from 9 to 14 years in the intervention group. The mean age of learners was 10.9 (SD 0.9) years in the control group and 10.7 (SD 0.8) years in the intervention group with a median of 11 years for both groups. There was no statistical difference in age between groups (p = 0.99).

Learners reported on the number of employed family members in their homes as a crude measure of economic background. There was no statistical difference between the groups at the start of the study, p = 0.33, with a mean of 1.8 (SD 1.1) employed householders and a median of two.

Learners’ oral health practices and knowledge were compared pre- and post-intervention and between the control and intervention groups at the end of the study (Table 2). At the start of the study, 326 (96%) learners from the control group and 315 (93.5%) of the intervention group owned their own toothbrush. Significantly more learners owned their own toothbrush at the end of the study in both groups (p = 0.02 for control and p < 0.01 for intervention). There was no significant difference in toothbrush ownership between the control and intervention at the end of the study (p = 0.15).

In the control group 281 (83%) of learners reported brushing their teeth daily, 55 (16%) brushed occasionally and 3 (0.9%) did not brush. The control showed significant improvement in brushing practice after intervention with 293 (86%) brushing daily, 44 (13%) brushing occasionally and 2 (0.6%) never brushing (p < 0.01). At the start of the study in the intervention group 277 (82%) brushed daily, 51 (15%) brushed occasionally and 9 (2.7%) did not brush, while after the intervention 328 (97%) brushed daily, 9 (2.7%) brushed occasionally and none reported never brushing (p < 0.01). The intervention group showed significantly better brushing practice habits post-intervention compared with the control group (p < 0.01).

At the start of the study, 257 (76%) learners from the control group and 273 (81%) from the intervention knew they should be brushing twice daily, however only 224 (66%) from the control and 207 (61%) from the intervention actually performed the ritual. At the end of the study significantly (p < 0.01) more learners in both groups were aware and actually practiced twice daily brushing, than at the beginning. There was no significant difference between the groups regarding frequency of brushing practice at the end of the study (p = 0.28), however in the intervention group significantly (p < 0.01) more learners knew at the end of the study how often they should brush compared with the control.

Both groups revealed significant improvement in knowledge of brushing duration after intervention (p < 0.01), and the intervention group had significantly better results compared with the control (p < 0.01).

With regard to brushing technique, both groups showed significantly better knowledge of the correct technique as compared with the start of the study (p < 0.01) and the intervention group recorded significantly better results than did the control group (p < 0.01).

At the start of the study 96 from the control and 103 from the intervention knew how to floss. After the intervention, 189 from the control and 336 from the intervention knew how to floss (p < 0.01).
<table>
<thead>
<tr>
<th></th>
<th>Control n (%)</th>
<th>Intervention n (%)</th>
<th>Significance Control vs Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before After</td>
<td>p</td>
<td>Before After</td>
</tr>
<tr>
<td>Toothbrush ownership</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has own toothbrush</td>
<td>326 (96.0)  329 (97.0)</td>
<td>0.02</td>
<td>315 (93.5)  330 (97.9)</td>
</tr>
<tr>
<td>Shares toothbrush</td>
<td>9 (2.7)</td>
<td>7 (2.0)</td>
<td>10 (2.9)</td>
</tr>
<tr>
<td>No toothbrush</td>
<td>4 (1.3)</td>
<td>3 (1.0)</td>
<td>12 (3.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brushing practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brushes daily</td>
<td>281 (82.9)  293 (86.4)</td>
<td>&lt;0.01</td>
<td>277 (82.2)  328 (97.3)</td>
</tr>
<tr>
<td>Brushes sometimes</td>
<td>55 (16.2)</td>
<td>44 (13.0)</td>
<td>51 (15.1)</td>
</tr>
<tr>
<td>Doesn't brush</td>
<td>3 (0.9)</td>
<td>2 (0.6)</td>
<td>9 (2.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of brushing practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brushes twice/more a day</td>
<td>224 (66.1)   239 (70.5)</td>
<td>&lt;0.01</td>
<td>207 (61.4)  243 (72.1)</td>
</tr>
<tr>
<td>Brushes once a day</td>
<td>113 (33.3)   98 (28.9)</td>
<td></td>
<td>125 (37.1)  94 (27.9)</td>
</tr>
<tr>
<td>Never brushes</td>
<td>2 (0.6)</td>
<td>2 (0.6)</td>
<td>5 (1.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of frequency of brushing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Should brush twice/more per day</td>
<td>257 (75.8)   323 (95.3)</td>
<td>&lt;0.01</td>
<td>273 (81.0)  335 (99.4)</td>
</tr>
<tr>
<td>Should brush once a day</td>
<td>43 (12.7)</td>
<td>16 (4.7)</td>
<td>31 (9.2)</td>
</tr>
<tr>
<td>Unsure how often one should brush</td>
<td>39 (11.5)</td>
<td>0</td>
<td>33 (9.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of duration of brushing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Should brush for 2min or more</td>
<td>201 (59.3)  285 (84.1)</td>
<td>&lt;0.01</td>
<td>200 (59.3)  326 (96.7)</td>
</tr>
<tr>
<td>Should brush for &lt;1min</td>
<td>28 (8.3)</td>
<td>37 (10.9)</td>
<td>49 (14.5)</td>
</tr>
<tr>
<td>Unsure how long to brush</td>
<td>110 (32.4)   17 (5.0)</td>
<td></td>
<td>88 (26.1)   0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of correct brushing method</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In circles</td>
<td>109, 32.1</td>
<td>171 (50.4)</td>
<td>109 (32.3)</td>
</tr>
<tr>
<td>Side to side/ up and down</td>
<td>208 (61.4)   166 (49.0)</td>
<td></td>
<td>201 (59.6)  28 (8.3)</td>
</tr>
<tr>
<td>Unsure of correct brushing method</td>
<td>22 (6.5)</td>
<td>2 (0.6)</td>
<td>27 (8.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of flossing technique</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knows how to floss</td>
<td>96 (28.3)   189 (55.8)</td>
<td>&lt;0.01</td>
<td>103 (30.6)  336 (99.7)</td>
</tr>
<tr>
<td>Doesn’t know how to floss</td>
<td>243 (71.7)  150 (44.2)</td>
<td></td>
<td>234 (69.4)  1 (0.3)</td>
</tr>
<tr>
<td>Possession of floss</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has floss</td>
<td>106, 31.3</td>
<td>113 (33.4)</td>
<td>124 (36.8)</td>
</tr>
<tr>
<td>Doesn’t have floss</td>
<td>233, 68.7</td>
<td>226 (66.6)</td>
<td>213 (63.2)</td>
</tr>
<tr>
<td>Flossing practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular flossing</td>
<td>80, 23.6</td>
<td>92 (27.2)</td>
<td>115 (34.1)</td>
</tr>
<tr>
<td>Never flosses</td>
<td>259, 76.4</td>
<td>247 (72.8)</td>
<td>222 (65.9)</td>
</tr>
<tr>
<td>Knowledge of toothbrush replacement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When bristles lose shape or every 2/3 months</td>
<td>303 (89.4)  334 (98.5)</td>
<td>&lt;0.01</td>
<td>300 (89.0)  336 (99.7)</td>
</tr>
<tr>
<td>Toothbrushes need never be replaced</td>
<td>36 (10.6)</td>
<td>5 (1.5)</td>
<td>37 (11.0)</td>
</tr>
<tr>
<td>Knowledge of amount of toothpaste use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Pea sized” amount</td>
<td>64 (18.9)   176 (51.9)</td>
<td>&lt;0.01</td>
<td>67 (19.9)  272 (80.7)</td>
</tr>
<tr>
<td>A “brush length” amount</td>
<td>141 (41.6)  140 (41.3)</td>
<td></td>
<td>139 (41.2)  64 (19.0)</td>
</tr>
<tr>
<td>Unsure</td>
<td>134 (39.5)  23 (6.8)</td>
<td></td>
<td>131 (38.9)  1 (0.3)</td>
</tr>
<tr>
<td>Knowledge of frequency of dentist visits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every 6 months</td>
<td>108 (31.9)  199 (58.7)</td>
<td>&lt;0.01</td>
<td>82 (24.3)  307 (91.1)</td>
</tr>
<tr>
<td>Once a year</td>
<td>36 (10.6)</td>
<td>53 (15.6)</td>
<td>55 (16.3)</td>
</tr>
<tr>
<td>When toothache occurs</td>
<td>109 (32.1)  76 (22.4)</td>
<td></td>
<td>122 (36.2)  3 (0.9)</td>
</tr>
<tr>
<td>Unsure</td>
<td>86 (25.4)</td>
<td>11 (3.2)</td>
<td>78 (23.1)</td>
</tr>
</tbody>
</table>
the technique (p < 0.01), the intervention group having significantly better results than the control (p < 0.01). Significantly (p<0.01) more learners from the intervention group possessed floss at the end of the study compared with the control. Both groups showed significantly more learners flossing than at the start of the study (p < 0.01 for both groups), whilst the intervention group had significantly more learners flossing than the control, post-intervention (p < 0.01).

Both groups showed significant improvement in knowledge as to when to replace their toothbrushes compared with pre-intervention (p < 0.01 for both). There was no significant difference between the two groups at the end of the study (p = 0.05).

After the intervention significantly more learners in the intervention group 272 (80.7%) compared with the control 176 (51.9%) knew the correct amount of toothpaste to apply when brushing (p < 0.01). In the intervention group, significantly (p < 0.01) more (91% vs. 59%) learners knew how often they should visit a dentist compared with the controls at the end of the study.

DISCUSSION

In South Africa, the vast majority of the population (84%) rely on public services for dental care. However, due to poorly distributed and inadequately equipped facilities, dental treatment is generally limited to emergency relief of pain and sepsis. Given that situation, it becomes important to enhance efforts to reduce the incidence of dental caries by implementing preventive oral health education and care programmes.

The school environment encourages the development of life skills, self-esteem and improved health-related behaviour and is an apt setting for oral health promotion in children. The DoH did set a goal that 50% of all schools should receive oral health promotion programmes by 2004. However, subsequent studies reported that such programmes have been fragmented and lacked proper evaluation for appropriateness was lacking.

The study used a strategy of randomized cluster sampling. Ideally in randomized controlled trials, clusters of children are randomised and results of studies assessing the effect of health promoting schools on oral health indicators compared with non-supportive schools is defined as “one that constantly strengthens its capacity as a healthy setting for living, learning and working”. In these studies, oral health education was given repeatedly and resulted in better knowledge and brushing habits and consequently a reduced caries incidence.

Information related to correct tooth-brushing and flossing techniques are not as frequently or well described in the media and advertising and hence the most significant effects of the study are evidenced in these outcomes.

STUDY LIMITATIONS

The measurement instrument in this study is self-reported behaviour. As there were no oral examinations conducted on learners, there is no evidence that the improvements noted in oral health knowledge are causally associated with better oral hygiene as assessed by plaque and bleeding indices or a reduction in untreated caries. Oral health promotion in this circumstance was conducted in isolation and not in collaboration with general health promotion. No measure of cognitive abilities of participants was assessed at the start of the study. It was assumed that all participants would be of similar cognitive function having passed the previous grade.

CONCLUSION AND RECOMMENDATIONS

The study provides clear evidence that repeated oral health education results in improved oral health knowledge and behaviour; however the effect on caries status and oral hygiene has not been clinically assessed. Future studies should include oral examinations in testing the efficacy of different intervention strategies. Oral health promotion should be included as part of general health promotion. The results of this study are also encouraging in that the method of oral health education delivery allows the opportunity for task shifting, although this was not the objective of the study. This is useful given the scarcity of dental manpower resources in the public sector in SA.

An inference may be drawn from the study that the World Health Organization's HPS model may be a promising concept for implementation in South African primary schools as it recognizes the need for continued support through education, creation of a healthy environment and provision of health services.
References


Continuous education on diabetic patients presenting for procedural sedation: a refresher to prepare for your case

The mainstay of treatment of Type 1 diabetics is a combination of insulin. This is available as bolus, or short acting types that are usually taken around meals, with a shorter onset and peak effect. Basal, or longer acting insulins are injected once or twice daily and act on the back-ground level of glucose, especially that released from the liver. Oral therapy is the treatment of choice for Type 2 diabetics. Some Type 2 diabetics can also be treated with a combination of oral therapy and insulin.

Surgery itself, fasting and anxiety around the procedure, can trigger a stress response, resulting in higher levels of counter regulatory hormones (catecholamines, cortisol, glucagon and growth factor), causing excessive release of inflammatory substances such as cytokines.

New evidence suggests that all diabetic patients undergoing surgery should have a recent HBA1c-value (taken less than six weeks prior to surgery). HBA1c levels of greater than 7% have been proven as an independent risk factor for wound complications. The Society for ambulatory anesthesia consensus statement on perioperative blood glucose management in diabetic patients undergoing ambulatory surgery suggests that the HBA1c level, additional co-morbidities and the risk of the surgery proposed should all be taken into account when planning the anaesthetic.
The ideal blood glucose target on the day of surgery remains uncertain despite extensive research. Van den Berghe et al. proved in their landmark research of the critically-ill patient, that hyperglycemia is harmful in the peri-operative setting, increasing morbidity and mortality in this patient group.10 However, tight glucose control has been associated with hypoglycemic episodes.11 Further evidence shows that variable glucose levels in the peri-operative period itself is associated with detrimental biochemical effects and can be harmful.12,13 Khan et al. suggest that practitioners should, despite the lack of evidence of a precise target level, remain focused on general goals, such as: the avoidance of hypoglycemia, prevention of ketoacidosis or hyperosmolar states, maintenance of fluid and electrolyte balance and avoidance of marked hyperglycemia.2

On the day of the surgery blood glucose is typically done by point-of-care testing, and should be measured before, at least two-hourly during the procedure (in case of long procedures) and afterwards during the recovery period. Hypoglycemia should be treated promptly, according to standard guidelines.

Stepwise strategies should be adapted into regular practice to minimize fluctuations of blood glucose levels, and to avoid episodes of hypoglycemia, hyperglycemia and other complications that hinder patients from returning to their normal treatment strategies.3

Steps suggested by Vann et al.10 include:

Step 1: Assessing the patient’s diabetes: type, medication and degree of control. The patient’s ability to manage their diabetes as well as their motivation to maintain good control should guide the treatment goals.

- All information on treatment type, dosages, recent HBA1c as well as fasting and pre-meal values
- Occurrence and frequency of hypoglycemic episodes as well as the symptoms experienced, or the lack thereof.

Step 2: Carefully explained instructions to the patient: The treatment plan should involve clear instructions on the dosing of their medication the evening before, as well as on the day of surgery, as well as fasting guidelines.

- New evidence suggests the importance of continuation of basal insulin, with the dose depending on the type and duration of surgery, as well as the time of day and amount of missed meals.
- The Society for Ambulatory Anesthesia Consensus suggests preoperative long-acting insulin levels should be adjusted according to the type of insulin, for example 75-100% of normal dosage for long-acting, peak-less insulins and 50-75% of the dose to be taken in the case of intermediate-acting insulin,6 although the ideal dose for basal insulin continuation still needs to be validated.
- Up to now, all oral hypoglycemic drugs have been stopped peri-operatively. Recent literature suggests careful continuation of certain oral agents, for example a patient treated with metformin undergoing a short starvation period (one missed meal only):
  - However, metformin should be withheld in patients with pre-existing renal impairment or with the use of nephrotoxic agents, such as contrast media.
- Evidence also suggests that the incretin family (diptedyl) peptidase-4 [DPP-4]) may be taken on the day of surgery.6,14
- Beware of caveats for certain oral hypoglycemic drugs
- Patients should follow routine fasting guidelines, but may be encouraged to take clear fluids, such as apple juice, until two hours before the scheduled procedure
- Patients should be asked to bring their insulin, as well as as normal treatment options for hypoglycemia (glucose gels) to the office on the day.

Step 3: The day of surgery:

- Diabetic patients benefit from early morning scheduling, whereby fasting time is limited and continuation of treatment can be resumed as soon as possible.
- The avoidance of nausea and vomiting that further extend the time of missed meals is paramount and prompt treatment thereof is advised.
- Patients on insulin may resume their home regime upon leaving the office, and oral therapy can be restarted as soon as the patient eats and drinks normally

It is important to know when to refer a patient to a secondary facility/ in-hospital care rather than attempting an office-based procedure in patients that are poorly controlled. Sedation clinicians should classify diabetics according to the ASA (American Society of Anesthesiologists) classification to determine their status. It is advisable to refer ASA 3 (poorly controlled patients with other co-morbidities) patients to secondary facilities which have the potential for multi-disciplinary care.

Collaboration of multi-disciplinary teams and updated guidelines: Updated, written guidelines are needed to best manage these complicated patients pre-operatively, intra-operatively as well as their transitioning back to their normal therapy after the procedure.15 Implementation of such validated guidelines will strengthen diabetes care, especially when combined as a multi-disciplinary collaborative effort.2

CONCLUSION

Ambulatory surgery provides a good environment of the care for diabetic patients when there is minimal disruption of treatment regimens as well as collaboration that involves a multi-disciplinary approach. Referral of poorly controlled patients presenting for long, complex procedures is advisable. New research points to the continuation of basal insulin and certain oral agents as well as the determination of a pre-operative HBA1c-level.

References


Local anaesthetics in dentistry - Part 3: Vasoconstrictors in local anaesthetics

INTRODUCTION
Vasoconstrictors like adrenaline in local anaesthetics are associated with more drug interactions than any other drug in Dentistry with an incidence of adverse reactions ranging from 2.5%-11%. Therefore, understanding the physiological and pharmacological effects, interactions with other drugs, and dosages are important in day to day dental practice.

Local anaesthetics are vasodilators, hence the addition of a vasoconstrictor like adrenaline provides the following advantages: improves the anaesthetic onset and duration, reduces bleeding, and decreases the systemic absorption rate of local anaesthetics by reducing the plasma concentration. However, adrenaline is unstable and therefore an antioxidant is added to prevent it oxidizing. Sodium bisulphite is the preservative most commonly added to local anaesthetics. Of course, patients allergic to sulphites will now react to a local anaesthetic containing sodium bisulphites.

DOSAGE
Calculating the dose of vasoconstrictor is different from ascertaining the local anaesthetic dosage in that vasoconstrictors are expressed as a dilution ratio and are not weight-dependent. In local anaesthetics, the adrenaline in dilution ratios of 1:80000 (Xyloox E80A, Adcock Ingram; Xylestesin, 3M), 1:100 000 (Ubistesin forte, 3M; Septocaine, Septodont) and 1:200000 (Ubistesin 3M; Septocaine, Septodont) are generally the most commonly used concentrations in dentistry. Adrenaline concentrations are generally expressed as 1:1000 which is 1mg/ml. Therefore, a local anaesthetic with 1:100000 adrenaline concentration will translate to 0.01mg/ml resulting in a 1.8ml local anaesthetic cartridge containing 0.018mg adrenaline. A 1:200000 will therefore contain a concentration of 0.005mg/ml translating to approximately 0.01mg per cartridge of local anaesthetic. The maximum dose of adrenaline in healthy patients is 0.2mg per appointment (approximately 10 cartridges of 1:100000 local anaesthetic). However, in medically compromised patients, such as those having cardiac risk, the recommended maximum dosage of adrenaline is 0.04 mg i.e. two cartridges of 1:100000 local anaesthetic. The American Heart Association and the American Dental Association have stated “the typical concentrations of vasoconstrictors contained in local anaesthetics are not contraindicated in cardiovascular disease so long as preliminary aspiration is practiced, the agent is injected slowly, and the smallest effective dose is administered”. Adrenaline 1:100,000 caused more sympathomimetic side effects than did 1:200,000 adrenaline concentration thus it is logical to use this lower concentration of adrenaline when possible. In several European and Asian countries, adrenaline concentrations of 1:300000 and 1:400000 are now available in dental cartridges. Furthermore, using a lower concentration of adrenaline like 1:200000 does not seem to compromise the anaesthetic efficacy of the local anaesthetic. In fact, 1:200000 solutions should be the preferred choice of adrenaline concentration in the absence of significant differences in performance with the 1:100000 solution. For patients undergoing periodontal surgery, 4% articaine with either adrenaline 1:100000 or 1:200000 concentration provides excellent surgical pain control. However, the 4% articaine 1:100000 adrenaline concentration has the additional advantage of providing better visualization of the surgical field because there is less bleeding.

ADRENALINE AND DRUG INTERACTION
Another problem associated with adrenaline is that it can interact with some of the drugs that the patient may be taking. In this instance the most commonly affected drugs are the non-selective beta blockers, some antidepressants and “street drugs” (Table 1).

NON-SELECTIVE BETA BLOCKERS
Non-selective beta blockers like propranolol (Inderal) and nadolol (Corgard) are used as anti-hypertensive drugs or to control migraines. Vasoconstrictors administered to patients on non-selective beta blockers can result in uncompensated peripheral vasoconstriction as a result of unopposed stimulation of alpha 1 receptors, leading to increase in blood pressure, bradycardia and headaches. Cases have been recorded in both the dental and medical literature where the magnitude of the blood pressure...
increased was alarming and potentially life threatening. Therefore, in patients on non-selective beta blockers requiring simple restorative procedures, complete avoidance of adrenaline seems rational. For more complex procedures for which haemostasis or a more prolonged duration of local anaesthesia is required, the initial vasoconstrictor dose should be kept to an absolute minimum such as one-half of a dental cartridge with 1:100000 or preferably 1:200000 and injected carefully to avoid intravascular administration. The vital signs of the patient should be monitored before further administration. If there is no change in cardiovascular status, additional cartridges can be injected individually at five-minute intervals. Adrenaline containing retraction cord must be avoided in a patient taking a non-selective β-antagonist.

**TRICYCLIC ANTIDEPRESSANTS**

Tricyclic antidepressants like imipramine and amitriptyline inhibit the uptake of adrenaline at the neuronal level, resulting in increased concentrations of the catecholamines at the sympathetic neuronal junction. A maximum dose of 0.04 mg, (equivalent to two cartridges of 1:100000 local anaesthetic) of exogenous adrenaline is proposed for patients on tricyclic antidepressants. Using a lower concentration of 1:100000 or less, e.g. 1:200000, is preferable and in a dosage which is no more than one-third the normal maximum which would be given, should preclude any problem that could arise from a tricyclic drug interaction.

The interactions of vasoconstrictors with general anaesthetics like halothane, thiopental and barbiturates can increase the dysrhythmic effects of dental vasoconstrictors. The clinician needs to inform the anaesthetist before administering a local anaesthetic with vasoconstrictor, and to restrict the dose to the limit recommended for the vasoconstrictor according to general anaesthetic procedures: halothane (2.2µg/kg for halothane, 3.5µg/kg for enfurane and 5.5µg/kg for isoflurane). A reported death under halothane anaesthesia caused by adrenaline in gingival retraction cord reinforces the need to adhere to recommended doses of adrenaline under general anaesthesia.

**“STREET DRUGS”**

Methamphetamines and cocaine have sympathomimetic effects and can interact with adrenaline in local anaesthetics. Vasoconstrictors in combination with cocaine or methamphetamines increase the risk of hypertensive crises, stroke and myocardial infarction. Electrode treatment should be postponed for at least 24 hours after the last cocaine use to allow elimination of the drug.

**ADRENALINE AND THE MEDICALLY COMPLEX PATIENT**

Adrenaline is both a hormone and a neurotransmitter belonging to sympathomimetic drugs that can mimic sympathetic nervous system mediators. It provides direct stimulation of the adrenergic receptors. Clinicians need to be aware of its effect on the sympathetic nervous system especially in medically compromised patients as certain modifications must be made (Table 1). A joint statement of the American Dental Association and American Heart Foundation on vasoconstrictors provides the following advice: “Vasoconstrictors should be used with extreme care to avoid intravascular injection. The minimum possible amount of vasoconstrictor should be used.”

**CARDIOVASCULAR DISEASES**

In the presence of ischaemic heart disease, elective dental treatment is contraindicated in the following situations: patients with unstable angina, recent myocardial infarction (less than six months), recent coronary artery bypass surgery (less than three months).

If emergency dental treatment is necessary, medical consultation is required and adrenaline dosages should be limited to one to two cartridges of 1:100000 solution (0.018 to 0.036 mg of adrenaline). Similarly, in patients with stable angina, vasoconstrictors should be limited to one to two cartridges. Vasoconstrictors are contraindicated in patients with severe arrhythmias. Digoxin, prescribed to increase the heart’s contractile force, has a narrow therapeutic index and may precipitate a cardiac arrhythmia when used concurrently with vasoconstrictors.

**STROKE**

Use of adrenaline should be deferred for patients who have suffered a cerebrovascular accident, or stroke within the last six months. After that time, doses of adrenaline should be limited to less than 0.036 mg, equivalent to two cartridges of local anaesthetic with 1:100000 adrenaline concentration.

**HYPERTHYROIDISM**

The use of adrenaline in local anaesthetics should be avoided, or at least minimized to one to two cartridges, in the untreated or poorly controlled hyperthyroid patient. Although the theoretical risk of thyroxine - adrenaline potentiation is serious, no clinical case has been reported.

<table>
<thead>
<tr>
<th>Table 1: Precautions regarding adrenaline usage in local anaesthetics.</th>
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<tr>
<td><strong>Contraindications to vasoconstrictors in dentistry</strong>:</td>
</tr>
<tr>
<td>- Heart diseases:</td>
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<tr>
<td>- Unstable angina, Recent myocardial infarction, Recent coronary artery bypass surgery, Refractory arrhythmias, Untreated or uncontrolled congestive heart failure, Untreated or uncontrolled severe hypertension,</td>
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<tr>
<td>- Uncontrolled hyperthyroidism</td>
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<td>- Uncontrolled diabetes</td>
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<td>- Sulphite allergies</td>
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<tr>
<td>- Steroid-dependent asthma</td>
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<td>- Pheochromocytoma</td>
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<th><strong>Precautions to the use of vasoconstrictors in dentistry</strong>:</th>
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<tr>
<td>- Patients taking tricyclic antidepressants</td>
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<tr>
<td>- Patients taking phenothiazine compounds</td>
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<tr>
<td>- Patients taking monoamine oxidase inhibitors</td>
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<tr>
<td>- Patients taking nonselective Beta-blockers</td>
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<tr>
<td>- Cocaine abusers</td>
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<tr>
<td>- Patients undergoing general anaesthesia with Halothane</td>
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<tr>
<td>- Patients taking Digoxin</td>
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</tbody>
</table>
CORTICOSTEROID-DEPENDENT ASTHMA

Administration of local anaesthetic with vasoconstrictors in cortico-dependent asthma patients may result in a higher risk of sulphite allergy. An anaesthetic without vasoconstrictor, and thus without bisulphite, is indicated. 4,10,17

PHEOCHROMOCYTOMA

A tumour of the adrenaline medulla, characterized by the presence of catecholamine-producing tissue, constitutes an absolute contraindication to the administration of vasoconstrictors.10

BONE IRRADIATION

It is desirable to avoid the use vasoconstrictors with a local anaesthetic when a patient is receiving irradiation of bone.10

CONCLUSION

A thorough understanding of the pharmacologic interactions between adrenaline and vasoconstrictors is important to avoid untoward reactions in patients.

A lower concentration like 1:200000 provides similar vasoconstriction and may be preferred especially for medically compromised patient.

References

Maxillo-facial radiology case 150

INTERPRETATION

Figures 1, 2, 3 & 4 refer to a syndrome reported by Sjögren in 1933, characterized by keratoconjunctivitis, dry mouth, chronic rheumatoid arthritis and swelling (green arrow) of the salivary glands. Subsequently, similar cases have been reported as Sjögren’s Syndrome. The aetiology of this syndrome has remained a mystery. The syndrome occurs most commonly in middle aged women. It is a systemic disease, with the above symptoms complicated by rheumatoid arthritis, collagen disease, and autoimmune diseases, which lead to various clinical manifestations.

Xerostomia is caused by hyposalivation, which may bring about arthropy, erosion, or ulcers of the oral mucosa. The cardinal sialographic findings in Sjögren’s syndrome include small round shadows, called the “branchless fruit-laden tree” the appearance of which is demonstrated in Figs. 2 & 3 (yellow arrows). The degree of distension in the peripheral parts of the ducts is described as appearing in four sequential stages. Stage I is classified as the punctate pattern; Stage II, the globular pattern; Stage III, the cavity pattern, and Stage IV, the destructive pattern. Fig. 4 is a Technetium–99 pertechnetate salivary scintigram. In contrast to strong uptake in the thyroid glands (red arrow), both submandibular and parotid glands bilaterally show minimal uptake, indicating hypofunction. In 1892, Mikulicz reported a lesion that presents as a bilateral swelling of the lacrimal glands and salivary glands. It appeared to be caused by chronic infection. Subsequently lesions with similar clinical findings have been reported, including those caused by specific inflammations, such as tuberculosis, syphilis, leukaemia and malignant lymphoma. Thus lesions resulting from any obvious cause and characterized by secondary bilateral enlargement of the major salivary glands and lacrimal glands are known as Mikulicz syndrome. Lesions with similar findings but of unknown origin are known as Mikulicz disease. Later, on the basis of a report by Godwin in 1962, Mikulicz disease became commonly known by the term benign lymphoepithelial lesion. The early sialographic features of this disease include irregular dilatation or partial disappearance of peripheral ducts and maculation. Figure 5 is a frontal submandibular sialogram showing a distended Wharton duct (black arrow), and extensive disappearance of, or, diffuse defects of the peripheral ducts.

Reference

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INTRODUCTION

A laser is a device that delivers coherent, monochromatic and collimated light as a form of energy. Most dental laser devices emit invisible light in the infrared portion of the electromagnetic spectrum. On May 7, 1997, the Food and Drug Administration (FDA) cleared for marketing in the United States the first erbium: yttrium - aluminum -garnet, or Er: YAG, laser for use in preparing cavities in the teeth of living human subjects.1

Unlike Soft Tissue laser light energy which is transformed into heat transmitted to targeted tissues (photothermal effect), the Erbium laser energy at 2940 nm is highly absorbed by both water and hydroxyapatite, which are some of the components of dental tissues. The laser energy immediately vaporizes the water in the tissue, causing it to expand, resulting in micro-explosions and expulsion of the targeted material. The laser can thus more rapidly remove tooth structures with higher water content. This is an advantage in the management of caries since the lesions have greater water content than healthy structures, allowing preferential removal of the diseased part of the tooth. Since the water absorbs the Erbium laser radiation so well, the temperature rise of the tissue is low and the interaction is limited to the surface of the tissue, with a very shallow depth of penetration, making the laser safe in use.1 The Erbium lasers have a tooth removal thickness of less than 300µm as compared with the more than 1000-2000µm removed by dental handpieces.2

As some conduction of heat cannot be avoided, the Erbium laser includes a water spray delivered through the laser tip, used for cooling the target tissue. Thus little to no heat is generated and tissue thermal damages are avoided. It has also been proven that the addition of water increases the rate of ablation and produces a more desirable surface morphology. Spray air/water levels can be adjusted according to the treatment type.

DISCUSSION

Comprehensive studies have been conducted on the effects of the Er: YAG laser on the pulp and the hard dental tissues.1 When cavity preparations were performed on extracted teeth, the pulpal temperatures remained well below the safe temperature of 5.5°C, in fact less than 3°C.1,3,4 This is in contrast to temperature changes associated with a dental handpiece, which may be as high as 15ºC.2 Investigators then conducted in vivo animal studies and reported that the pulpal response to cavity preparation with an Er:YAG laser was minimal, reversible and comparable to (or less than) the pulpal response created by a high-speed drill.1 The reason for the low temperature change is that the ablation of the tooth structure allows the dispersion of heat with the plume formation. The studies have also demonstrated the value of water spray in conjunction with the Er:YAG laser. Not only does water spray help cool the tooth during ablation (as with a high-speed drill), but the efficiency of the process is increased. The survey further reports that 46 studies have shown that the Er:YAG laser alone, or combined with acid etching, produces a surface similar to acid-etched surfaces and that the bond strength when bonding composite to that treated tooth structure is equal to or better than that produced by acid etching alone.1 Examination of the dental structures after ablation of enamel and dentine with different Er:YAG laser settings, has shown exposed enamel prisms, a dentine surface without a smear layer as well as opened dentinal tubules.5
Two key advantages of laser-based systems are their sensitivity and the lack of attendant risks of ionizing radiation. This has allowed their frequent use for monitoring lesions of dental caries and dental erosion. A considerable international research effort is focused on developing new laser applications for dental practice, and each year several large meetings are held which bring together this research. The Er; YAG laser also confers great advantages when used in operative dentistry to ablate hard tissue. The Erbium lasers, for example, produce absolutely no vibration as there is no need for contact of the laser tip with the tooth structure. The vibratory noise generated by a handpiece is more than 120dB/vibration.

Comparison of the effects of the Er;Cr:YSGG laser and of different cavity disinfection agents on the micro-leakage of current adhesives has shown no differences when the techniques are tested with etch and rinse adhesives. The combined treatment of laser irradiation together with fluoride prompts an accelerated fluoride uptake with a resultant reduction in the progression of caries-like lesions.

CONCLUSION

Patients prefer the comfort, silence and lack of vibration of lasers whilst there are also the added benefits such as disinfection and reduced pulpal temperature compared with high-speed drills.

In conclusion, Erbium lasers have long been recognized as the optimal dental lasers for effective, precise, and minimally invasive ablation of dental tissues. However, hard tissue lasers are categorised as Class IV and all the prescribed safety regulations should be observed, in consultation with appointed laser safety officers.

References

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“In my hands”: Part 9: The case for Case Reports

INTRODUCTION

Evidence based practice (EBP) was developed to assess available scientific evidence and rank it according to the rigour, strength and precision of the research. It aims to provide guidance for clinicians on which to base therapeutic decisions. A number of different hierarchies of evidence have been developed to enable different types of research to be ranked. Systematic reviews, meta analyses and randomized controlled studies (RCTs) usually rank highest because they provide the most reliable evidence of treatment effects. Case reports generally rank low on the scale, just above ideas, editorials and opinions. This is because they are susceptible to bias, have no control group, and cannot be used to establish causal relationships between the intervention and the outcome. However, systematic reviews and RCTs do have a number of limitations, particularly when applied in the evaluation of rapidly developing technologies, therapeutic devices and procedures, or where it is legally or ethically unacceptable to conduct such studies.

No hierarchy of evidence is unanimously accepted. Evans cautions that the use of any of the available measures should be as a guide and not as an inflexible rule. He stressed that different research designs are needed for different clinical scenarios and proposed a different ranking system for studies in the healthcare setting where the main focus is on the effectiveness of the intervention. The strength of such research is evaluated in terms of three components, namely, its effectiveness, appropriateness and feasibility, each scored on a four point scale as excellent, good, fair or poor. He further argues that the benefit of this evaluation in clinical practice is the acknowledgement that many factors can impact on the success of the intervention.

Effectiveness refers to whether the intervention worked as intended, and was appropriate for that particular patient. It also considers the advantages and disadvantages, as well as who will benefit from the intervention. Many believe that systematic reviews and multicentre RCTs provide the best evidence for effectiveness because they represent a range of different populations, settings and circumstances.

 Appropriateness relates to the psychosocial aspects of the intervention such as its impact on the person’s life, its acceptability and whether the results can be used by others and be generalized as applicable to a wider population (this is known as external validity). It entails considering what health issues are important to patients, and whether they view the outcomes as beneficial.

Feasibility concerns the impact the intervention has on an organization or service provider, the resources required to implement it successfully, whether it will be accepted and used by clinicians, as well as the economic implications to both practitioner and patient.

These three factors also stress that no matter how effective an intervention or treatment may be, if it cannot be appropriately implemented or is unacceptable to patients, then its value is questionable.

Where it is not possible, feasible or ethically acceptable to conduct RCTs, observational studies and case reports may be the most suitable alternative. For example, when measuring infrequent adverse outcomes, or the evaluation of interventions designed to prevent rare events, or in situations where clinicians or patients will not ethically...
or legally accept randomization as a means of assigning treatment or not, or where results of RCTs consistently contradict the findings from observational case studies. Thus although case reports have been considered as the “lowest” level of evidence, they are often the “first line” that can lead to further research. This has led to a resurgence in recognising the merits and acceptability of well documented case reports appearing in the literature.

Guidelines on conducting and writing case reports.

1. Why are they useful?
   - Case Reports involve genuine clinical scenarios, which makes them more applicable and interesting to colleagues.
   - They provide vivid accounts and as such have high readability value and impact.
   - They are a means of disseminating knowledge rapidly and succinctly to a widespread related audience.
   - They are a unique way of communicating anecdotal observations and to provide brief clinically related findings where experimental evidence is lacking.
   - They can be the first pointers in the recognition and description of “new” diseases.
   - They can be used to present accounts of rare manifestations of a disease.
   - Although they rank far below RCTs on the evidence ladder, they are far less costly and time intensive to conduct. They often shed light on new diseases, patient anomalies, drug effects, and different approaches to treatment that would be impossible to investigate with RCTs for ethical reasons. Note: “The lack of evidence is not the evidence of a lack of effect.”
   - They educate colleagues about new developments and possible alternative techniques that could be implemented in practice.
   - They forewarn others of possible adverse reactions to drugs or materials.
   - They alert and inform colleagues of situations where an unanticipated yet informative outcome had occurred during the routine course of treatment. This may help educate and equip practitioners to identify and to handle similar situations in their own patients.
   (You see only what you look for, you recognize only what you know! Dr Merril Sosman)
   - They may warn about clinical difficulties or failures encountered with new products.
   - Case reports are a good means of evaluation in instances when observational studies reveal consistent differences to findings reported in RCTs.
   - They present a more realistic picture of clinical outcomes as opposed to many controlled studies which often report only on the best achievable results.
   - They can be used as a discussion forum for ethical dilemmas faced by clinicians. This could prompt further discourse amongst colleagues, ideally leading to unbiased, rational collaborated ideas and solutions.
   - They can cover a broad range of topics, and offer a critical opportunity of showing bizarre cases to colleagues.
   - They present a full picture of clinical care on a case-by-case basis.
   - They serve as a means of continuous education for colleagues.

2. Who should write them?
Case reports are based on personal experiences. The “subject material” is encountered during daily practice and as such is easily within the grasp of clinicians. This makes case reports a good starting point for those practitioners wanting to begin research or scientific writing.

3. What are they and what do they entail?
Initially case reports were short, anecdotal communications between colleagues about unique or interesting patients seen in their rooms. Today, reports need to be more structured with a clear description of the case/s, a focused literature review related to the topic, a discussion of how the case may relate to future clinical practice, and should conclude with practical recommendations of suggestions on how to improve the status quo. Included should be an initial diagnosis, patient consent, a brief description of the natural disease course and routine treatment if applicable, details of the intervention / drug / therapy / treatment, measure of the outcomes, patient perceptions, remarks on safety and any known risks, and the conclusions of the clinician. In the situation where a series of cases are presented the authors must state whether ALL consecutive patients were treated in the same manner, or why any were excluded, and must report on the outcomes of each case.

4. When should they be written?
The value of case reports lies both in their novelty and/or educational value. Cases that increase the awareness of an unusual condition, describe a rare presentation of a common condition, identify innovative treatment, illustrate the application of a new material, highlight problems with a currently used product, offer advice on improved diagnostic strategies or debate clinical ethical dilemmas, are all constructive and worthwhile contributions to the literature.

They should also be written when a new approach or material has not succeeded. This will alert other colleagues to potential problems, forewarn them before they duplicate the mistakes, and protect patients from costly and potentially harmful procedures.

5. Where are they conducted and published?
The beauty of case reports is that they are based on genuine patients seen in clinical practice. This makes them the ideal avenue for non-academics to follow if they have an interest in sharing knowledge and experiences with others. They are one of the easiest and most rewarding ways to begin writing and publishing for less experienced researchers. They are also an excellent way of fostering collaboration and teamwork as many of the situations involve consultation between private practitioners, manufacturers and academic colleagues – all of whom can be involved in the report.

As a rule, case reports should only be published in peer reviewed journals. However, there has been an emergence of social media groups who share interesting cases with each other. This carries a number of risks for practitioners and the relevant ethical, legal, professional aspects have
been explored in detail in (part 8) the previous paper in this series.

6. How should they be constructed?
Carleton and Webb (2012) suggested that case reports have five sections, and proposed guidelines for each of these as follows:

• A brief Abstract that summarizes the case, its clinical relevance and educational value. It should be concise, and clearly intelligible to colleagues as well as the broader scientific community. 10
• An Introduction outlines the important clinical aspects and how they relate to current practices. It should also make reference to other key publications on the topic, but is not an extensive literature review. 10
• The Case is then presented as a chronological description of the patient(s). This includes age and sex, main complaint, initial presentation, co-morbidities, medical, family and social history, examination, diagnostic tests, treatment and materials used (if applicable) and outcomes. Albrecht, Werth and Bigby added that it should include perceptions of the patient(s), and in case series there should also be a follow-up as the results in those who return for recall visits may be a lot different from those who don’t. 7 The report should include enough information to justify the intervention and support the conclusion. The treatment should be described in detail with mention of whether it was a once-off, or if it is ongoing, and for how long. 7 The body of the report may contain illustrations, charts, tables or clinical photographs (obtained with the patient’s consent and having distinctive features blacked out to ensure anonymity). It should also try to pinpoint some distinguishing patterns that will allow others to recognize similar situations in their practices.
• The Discussion should justify the clinical decisions taken. This can be done by comparing and contrasting with other similar cases, and by making reference to related literature (if any is available). It should focus on one central theme, giving a detailed account of all actions taken, outcomes, and related findings. The authors should stress limitations of the study and offer some “take home lesson”. These recommendations may be an augur future treatment modalities or research, and are arguably the most important part of the case report. They should be substantiated by a critical appraisal of the literature, and where possible, try to predict conceivable implications if the findings are generalized and used by others. 10
• The Conclusion should be a brief, but precise, summary of the central theme, the findings, and the implications for the future. It should be based on the evidence presented as well as the discussion, and must end with a clear message to justify its relevance. 10

7. What does NOT constitute a case report?
• “Brag books” of before and after treatment photographs.
• Me, myself and I mini-advertisements showing the clinician’s special skills, high-tech equipment or state of the art practice and practices.
• Routine treatment procedures given a new lease of life by adding personal commentary.
• Sensational descriptions of bizarre observations. 6
• Reports that contain misleading elements. 6
• Proposal of treatment modalities that may do more harm than good if followed by others. 6
• False alarms which could destroy the credibility of well-tolerated drugs and accepted practices. 7

8. Drawbacks
The major limitation of case reports is the absence of a control group and the inability to conclusively state that the observed changes are a direct result of the intervention. 3 Kanduluru et al. caution clinicians to be mindful of the limitations of using such changes as a basis for future treatment modalities. They argue that other forms of scientific research are evaluated in terms of the levels of controlled evidence available, whether the cause preceded the effect, the clinically relevant pre-trial hypothesis, if the sample size was adequate, whether the study population is properly randomized, if there any different explanations that could work as well or better, whether there is a placebo, and if it was real or sham, and what protection was there against conflict of interest? 2 However, few of these criteria can be applied to any evaluation of case reports. Limited conclusions can be drawn as uncommon side effects may not be seen, thus it is impossible to predict the safety of a procedure or intervention, based on a case report. 7 Be skeptical of those reports which conclude that the treatment is “safe and effective”. 7

Others also warn that case studies have a risk of distorting the treatment effects, making them appear smaller or larger than they actually are. 6 In some situations outcomes are not quantifiable or measureable and rely on the subjective opinions of the clinician and the patient, which are unreliable. 7 A further limitation is the issue of author selection bias and publication bias. In the former, the authors decide what and when to publish, and may report on only a few selected cases. In the latter, journal editors may be less likely to publish reports which do not have interesting data, show dramatic treatment effects, or depict sensational complications. 3, 7 In addition, case reports attract fewer citations, making editors reluctant to publish them in favour of controlled scientific studies and meta analyses. 4, 7

CONCLUSION
This paper presents the many merits of case reports, specifically that they are based on real life situations that closely reflect clinical situations, that they can report on rare or infrequent situations and cases where it would not be legally or ethically permissible to conduct a RCT, that the topic material is found in the daily ambit of clinical practices, and the procedure for writing is within the grasp of all clinicians. In the words of Sir William Osler “Physicians should always note and record the unusual”. 12 Extrapolated for practitioners, the pertinent points are “Perceive, Publish or Perish!”

PS. In case you need more convincing as to their value, consider that the ground-breaking heart transplant surgery of Professor Christian Barnard in 1967 was first presented to the world as….. a case report! 13

Case Closed!
References
3. Chambers D, Rodgers M, Woolacott N. Not only randomized trials, but also case series should be considered in systematic reviews of rapidly developing technologies. J Clin Epidemiol. 2009;62:1253-60.
Current patterns of maxillofacial trauma suggest that mandibular fractures occur two to three times more often than other facial fractures. Review studies reveal that motor vehicle accidents and interpersonal violence are the most common causes of mandibular fractures followed by falls and sports injuries.1 The goals of treatment of mandibular fractures are trifold: restoration of premorbid occlusion, early return of function, and acceptable aesthetics (surgical correction of a disfiguring defect, or the cosmetic improvements). The basic sequence of management via open reduction requires four steps: restoration of premorbid occlusion, exposure of the fracture site(s), reduction of the fracture(s), and application of fixation. Restoration of the premorbid occlusion is typically done with application of intermaxillary fixation using Erich arch bars or intermaxillary fixation screws. Exposure can be done intraorally (commonly used for symphysis, parasymphysis, body and angle fractures) or extraorally (complex fractures or subcondylar injuries). Once the fractures are exposed and reduced, fixation is applied.

The objectives of mandibular fracture management include the restoration of the pre-existing anatomical form, functional occlusion and facial aesthetics.

Two general treatment philosophies emerged for plate and screw fixation of mandibular fractures in the 1970s and 1980s.1 The first is AO/ASIF philosophy, which promotes sufficient rigidity at the fracture site to prevent inter-fragmentary mobility during mandibular function.1 A second philosophy (Champy principles) emphasizes “the ideal lines of osteosynthesis” in the mandible which uses noncompression monocortical miniplates in the region of optimal stress to neutralize tension. This principle prescribes the need for two plates for adequate fixation for fractures in the symphysis and parasymphysis region to ensure optimal balance of forces. Successful stabilization of a fracture depends to varying degrees on at least two factors: the amount of bone contact and the rigidity of the fixation device.

Raut and colleagues reported on a trial which sought to compare the clinical efficacy and long term outcome of using a single 2.5mm (four holes with gap) miniplate and two 2mm miniplates (four holes with gap) in symphysis/parasymphysis fractures.1

**MATERIALS AND METHODS**

The study group comprised 30 patients with fractures of mandibular symphysis or parasymphysis region who reported to the Department of Oral and Maxillofacial Surgery at a Dental Hospital in India. Patients who were between 20-50 years old and had simple or compound (unfavorable) fractures in the symphysis or parasymphysis region of the mandible which were amenable to treatment using an intra-oral approach, were included in this randomized clinical trial. Medically compromised patients who were unfit for the procedure under general anesthesia; patients with comminuted fractures; patients with additional fractures at other sites on the mandible; patients with pan facial trauma; and edentulous patients were excluded from this study.

Thirty numbers were generated from a random sampling table and were then assigned alternatively into two groups—Group A and Group B. The patients were then asked to choose from the 30 random numbers that were generated and depending upon the number they chose they were allocated to one or other of the two groups.

**Group A:** Fracture in this group of patients was treated using a single 2.5 mm (four holes with gap) titanium miniplate fixed at Champy’s ‘neutral’ zone.
Group B: Fracture in this group of patients was treated using two 2 mm (four holes with gap) titanium miniplates fixed according to the principles of Champy’s lines of osteosynthesis and zones of compression and tension.

All patients received one dose of antibiotic (inj. Amoxicillin + Clavulanic acid, 1.2 g) pre-operatively and Dexamethasone 8 mg pre-operatively which was later tapered down over a period of two days. All patients also received an orthopantomogram and an occlusal view of the mandible radiograph.

A standard vestibular incision was used in all patients to access the fracture site. The fractured segments were manipulated and reduced into position. Intra-operative inter-maxillary fixation (IMF) was done using Erich arch bars and 26 gauge stainless steel wires in all cases along with circumferential loop wiring using 26 gauge stainless steel wire to include 2 or 3 teeth on each side (as deemed necessary by the operator). Split arch bars were used when the operator deemed it was necessary for reduction. Fixation was done according to the group to which the patient belonged, with either a single 2.5mm titanium (4 holes with gap) miniplate and 2.5 × 8mm screws or two 2 mm titanium miniplates (4 holes with gap) and 2 × 8mm screws. Once fixation was done, the IMF was released. Closure was done in layers using 3-0 polyglycolic acid sutures (Vicryl®). The lower arch bar was kept in place for three weeks. Patients were given strict instructions to maintain proper oral hygiene. All patients were given oral Amoxicillin + clavulanic acid (625mg) twice a day for five days and Diclofenac sodium (50mg) + Paracetamol (325mg) thrice a day for three days post-operatively.

Clinical follow-up of all patients was done by an independent observer (blinded) at intervals of: first post-operative day, one week, 12 weeks and 24 weeks. Another independent observer was asked to evaluate the clinical findings at the above mentioned intervals. The following parameters were evaluated: Duration of surgery; Fracture segment mobility/mal-union; Paresthesia; Occlusion; Wound dehiscence and Time taken to return to normal function and diet.

RESULTS

A total of 30 (24 males, 6 females) patients with a mean age of 32 years were selected for this study. The most common etiology was motor vehicle accidents (67%) followed by falls (17%). There were four cases of assault and one case of farm accident (borewell recoil injury). Mean duration of surgery in Group A patients was 27min and in Group B patients was 39min. Immediate post-operative reduction and stability achieved was comparable in both group of patients. Occlusion was deemed satisfactory in all but one patient (Group A) by both the evaluators. Post-operative malocclusion in that patient was corrected using elastics for a period of two weeks. This finding was statistically insignificant (P > 0.05). In all patients, there was no fracture segment mobility noted post-operatively. Upper border or lower border splaying was not seen in either group. Five patients (1 in Group A, 4 in Group B) reported of post-operative paresthesia which resolved on its own after a mean period of 3 weeks. Four patients (all belonging to Group B) showed post-operative wound dehiscence and gaping which was statistically significant.

Radiographically, no discrepancies were noted with respect to reduction of fracture fragments achieved. However, Observer Two noted that in three cases (20% of patients in Group B) the plate fixed at the superior end was close to the apices of the canine and the pre-molar which was not the ideal positioning desired.

CONCLUSIONS

The researchers found that that a single 2.5 mm (four holes with gap) mini-plate provides adequate stability in symphyseal and parasymphyseal fractures with a relatively shorter operating time when compared with the conventional two plate fixation technique. Though miniplates are most commonly placed according to Champy’s principle, symphysis/parasymphysis fractures can also be managed by placing a single stronger miniplate in Champy’s neutral zone along with arch bars or dental splints, which act as effective tension bands to counter the forces, resulting in fewer potential complications like wound dehiscence and iatrogenic injury to the tooth roots.

IMPLICATIONS FOR PRACTICE

The benefits of using a single miniplate for treating symphyseal and parasymphseal mandibular fractures has been clearly shown in this trial. Clinicians should however note that the small sample of patients used warrant that these results be treated with caution.

Reference

2. The risk of thrombo-embolic events during dental extractions.

Warfarin or antiplatelet agents such as clopidogrel (Plavix®), ticlopidine (Ticlid®), prasugrel (Effient®), ticagrelor (Brilinta®) and/or aspirin are commonly used in patients who have experienced a deep vein thrombosis (DVT) or pulmonary embolism, patients who have had an myocardial infarction and/or who have undergone cardiac stent placement.

There is general agreement that treatment regimens with these older anticoagulants/antiplatelet agents should not be altered before dental procedures. A 2009 systematic review and meta-analysis found no increased risk of bleeding associated with continuing regular doses of warfarin in comparison with discontinuing or modifying the dose for patients undergoing single and multiple tooth extraction. A 2013 systematic review found no clinically significant increased risk of postoperative bleeding complications from invasive dental procedures in patients on either single or dual antiplatelet therapy. In a 2013 statement, the American Academy of Neurology recommended that patients undergoing dental procedures continue taking aspirin or warfarin for stroke prevention. A 2015 systematic review of management of dental extractions in patients receiving warfarin determined that patients whose International Normalized Ratio (INR; a measure of the therapeutic index of warfarin) was in therapeutic range (i.e., 3.0 or less) could continue their regular warfarin regimen prior to the procedure.

In February 2007, the American Heart Association, the American College of Cardiology, the Society for Cardiovascular Angiography and Interventions, the American College of Surgeons, and the American Dental Association published their consensus opinion about drug-eluting stents and antiplatelet therapy (e.g., aspirin, clopidogrel, ticlopidine). The consensus opinion states that healthcare providers who perform invasive or surgical procedures (e.g., dentists) and are concerned about periprocedural and postprocedural bleeding should contact the patient’s cardiologist regarding the patient’s antiplatelet regimen and discuss optimal patient management, before discontinuing the antiplatelet medications. Given the importance of antiplatelet medications post-stent implantation in minimizing the risk of stent thrombosis, the medications should not be discontinued prematurely.

Some patients who are taking one of these or multiple anticoagulant medications may have additional medical conditions that can increase the risk of prolonged bleeding after dental treatment, including liver impairment or alcoholism; kidney failure; thrombocytopenia, hemophilia, or other hematologic disorders; or may be currently receiving a course of cytotoxic medication (e.g., cancer chemotherapy). In these situations, dental practitioners may wish to consult the patient’s physician to determine whether care can safely be delivered in a primary care office. Any suggested modification to the medication regimen prior to dental surgery should be done in consultation with and on advice of the patient’s physician.

There are very few studies in the literature comparing post-extraction bleeding in patients who continued anti-platelet therapy during extraction with that of the patients who discontinued the therapy and to a healthy control group and even less has been done to evaluate the difference between patients on monotherapy and dual therapy. Sadhasivam and colleagues from India (2016)2 reported on a clinical trial that sought to evaluate the difference in post-extraction bleeding among an anti-platelet stopping group, an anti-platelet non-stopping group and a healthy control group and also related it to the type of therapy (mono/dual therapy).

MATERIALS AND METHODS

A total of 300 patients requiring dental extractions were included in the study and were divided into three groups. Of these, 200 were on anti-platelet therapy (single/dual) for various cardiac ailments and were allocated randomly either into Group 1 or 2 whereas Group 3 comprised of 100 healthy patients not taking any haemostasis-altering medication. Hence, Group 1 (Non-stopping group) consisted of 100 patients (86 males and 14 females) who continued anti-platelet therapy during dental extractions; Group 2 (Stopping group) comprised 100 patients (88 males and 12 females) who discontinued anti-platelet therapy 3–5 days prior to dental extractions and resumed their medication 2 days post-extraction; and Group 3 (control group) included 100 healthy patients (45 males and 55 females) who were not on any haemostasis-altering medications.

Group 2 patients were referred to physician/cardiologist for a written consent regarding discontinuation of anti-platelet therapy during dental extraction. All patients underwent estimations of bleeding time and clotting time on the day of extractions. Patients with a pre-operative bleeding time of more than 10min, a history of systemic conditions like liver disease, bone marrow disorders, patients who were on any hemostasis altering medications other than anti-platelet drugs, patients with a systolic blood pressure above 150mm of Hg or a diastolic blood pressure above 100mm of Hg and medically compromised patients who were not fit to undergo dental extraction procedures under local anaesthesia were excluded from the study.

Extractions (single or multiple teeth) were performed under local anaesthesia using 2% lignocaine hydrochloride with a vasoconstrictor (1:80,000 adrenaline). Following extraction, a pressure pack was given and patient was kept under observation. Presence or absence of bleeding at the extraction site was checked at 15, 30 min, 1, 24, 48 h and 1 week after extraction. At the observed time intervals the extraction site was kept under observation. Presence or absence of bleeding at the extraction site was checked at 15, 30 min, 1, 24, 48 h and 1 week after extraction. At the observed time intervals the extraction site was checked and bleeding that extended beyond the socket was recorded as a positive result for bleeding at that time interval. In case of persistent bleeding beyond one hour, a local haemostatic agent (gelatin sponge) was inserted into the extraction socket in order to achieve haemostasis. After ensuring haemostasis, patients were discharged with postoperative instructions and were

prescribed amoxicillin 500mg and paracetamol 500mg, thrice daily for 5 days. They were advised to inform by person or through phone immediately in case of any post-operative bleeding.

Post-extraction bleeding was classified as immediate, late and very late. Immediate post-extraction bleeding was considered to be prolonged if it continued beyond 30 min in spite of the pressure pack. Late bleeding was considered to be clinically significant if it extended beyond 12 hours, or made the patient call or return to the surgeon or emergency department, or resulted in haematoma or ecchymosis within the oral soft tissues or which required blood transfusion. Very late bleeding was considered present if oozing occurred even after 24 hours.

RESULTS

A total of 300 patients were included in the study. Groups 1 and 2 comprised of patients who either continued or stopped anti-platelet therapy during extractions and Group 3 served as control group comprising healthy patients. The two treatment groups were similar in terms of number of patients on monotherapy and dual therapy (p value = 0.102).

The bleeding time estimates among patients in Group 1 ranged from 1min and 10s to 3min (mean 1min and 32s), whereas in Group 2, this range was from 1min and 7s to 2min and 30s (mean 1min and 25s). Group 3 bleeding time values ranged from 1min and 20s to 2min and 10s (mean 1min and 27s). All these values were within acceptable limits and no statistically significant differences were observed among the three groups.

Events of single or multiple tooth extractions were also similar among the three groups.

Bleeding after 15min was present among 14 patients of Group 1 (14.0%), 17 patients of Group 2 (17.0%) and 3 patients of Group 3 (3.0 %); bleeding after 30min i.e., prolonged immediate post-operative bleeding was present among nine patients of Group 1 (9.0 %) and 15 patients of Group 2 (15.0%) whereas it was not seen in any patient of Group 3. Local pressure pack with gauze was used to control bleeding in required cases and bleeding was reassessed after another half an hour. Bleeding after one hour of extraction was present in nine patients of Group 2 (9.0 %) i.e., the group who had discontinued anti-platelet therapy before extraction whereas it was not seen in any other group. In these nine patients who continued to bleed even after pressure packing of one hour, gelatin sponge was packed into the extraction socket and patient was asked to bite on gauze placed over it. Haemostasis was achieved within a further half an hour in all nine patients and they were discharged uneventfully.

Statistical analysis revealed significant differences among the three groups with regard to bleeding after 15, 30 min and one hour with p values of 0.004, 0.000 and 0.000 respectively.

Among nine patients of Group 1 who presented with prolonged immediate post-operative bleeding, three were on monotherapy and six were on dual therapy and among 15 patients of Group 2, six were on mono-therapy and nine were on dual therapy. Hence, in both the groups, prolonged immediate post-operative bleeding was greater in patients on dual anti-platelet therapy when compared with patients on mono-therapy.

CONCLUSIONS

The researchers concluded that dental extractions can be performed without the risk of significant post-extraction bleeding in patients on single or dual anti-platelet therapy. Although local factors like periodontal and peri-apical pathology might be responsible for increased post-extraction bleeding, it can always be controlled using local haemostatic measures. Hence, there is no need for interrupting the anti-platelet therapy prior to extractions as the risks clearly outweigh the benefits.

IMPLICATIONS FOR PRACTICE

This huge clinical trial with a large sample size added to the weight of evidence from respected bodies such as the American Dental Association that there is little or no risk to patients who are on single or dual anti-platelet therapy who present for dental extraction. The most important point however, is to note that these decisions must be taken in consultation with the patient’s physician.

Reference

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<td>Bryan Sher: Lasers in dentistry workshop (REPEAT)</td>
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JOÃO BORGES
Born in Lisbon, Borges followed a different path as the rest of his family are lawyers and literature experts. An international education led him to paediatric dentistry and he has acquired a vast knowledge of implantology and prosthodontics. He still lectures, a passion of his and became a Nobel Biocare lecturer, lecturing in English, French, Spanish, Portuguese and Italian. He was invited by Professor Clarimundo Emilio to be a part of the dentistry department at Lisbon’s University School of Dental Medicine and given the opportunity to fulfill his dream of teaching undergraduates. Over the years he developed a passion for dental aesthetics, dentistry, rehabilitation and smile design. He decided to apply for a post-grad in Aesthetic Dentistry and a master’s degree in dental research. He is still an “invited professor” at the University in Barcelona in the Masters Degree faculty in Restorative Aesthetic Dentistry.

STUART GRAVES
Dr Graves received his oral and maxillofacial surgery training from Georgetown University, where he was also an assistant professor. He is past President of the Implant Society of Northern Virginia and also past President of the Mid-Atlantic Society of Oral and Maxillofacial Surgery and a Diplomate of the American Board of Oral and Maxillofacial Surgery. He is currently serving on the editorial review board for the Journal of Oral & Maxillofacial Implants. He lectures both nationally and internationally and has published several articles on advanced surgical techniques in Implant Dentistry. He maintains a busy private practice in Northern Virginia where over 90% of his procedures involve dental implants. With more than 30 years of experience, he places more than 2,000 implants every year. That experience and a desire to help people smile again, combined with his ability to place patients at ease, are just a few reasons he is known as a first-class oral surgeon.

ZAKI KANAN
Zaki is a highly experienced and respected implant and cosmetic dentist, well known in the dental community and past President of the British Academy of Cosmetic Dentistry. He features prominently on the lecture circuit, speaking on all aspects of cosmetic dentistry with a special interest in dental implants, wherein he has achieved a Masters Degree from the world renowned Guy’s Hospital in 2001. He also has a Diploma in Sedation, a Diploma in Hypnosis and is a Licentiate of the Faculty of Homeopathy. His main area of interest is Dental Implants wherein he has designed some innovative techniques featured in The Times. He was also the first person in the UK to carry out a Live All-on-4 procedure on TV and has a high profile list of clients and celebrities. Zaki has received numerous awards, the highlight of which was being voted ‘UK Dentist of the Year’ at the Dental Awards in 2012. He has also been runner-up in Private Dentistry’s poll of the top 20 Elite Dentists in the UK in 2012 and 2013, he finally took top spot in 2014. He has won Smile Awards and featured in Dentistry’s poll of the Top 50 most influential dentists in the UK. Through his expertise in all aspects of tooth whitening, he has been appointed UK Dental Advisor to Philips Oral Healthcare. He is a former President of The London Dental Fellowship and sits on the editorial board for The International Journal of Cosmetic Dentistry and was an editorial consultant for Dental Implant Summaries. He regularly appeared on Channel 4’s Embarrassing Bodies programme carrying out complex implant treatments and is a sought after clinician by the media, where he often features.

DINOS KOUNTOURAS
Dr Konstantinos (Dinos) Kountouras is a Lecturer in the Department of Operative Dentistry at the Aristotle University of Thessaloniki, Greece. He qualified from the University of Liverpool in England in 1991 and has received his Master of Science in Prosthodontics from the Eastman Dental Institute, University of London in 1995. He was awarded the Fellowship in Implant Dentistry from the Department of Implant Dentistry of New York University, USA in 1997 and he has received his PhD in Biomaterials from the University of London in England in 2000 for his research work on bonded composite resin systems. He is an affiliate member of the European Academy of Esthetic Dentistry and also a graduate of the Dawson Academy UK. He is the founding and current President of the Hellenic Academy of Aesthetic Dentistry and the Scientific Editor of the Greek Edition of the European Journal of Esthetic Dentistry by Quintessence Publications. Dr Kountouras has been publishing and lecturing to international conferences in the fields of Minimal Invasive Aesthetic and Implant Dentistry. Since 2001, he has been working in his own private practice in Thessaloniki, Greece and in 2012 he also became the Medical Director of Aesthetic Dentistry of Arrail Dental Group, China. His clinical work has a special emphasis in complete aesthetic smile rehabilitations and makeovers. He has been publishing and lecturing to international conferences in the fields of Minimal Invasive Aesthetic Dentistry. He collaborates with colleagues and multinational dental technicians to achieve his philosophy of treatment that is to enhance the natural aesthetics of the smile by custom designed bonded minimal invasive dentistry.

ALASDAIR MCKELVIE
Alasdair graduated from Dundee Dental School in 1984, remaining in the hospital environment for twelve months as a house officer, gaining experience in restorative dentistry. He worked for 23 years in general dental practice as an associate before opening his own private practice. Alasdair has also been an active member of his local BDA section for a number of years, including being Chairman. Alasdair’s association with Dental Protection began with a period as Local Dental Advisor in 2000, and a Dentos-Legal Advisor since 2003. He graduated from the University of Wales with his LLM in Healthcare Law in 2007. He is actively involved with South African casework.

LEONARDO TROMBELLI
Leonardo Trombelli is the Full Professor and Chair, Periodontology and Implantology, for the School of Dentistry at the University of Ferrara. He is the Director of the Research Center for the Study of Periodontal Diseases at the University of Ferrara, the Director of the Operative Unit of Dentistry at the University Hospital of Ferrara. He was the President of the Italian Society of Osseo-integrated Implantology (2007-2009), and is active member of the Italian Society of Periodontology, the Italian Society of Osseo-integrated Implantology, the International Association of Dental Research, and the International Academy of Periodontology. He is a peer review panel member of the Journal Periodontology and editorial Board member for the Journal of Clinical Periodontology. He is in private practice limited to Periodontology and Implantology.
Local Speakers

MARK BOWES
Having practiced in London for 23 years and being a member of the British Academy of Aesthetic Dentistry, Mark is now in private practise specialising in Aesthetic and Complex Restorative Dentistry. He has pioneered the development of Digital Smile Design in South Africa and founded the SA Academy of Aesthetic Dentistry. Former Congress President for the World International Federation of Esthetic Dentistry (IFED), Mark is a member and registered speaker for the ITI (International Team for Implantology) and has lectured locally internationally. He is the only DSD World Master and an Instructor SA and is one of only two on the African Continent. He lectures and teaches DSD both in South Africa and Internationally. Mark has also introduced Intelligent Aligner Systems locally and is the only certified instructor for IAS in Africa, for Inman and Clearsmile Aligners and runs courses for fellow dentists.

GREG BOYES-VARLEY
Greg Boyes-Varley is in full-time private practice as a Maxillo-Facial and Oral Surgeon and has been in specialist private practice since 1987 and covers the Oral and Maxillofacial Surgery discipline to the Morningside MediClinic and the advanced applied surgical services to the Multidisciplinary Head and Neck Oncology Reconstruction Unit at the Morningside MediClinic. He is a part-time Senior Consultant/ Senior Lecturer in the Department of Maxillo-Facial and Oral Surgery at the University of the Witwatersrand in Johannesburg and an examiner for the College Maxillofacial Surgery for the College of Medicine of South Africa. He sits on the Executive Committee of the Society of Maxillofacial and Oral Surgeons of South Africa and is the current President.

BRADLEY BREDEKAMP
Bradley Bredekamp qualified with BChD in 1994 and in then completed his MChD (Oral Medicine and Periodontology) cum laude from the University of Stellenbosch. The recipient of a special Medical Research Council Scholarship and the John Lenman Merit Award in Periodontology, he is also co-founder of the KZN Implant study group and the KZN ITI Study Group, an ITI Fellow and Executive Member of the SA Academy of Osseointegration (SAAO). He is also past chairperson of the KZN SADA continuing education committee and currently working in private periodontal practice. He has published many papers and a handbook on Clinical Oral Manifestations of HIV/AIDS patients.

DEON DE VILLIERS
Dr de Villiers is a qualified Prosthodontist. He completed his dental degree at the University of Pretoria in 1984 and his four year specialist degree at the University of Pretoria in 1994. He has been in private practice since 1995. He is a past President of the Academy of Prosthodontics of South Africa (APSA) and is currently a member of APSA. He has extensive experience in the field of crown and bridge work and has a special interest in Implant Dentistry. He is passionately committed to using only those techniques for tooth restorations that minimize the damage to existing tooth structure and dental nerve vitality instead of conventional prosthodontic treatment techniques that are very destructive and damaging to the teeth (e.g. crown preparation).

GRANT GAVIN
With business interests in Property, both Real Estate and Investment, Business Coaching and Public Speaking, Grant has built his various businesses on the back of an incredibly successful tenure as the owner of the largest Real Estate Company in the North Durban Suburbs. After working in London for the Walt Disney Company, Grant spent two years as Regional Manager of RE/MAX SA and bought a controlling share in the company. Today he employs 70 Top Professionals operating from two franchises, with annual property sales of over R1 Billion. Apart from all his other financial achievements, Grant founded the Durban Entrepreneurs Club to provide a platform for like-minded individuals and is a sought-after public speaker on the topics of entrepreneurship, sales, personal development and leadership.

DALE HOWES
Dale Howes is in full time private prosthodontic practice in Johannesburg and is the Senior Consultant for the Post Graduate Prosthodontic Programme at the University of the Witwatersrand, and has served as external examiner at the Universities of Pretoria; Gent, Belgium and for the South African College of Dentistry. He is the past president of the Academy of Prosthodontics of South Africa, a National Councilor of the South African Dental Association and founder of the Pi Bränemark Institute of South Africa. His research has been published in international peer reviewed journals and involves jaw movement studies, caries susceptibility, implantology and craniofacial reconstruction. He is a board member of the International Society of Maxillofacial Reconstruction and the international working group for Advanced Digital Technology in Craniofacial Reconstruction.

HLOMBE MAKULUMA
Dr Hlombe is a personal and business effectiveness coach and is a qualified General Medical Practitioner and an Internationally Certified Business and Executive Coach. He specialises in working with various health practitioners operating their own private practices. He coaches them on the business aspects of operating a practice focusing on fundamentals of building a health practice as a business, managing health practice finances, and growing the practice.

DESI MOODLEY
With academic qualifications in Restorative Dentistry and Aesthetic Dentistry, he won the coveted Hatton Award for the best Post-Graduate Research paper presented at SA Division of the International Association of Dental Research (IADR) in New Orleans (USA) as well as various other awards in the field. He is author of many scientific articles in local and international journals and a well-known lecturer. He has been in private practice until 2012 and has since been appointed as senior lecturer in the Department of Restorative Dentistry at the University of the Western Cape.

JOHAN PALM
Dr Johan Palm not only obtained his BChD with distinction but also achieved that accolade for Postgraduate diplomas in Oral Surgery, Aesthetics and Implantology. After community service at Rob Fereira Hospital in Nelspruit, he continued in private practice in Vereeniging. Dr Palm has a keen interest in Aesthetic Dentistry, Implantology and other Oral Surgery.

SIMON REEVES
Dr Simon Reeves who is in private practice in the Cape, worked in UK in both NHS and private practice after receiving his doctorate from Stellenbosch. He is actively involved in Dental Peer Review and staff training programmes and completed a course in Advanced Restorative Techniques at Manchester University before returning to SA in 2006. He has been an Associate dentist at Intercare Medical and Dental Centre in Cape Town and wrote and presented several CPD-accredited training courses for dental support staff, which were presented all over the country. He has a special interest in Endodontics (Completed PDD in Endodontics (UWC) and is still presenting support staff training lectures around the country.
**Local Speakers**

**JAMES ROELOFSE**
James Roelofse is Professor in Sedation and Pain Control and Visiting Professor at University College London, responsible for developing sedation training programs; where he is also Programme Director of a Postgraduate Certificate in this field. Roelofse is President of SA Society of Sedation Practitioners (SOSPOSA), a SIG group of SASA and a member of the International Committee for the Advancement of Procedural Sedation. As academic advisor for Sedation Solutions, UK he regularly contributes articles for the knowledge hub and SADA journal, with 156 published scientific articles to his name and has contributed to various handbooks.

**CYNTHIA SCHOEMAN**
Cynthia Schoeman is the founder and MD of Ethics Monitoring & Management Services (Pty) Ltd and has worked in the field of ethics for more than a decade to improve ethics in organisations and promote proactive management of ethics. She developed a web-based ethics survey, Ethics Monitor, which serves as a valuable tool to measure, monitor, manage and accurately report on organizational ethics. Cynthia is the author of two books on ethics: Ethics: Giving a Damn, Making a Difference, published in 2012 and Ethics Can, published in August 2014. Cynthia is a regular speaker at conferences and seminars and has lectured on ethics as an external lecturer at a number of business schools for more than 10 years to a wide variety of audiences, from students to senior executives.

**LONDI SHANGASE**
Londi Shangase qualified as a dentist at the Medical University of Southern Africa in 1994. She practiced as a general dentist for five years. She obtained her MDent degree in Periodontology and Oral Medicine in 2003 at the same institution. She has worked as a specialist involved with the teaching and training of undergraduate and postgraduate students in two dental institutions i.e., Medunsa and University of Pretoria. In April 2011 she joined the University of the Witwatersrand as an Adjunct Professor and Head of the Department of Oral Medicine and Periodontology at the School of Oral Health Sciences. She is a regular speaker on Periodontics and Oral Medicine, in General Dental Practitioners’ meetings in Gauteng. She has great interest in dental education and has been in academia for the past thirteen years.

**BRYAN SHER**
As a practising dentist in in Sea Point, he uses laser technology, Dual Wavelength (Biolase Waterlase iPlus & EPIC Diode). Sher is a part-time intermediate paramedic registered with HPCSA and is currently completing a Mastership in Laser Dentistry through RWTH Aachen University. He has also completed a course in Clinical Hypnosis with SASCH and has been in private practice since 1991.

**ANUSHKA SINGH BHIMA**
Anushka Singh Bhima qualified as a lawyer LLB, Law in 2005 at the University of Pretoria. She is an unconventional attorney, entrepreneur and author. She is the director of ASK Medico-Legal and Consulting services, a legal consulting firm rooted in integrity through its core values. They assist Health Care Professionals with up to date legal knowledge relevant to their profession. She has co-written a series of books which focuses on soulful self-care and helpful how-to’s on making healthier choices. A philosophy which allows you to take the best care of yourself from belly to soul. She is respected as South Africa’s Wellness Warrior.

**PEET VAN DER VYVER**
Peet van der Vyver qualified as a Dentist BChD and completed a Diploma in Endodontics, Masters Degree in Endodontics and Diploma in Aesthetic Dentistry (all Cum Laude). He is the recipient of several gold medals and awards across the various fields of Dentistry. Member of various National Dental organisations and Extraordinary Professor at the University of Pretoria, well-known lecturer and writer, he has too many credentials to fit in one write-up.

**LIZELLE VAN DER WALT**
Lizelle van der Walt is a Gallup® Certified Strengths Coach and passionate about assisting employers and employees to discover and develop the strengths and abilities they need to grow into strong teams and successful companies. Lizelle holds a Bachelor degree in Optometry and has 20 years’ experience in running and growing a private practice. She has been coaching individuals and teams for the past five years and is currently enrolled at USB and hopes to complete her MPhil in Management Coaching in 2018.

**ANDRE VAN ZYL**
After many years in private practice in the UK and SA, André has held several senior positions across various faculties and has been instrumental in distance learning and hands-on training. In 2008 he became the first SA academic to be invited as a Fellow of the International Team for Implantology (ITI) and as one of the ITI international panel of speakers. Elected as Vice-President of the International Congress of Oral Implantologists (ICOI) for Africa in 2012, his department was awarded an ITI Center of Excellence (the 8th in the world) and an ITI Scholarship Center (the 21st in the world) in 2013. His special interests include Oral Cancer, Potentially Malignant Disorders, Guided Bone Regeneration, Implant Dentistry and Aesthetic Periodontal Surgery.

**PAUL VAN ZYL**
Paul van Zyl has a long and illustrious career in Prosthodontics and has achieved many credentials cum laude and awards for Restorative Dentistry, Orthodontics and Dental Radiography. In private practice since 1991, there are simply too many outstanding achievements to mention here, but some of it include many years as president of APSA (Academy of prosthodontics SA), holding various international member positions, lecturer and recipient of awards of excellence.

**MARK WERTHEIMER**
Mark Wertheimer – BDS, MSc(Dent), MDent(Orth), FCDSA(Orth). Amongst Mark’s many achievements are Past President of the Paedodontic Society of S.A, Member of National Council of SADA Exco, President of SASO, board director of SADA, Ambassador of International Ambassadors Forum of American Association of Orthodontists and Council member of Council of World Federation of Orthodontists. He was involved in post-graduate teaching in the Department of Orthodontics at Wits University and won the coveted Colgate prize from IADR. Mark has lectured extensively at international conferences and to numerous professional groups and societies and has been in private orthodontic practice since 1996.
1. Identify the INCORRECT statement: 
   *Candida parapsilosis* is a fungus which: 
   a. is frequently isolated from human hands 
   b. has a mortality rate of 20% among children 
   c. causes significant damage to oral epithelium 
   d. results in nosocomial bloodstream infections in children 
   e. is frequently found on pacifiers

2. Identify the INCORRECT statement: 
   a. *Staphylococcus* is the most dominant bacterial genera found on pacifiers 
   b. *S. epidermidis* is a prevalent species in the periodontal pocket in cases of chronic periodontitis 
   c. *S. epidermidis* has been associated with infective endocarditis 
   d. *S. epidermidis* does not survive on previously used pacifiers 
   e. *S. epidermidis* has been recognised as an important opportunistic pathogen

3. The study confirmed that Chlorhexidine is the gold standard rinsing agent for controlling dental plaque. 
   a. True 
   b. False

4. The results of this study regarding the efficacy of apple cider vinegar are in agreement with previous work (Mota et al.) which showed that the vinegar exhibited fungicidal and fungistatic properties. 
   a. True 
   b. False

5. Identify the INCORRECT statement: 
   The basic oral health package includes: 
   a. oral examination 
   b. 1-3-surface restorations 
   c. implants 
   d. dental extractions 
   e. preventive dentistry

6. The majority of cases when dental treatment for children is delivered under general anaesthesia involves the placement of dental restorations. 
   a. True 
   b. False

7. The National Oral Health Strategy document (2005), recommended an objective of one dentist per 60 000 population. 
   a. True 
   b. False

8. Identify the CORRECT statement: 
   Of the Provincial Dental Clinics in the Western Cape: 
   a. 50% could take bitewing radiographs 
   b. just over 30% offered the basic treatment package 
   c. over half offered scale and polish as a service 
   d. 40% offered dental extractions ONLY 
   e. 60% offered restorations

9. The dentist to patient ratio in the private sector in South Africa currently is: 
   a. 1:50000 
   b. 1:1800 
   c. 1:10000 
   d. 1:1200

10. Poor communities are unlikely to prioritize oral health care if adequately educated on the value of maintaining good oral health. 
    a. True 
    b. False

11. Primary oral health care facilities in SA focus on emergency relief of pain and sepsis. 
    a. True 
    b. False

12. Diabetes is recognised as a global disease with a frequency of nearly 600 million expected by 2035. 
    a. True 
    b. False

13. The pre-procedure consultation for diabetic patients presenting for procedural sedation: a refresher to prepare for your case 
    a. True 
    b. False
14. Although the ideal dose has not been determined for continued insulin intake at the time of the surgery, The Society for Ambulatory Anaesthesia suggests adjustments depending on the type of insulin. eg 75%-100% of long acting, 50% to 75% of intermediate acting insulin.
   a. True
   b. False

Local Anaesthetics in Dentistry. Vasoconstrictors in local anaesthetics (p 176)
15. The maximum dose of adrenaline in healthy patients is 0.2mg per appointment (approximately 10 cartridges of 1:100000 local anaesthetic); in cardiac risk patients the maximum dose of adrenaline is 0.04 mg i.e. 2 cartridges of 1:1000000 local anaesthetic.
   a. True
   b. False

Maxillo-Facial Radiology Case 149 (p 179)
16. Sjögren’s syndrome occurs most commonly in middle aged men.
   a. True
   b. False

   17. The cardinal sialographic findings of Sjögren syndrome include small round shadows, called the “branchless fruit-laden tree” appearance?
   a. True
   b. False

Cavity preparation using hard tissue lasers in Operative Dentistry (p 182)
18. The use of hard tissue lasers to prepare cavities on extracted teeth resulted in a dangerous rise of pulp temperature.
   a. True
   b. False

Clinical Windows (p 188)
19. In the Raut et al trial, immediate post-operative reduction and achievement of stability was superior in the group that received two miniplates.
   a. True
   b. False

20. The results from the Sadhasivam et al trial suggests that there needs to be a change in the guidelines as supported by the American Dental Association.
   a. True
   b. False

ETHICAL
“In my hands”: Part 9: The case for Case Reports. (p 184)
21. There is no ethical need to inform patients of their inclusion in a properly conducted clinical trial such as an RCT (Randomised Control Study).
   a. True
   b. False

22. Case Reports may offer the opportunity to explore ethical issues as well as clinical outcomes.
   a. True
   b. False

23. The ethical principle that treatment should always be directed to the benefit of the patient should guide case reporting.
   a. True
   b. False

24. Ensuring the anonymity of the patient should always be an ethical priority in Case Reports.
   a. True
   b. False

25. Practitioners who are engaged in social media groups to share interesting cases must be cognisant of the ethical implications, in particular the issue of possible widespread dissemination of patient information.
   a. True
   b. False

Readers will note that we have reduced the number of General Questions to twenty whilst retaining five Ethics based questions. Our allocation of CPD points remains unchanged. There is optimism that this section will continue to provide members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure Continuing Education. Please note that SADA is no longer offering the ‘CPD via SMS’ service.

Contact Ann Bayman at SADA, Tel: 011 484 5288, for any enquiries and assistance.

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Andolex Product Manager
Tel: 011 021 4155
E-mail: c.niemann@inovapharma.co.za

Alisha Poolingam
Tel: 011 745 6000
E-mail: Alisha.a.poolingam@gsk.com

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Tel: 0800 22 86 87
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South African Dental Association
Tel: 011 484 5288
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SCHOOL OF ORAL HEALTH SCIENCES

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