Australopithecus Afarensis (recreated from skull fossils)

Cover image: Australopithecus afarensis – a hominid species that lived some 3.85 to 2.95 million years ago. Their dentition and jaws were certainly robust enough to handle a hard diet, but studies on the microwear seen on their teeth confirm that their staple food was mainly plant based, leaves, fruit, seeds, nuts…. and insects and probably small vertebrates such as lizards. (Smithsonian Institute Human Origins Programme.)

Source: www.bio.sunyorange.edu
www.wikipedia.org

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Oral diseases may be linked to an increased risk of general health conditions and vice versa. Preventive care is always the best option to protect your mouth and body. Seek early detection and treatment to fight oral diseases and associated health complications.

www.worldoralhealthday.org

South African Dental Association
T: +27 11 484 5288  |  W: www.sada.co.za
Collegial Coincidence.

“A Brief History of Time” is the famous bestseller book relating the perceptive views of Steven Hawking who set out to understand the Universe, a part of which is Time. He would be intrigued and probably amused that commentators have looked at his dates of birth and of death and have discovered that perhaps Time has played a role... his birth took place exactly on the 139th celebration of the birth of Einstein. His death occurred on the 300th anniversary of the death of Galileo Galilei. Of course one may remark on the coincidence... but would comment that that is all that it is... a coincidence. Nevertheless the facts do give food for thought, just as the books by this brilliant physicist give food for (very deep) thought.

Now think of 350,000 and consider 255,000... these are the estimated prevalences of Hepatitis C and of Hepatitis B in South Africa. The annual incidence of Hepatitis C is estimated at 24,500 new cases, while there are some 33,000 new sufferers of Hepatitis B each year. These are figures of great concern. Viral hepatitis is reported to be the seventh leading cause of death worldwide. Hepatitis C and B account for 75% of liver disease. This, the March issue of the Journal, presents a paper dealing with these viral infections, as part of the Theme of the Association, “Oral Manifestations of Infectious diseases.” Dentistry has a major role to play in the prevention of transmission of the viruses.

The Association joined international colleagues when World Oral Health Day was celebrated on 20th March 2018. The evocative slogan “Say AHH  Think Mouth  Think Health” embodies the awareness that Oral Health should not, indeed, cannot, be regarded separately from systemic health. It is therefore paradoxical that the Federation Dentaire International should offer a formal definition of Oral health which focusses entirely on the craniofacial complex:

• Oral health is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort and disease of the craniofacial complex’.

Of course the FDI would not ignore the broader implications and the preamble to their definition includes the words : “…demonstrate that oral health does not occur in isolation, but is an important part of overall health and well-being.” Despite this, there remain hints of the traditional separation of the profession of Dentistry from Medicine. If we explore the intent of the Association Theme...Oral Manifestations of Infectious Diseases, it is readily seen that the responsibilities of care of infections do in fact extend across both disciplines : Acute necrotising ulcerative gingivitis; Candidiasis; Dental abscess; Black Hairy tongue; Epizootic stomatitis (Foot and Mouth disease); Herpes simplex virus; Measles; Scarlet fever; Streptococcal pharyngitis; HIV infection; Syphilis; Varicella ; Herpangina; Pericoronitis. Links are also being established between conditions in the mouth and various systemic diseases... periodontitis and diabetes may be an example. One cannot but speculate what deep revelations Steven Hawking may have made in the field of Health!

The Association Theme and the WHO slogan marry well in the month of March. The month may be best known for the famous warning “ Beware the Ides of March”. That referred to 15th March... Ides meaning “middle.” Caesar was dismissive of the precaution … and died in 44 BC on 15th March under the knives of his Senators... especially one Brutus! If indeed the dire warning still carries impact, let us direct that sentiment and that antagonistic energy to the prevention, if not the assassination, of oral and dental disease. The connubial match of the Theme and the Slogan should never be regarded as a mere coincidence! And a closer collaboration between Medical and Dental colleagues likewise------ not merely coincidental but a dedicated collegial approach to shared problems.

WG Evans: Managing editor, Email:bill.evans@wits.ac.za
ERRATUM

In the August 2017 issue of the Journal of the Dental Association of South Africa a Position Statement was published under the title “Prevention of infective endocarditis before dental procedures.”

The South African Dental Association acknowledges with concern that the publication of that paper did not properly recognise the authorship. The principal author is Dr David Jankelow, who worked with a number of co-authors, all members of SA Heart, to produce the definitive paper. The Association wishes to retract the implied claim that the Position Statement was that of the Association with the endorsement of SA Heart. The correct and appropriate attribute should be that the policy was formulated by the SA Heart team and endorsed by the South African Dental Association.

The Journal of the SA Heart Association has generously granted permission for the SADJ to republish their paper as it appeared in that Journal in November 2017.

The South African Dental Association regrets the error and records sincere appreciation to SA Heart and especially to the original authors for their empathetic understanding.

Please refer to page 94 Prevention of infective endocarditis associated with dental interventions.
Dear Reader;

After long debates and deliberations, we felt it appropriate via this channel of communication to acknowledge and celebrate our editor’s birthday!

Editors do have a reputation for wanting to keep their work behind the scenes, and we are deeply aware that Prof Bill will feel to be recognized on this platform would be inappropriate. However the team working with him on the Journal felt we have to acknowledge the great work he has been doing, and hopefully will continue to do on behalf of The South African Dental Association through their official mouthpiece, the South African Dental Journal. Therefore, we for once, rightfully so or not, took a leap of faith, and overrode the editors possible decision!

So to soften the exposure, as I am sure Bill will feel somewhat in a quandary, we will keep this contribution short and sweet!

We acknowledge his work ethic, his total commitment and joy he brings, whilst we all feverishly try to present the best issue of the journal ever!

The changing goalpost in terms of needs and requirements for the journal, the growth we have experienced, the great feedback, and the sometimes not so great feedback is highly appreciated. All errors and erratums in the next issue is clean forgotten once we experience the sheer joy once we finish another issue.

The image on this page, speaks a thousand words! What a commitment. On many occasions on a weekend when last minute changes had to be implemented, Bill would feverishly search for a spot where Wi-Fi is available. Like this time, right at the main entrance at one of the camps in the Kruger national Park – a place he dearly loves!

So, an 80th birthday is a milestone, and should be celebrated in style! Thanks to colleagues and friends, an 80th party, with 80 guests were hosted at SADA headquarters, where 80 teddy bears was handed over to him!

The Publishing team.

PROFESSOR WILLIAM GREIG EVANS

Bill Evans was born in Salisbury (now Harare) on 29 March 1938. As a youngster he was affectionately referred to as Little Buffalo by his mother’s staff… (Buffalo Bill?). He attended Blakiston Primary School and Prince Edward School, being awarded scholarships and emerging as the Head Boy and Dux of both institutions. In high school he obtained full colours for athletics (he still has his white blazer and can almost fit into it), played rugby for the first team and featured in a number of Gilbert and Sullivan productions. Bill was active in the School’s Nature Society spending many happy hours with his friends collecting specimens for the clubhouse.

After completing his A levels, Bill attended the Dental School at the University of the Witwatersrand in Johannesburg from 1957 - 1961. Apart from achieving his BDS degree, he won numerous academic prizes and was awarded the Abe Bailey Travel Scholarship, which allowed him to travel overseas with students from other South African Universities. Not only was Bill a high performer academically, he was also chair of Dental Students’ Council and the House Committee of the Men’s Halls of Residence, was Vice President of the SRC, active in NUSAS and SRC Representative of the Rag Committee.

After completing his BDS degree, Bill entered private practice in Salisbury (Harare) and was an active member of his branch committee and the Executive Council of the Rhodesian Dental Association (RDA). In 1969 he returned to Wits and obtained his postgraduate Diploma in Orthodontics.

During this time Bill won the Colgate Palmolive Research prize at the IADR and was President of the Odontological Society of South Africa. He then returned to Salisbury to practice Orthodontics and returned to his activities for the RDA, also becoming a member of the Public Health Advisory Board and of the Student Governing Body of his high school.
In 1980, Bill moved back to his alma mater, Wits, where he successively became a senior lecturer in Orthodontics, Professor and Head of the Department, Head of the School of Oral Health Sciences, and Deputy Dean of the Faculty of Health Sciences. He took on all the committees and responsibilities that these offices required with dedication and total commitment to the students, staff and institution. In 2007 the Faculty of Health Sciences presented Bill with the prestigious Service Excellence Award. Bill is still a part-time member of the Department where he imparts his knowledge and love of Orthodontics to undergraduate and postgraduate students. His service to the South African Society of Orthodontics has led to the award of an Honorary Life Membership.

As a teacher, Bill has always embraced all aspects of student life. He is the most enthusiastic lecturer and loves a good laugh, especially when presented with the ridiculous or the absurd. He will grind his teeth until an orthodontic case works out. There was never a Rag float built at Wits Dental School without his whole hearted (and all night) involvement. He has welcomed student’s babies to his lectures and quite possibly has yet to miss a Graduation Ball, where he dances enthusiastically every year. When Wits Dental moved from Braamfontein to the CMJAH there were many snags. The Head of School became Mr Fix-It – replacing missing screws, fixing doors, gluing down the lino – bringing tools from home whenever he noticed a fault – working in the evenings and on weekends.

Bill is a sought after MC for many academic functions where he entertains with his stories and his wonderful laugh. Besides University activities, Bill serves on the Board of the College of Dentistry in the Colleges of Medicine of South Africa, and is a referee and member of the Editorial Boards of several journals. He is an active member of the Dental Association of South Africa (SADA), where he participates at branch and national levels, has helped to organise conferences and is the Managing Editor of this Journal.

Bill has been married to Joan, a dedicated teacher, for more than 50 years. They have a daughter, Rhian, who is an occupational therapist and works at the Wits Rural Facility; and a son, Rhys, who is a medical doctor practising in the UK. Bill and Joan have 5 granddaughters. He has a wide range of interests and for his 70th birthday, he learned to ski in Poland. Just imagine how he will celebrate his 80th!

Prof Joy Shackleton

PROFESSOR WILLIAM GREIG EVANS – THE MAN WE ALL KNOW AND LOVE AS BILL

I asked 80 people, who all know Prof WG Evans, from various different times and places, to describe in ONE SENTENCE - “Bill Evans”. Not only did none refuse, but every single person broke out into a smile or a laugh before responding. So, to celebrate 80 remarkable years in the life of an incomparably exceptional man, here are 80 magnificent nostalgic memories...All quoted verbatim.

An icon of dentistry especially to Witsies. You inspire me with your wisdom, but even more with your humility

Brilliant lecturer as well as a lovely amicable guy

Consistency and Integrity

That laugh!

Simple and inspiring

Smart man. Nice man. Entertaining

A world class gentleman, with an incredible sense of humour that loves red wine.

Positive, pleasant, always happy and laughing

He is a presence

The kind of man you want as a father

He is where ever Dentistry is

It has been my very great privilege and pleasure to have worked with Prof W G Evans over a period spanning some forty years, and I feel very qualified to attest to the pleasure this has given me!

His willingness to help is his most outstanding characteristic – also the word “passion” for Dentistry comes to mind

Sharp slap of shoe leather down the corridor; clashing keys; silver headed joviality at the door; sparkling eyes, bushy brows; a laugh, a touch, a greeting; ebullience; hurry, hurry, hurry!

Wow – I could write a book – a true gentleman

The rag floats would have sunk without him

Highly intelligent and absolutely fit for his age

Ah…. That funny crazy man, always full of jokes and tricks!

He personifies integrity

A ball of energy who does whatever needs to be done

True gentleman, passion for life, energetic, enthusiastic, warm-hearted, friendly, kind and very articulate (sic)/well-spoken

Stunning; adorable; lovable; caring

His STANCE when you ask him a question – he stands hands clasped in front of him and his head cocked so he is looking at you from under his bushy eyebrows and says ...“weeeell...umm”...

He also always has a HUGE bunch of keys in his pocket

A kind, humble, friendly and jovial man...a great guy!

The LEGEND of dentistry

Larger than Life

The most approachable professor ever, and will probably always be one of the students

PROFESSOR JOY SHACKLETON
The way he says “You bastad” when he hears you have seen a leopard, which he hasn’t - or when you are going to be someplace he’d love to be, and he can’t be there.

A great legend of the Wits dental school….always involved… from RAG to outreach trips…the works.

Enthusiasm – yes, he oozes enthusiasm

He is one of greatest gentleman I have ever met and most amazing professional. Always very supportive of progress. I don’t think words can describe how much he has contributed to our dental society

The MOST APPROACHABLE TEACHER that one could ever wish for – kind, respected, enthusiastic, energetic, sweet, boyish, lovable

The ever smiling boy

Charismatic and entertaining

The BEST ambassador, always shows such interest in everyone, loving man

A positive influence on all that had the privilege of passing through his hands

A guy with a sense of humour as well as a lot of common sense

Achieved so much yet anyone feels they can go talk to him as a pal

Sagacious

He’s such a unique person with an astonishing vocabulary

Jolly

Unbelievably talented and intelligent

His ability to bend wires into amazing designs is equalled (if not exceeded) by his knack for manipulating and contorting words into stupendous sentences

Despite the great man he is, he is still the nicest and most humble guy you ever met

I’ve never heard him say a bad word about anybody

I just love the way he dances with his wife

Formidable

Always smiling, it’s a pleasure to talk to him

Accommodating

He’s one guy you WANNA go talk to

A yes man. Actually no, that gives the wrong idea. Rather is he a man who “knows NO Nos”

Outgoing, entertaining, die hard

Magnetic and jovial

Where do I start? Always helpful. Accommodating and friendly

Big hearted. He’s like- um engaging, captivating, and never tiring

Energy – a ball of energy

Boisterous, exuberant, passionate man

Nothing is ever an issue for him. He is as happy acting as a janitor as he is as a professor. There is no job too big or too menial for him

The wise, enlightened smiling soul

A delightful, warm and generous gentleman

Friendly kind and a real gentleman

A man with a special brand of humour that always sees the best in others and does not miss a chance to make friends with the profession and the dental trade

Man of many talents

Gregarious – always a gentlemen

Tall and quirky

He epitomises “Warmth, Generosity and Kindness” – a very special man indeed!

Always game for a challenge

Determined, dogged and dedicated

Jolly old lad met kruisbande

Swiss army knife, and braces

Always has something up his sleeve

Benevolent Billy, bushy browed, gentle, funny man

A friend to the young at heart

There is a gentle giant who walks among us, and it is an honour to regularly cross paths with Prof Bill. He has had and continues to have a profound influence on everyone he meets - without ever being aware of this. A true gentleman, teacher and leader!

Energetic, helpful, cannot say no

A true scholar

The laugh, The voice, Eyebrows, Chin, Enthusiasm, Orthies, Mop of hair, Gentle, Teacher, Kind, Storytelling, Jokes, Energetic, Inquisitive, Jolly, High five, Pinkie clasp

Let me get my Leatherman out.

I’ll do it
Always tries to make everyone feel comfortable – sometimes at his own expense: Len Becker recalls him chairing a congress and thanking and Afrikaans speaker in (very broken) Afrikaans! He then introduced Prof Len in English. Len responded by saying “Thank you Bill for NOT introducing me in Afrikaans”

Brilliant Bill Evans – Friend, Scholar, Gentleman, Inspiration, Legend

We Salute You!

Compiled by: Prof Leanne Sykes

THE ORIGINAL INVITATION

William Greig Evans – Bill
A rock of a man is reaching a milestone of 80 amazing years in March 2018

Bill has dedicated his life to enriching the lives of others, in so many spheres, but most notably in the dental profession.

He has brought his own special brand of passion, enthusiasm, dedication and joviality to all the students he taught, the countless patients he has treated, and the colleagues he has mentored, guided, communicated with, inspired and empowered through his role at SADA, and as the editor of our Journal.

Bill is a man of true integrity. He can be relied onto keep his word, to be the first to offer help, to treat everyone equally - with kindness and respect, and to always go beyond the extra mile...

On behalf of SADA, we as his friends, will like to invite you to come and join us in celebrating this auspicious occasion in the life of a TRUE GENTLEMAN...

AND A THANK YOU LETTER FROM BILL!

Dear Friends… or as I described you during the Teddy-Bear party evening…. the pillars of my life.

I have been enormously privileged … the party was just so evocative of all the wonderful times I have been able to enjoy with you, the camaraderie and the warmth creating a special ambience.

For your generosity, for your kindness, but most emphatically for being a pillar, strong and tall in friendship over all these years, I thank you most sincerely.

The picture on this page shows some eighty teddy bears (counting every single example) … we are planning a trip to Wits Rural where there will be recipients who will each treasure their own Teddy Bear!

The Teddy Bear contributions were a wonderful thought and so generously brought to reality.

My sincere appreciation of your gifts.

And now...

The lights were out, the hallway darkened,
Around the corner K C harkened:
“Come in and see
For BEARS there be
Gathered to show the party intended”.

What a welcome, what a surprise
Was there a glisten in my eyes?
So many dear friends
Glad wishes each sends..
A special day to memorise.
Leanne with her heart of gold,
Makes one forget about getting old.
Her planning so secret
Her planning so perfect
So many ideas yet to unfold.

To all who made that evening so special
My appreciation is beyond the level..
But spills over to embrace
Eighty bears and ribbons and lace.
All the team deserve my medal!

Sincere appreciation and good wishes to all.
Bill.
ORAL MANIFESTATIONS OF SYSTEMIC INFECTIONS

Hepatitis B and Hepatitis C viruses, revisited.

SUMMARY
Dental health care personnel are at increased risk of acquiring blood-borne infections including hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV). Infection is acquired through inoculation of infected blood by needle stick injuries, by penetrations of sharp dental instruments and by contact of mucous membrane with the infected fluid. HBV infection is a vaccine-preventable disease. There is currently no vaccine available to prevent HCV infection.

INTRODUCTION
Blood borne infections by hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are major concerns in everyday dental practice. A study conducted between 1990 and 2013 found viral hepatitis to be the seventh leading cause of death worldwide. Infection by HBV and HCV accounted for 96% of hepatitis-related mortality, with deaths mainly due to liver cirrhosis and hepatocellular carcinoma (HCC). HBV and HCV are hepatotropic viruses acquired through exposure to blood and body fluids. Infection in clinical settings is suffered whilst recapping needles, during use of dental sharp instruments i.e. scalers and rotary instruments, and contact with body fluids such as may occur with eye splashes and saliva aerosols. Other modes of transmission are through contaminated needles in users of intravenous drugs, through contaminated transfused blood and blood products, and sexual contact. In endemic areas, vertical transmission from mother to child is still the major route of infection.

PATHOGENESIS OF HBV AND HCV INFECTION
Following inoculation, a variety of clinical syndromes may develop. These include asymptomatic acute infection, acute hepatitis, fulminating hepatitis, chronic hepatitis and chronic carrier state. Chronic hepatitis may progress to hepatocellular carcinoma. Disease progression of HBV infection is monitored by serum markers for HBsAg, HBeAg and HBV DNA. Whilst the presence of HBsAg signifies HBV infection, the presence of HBeAg and HBV-DNA indicate active viral replication. Infection with HCV accounts for more cases of chronic liver disease than HBV and rarely results in fulminating hepatitis. Disease activity is monitored by HCV-RNA in blood and elevated aminotransferase serum levels.

PREVENTION OF TRANSMISSION AND TREATMENT
Both HBV and HCV are resistant viruses which can survive in dried blood for at least a week and up to six weeks respectively. Whilst the risk of HBV is higher than that of HIV and HCV, a study found dental staff and student participants were more fearful of contracting HIV and HCV. This is mainly due to the availability of the HBV vaccine whilst there is no preventative vaccine for HCV and HIV. Prevention and eradication of infection by HBV, HCV and HIV in the clinical setting is through stringent infection control measures and the use of personal protective equipment. Despite progress made in developing protocols and technologies to improve infection control practices, there are still cases recorded of blood-borne pathogens transmission in dental practices.

ACRONYMS
ALT: alanine aminotransferase
APRI: platelet ratio index
AST: aspartate aminotransferase
CDC: Centres of Disease Prevention and Control
DAA: direct acting antiviral agents
EPI-SA: South African Expanded Programme of Immunisation
HBsAg: hepatitis B surface antigen
HBV: hepatitis B virus
HCC: hepatocellular carcinoma
HCV: hepatitis C virus
HDV: hepatitis D virus
HIV: human immunodeficiency virus
IVD: in vitro diagnostic test
NAT: nucleic acid test
PegINF: pegylated interferon
RDT: rapid diagnostic test
TTIs: transfusion-transmissible infections
WHO: World Health Organization

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1. T Kungoane: B Dent Ther, BDS, MSc Dent, MDent, FC Path (SA) Oral Path. Department of Oral Pathology and Oral Biology, School of Dentistry, Faculty of Health Sciences, University of Pretoria.
from a needle stick injury or cut exposure in susceptible (not vaccinated) individuals ranges from 6%-30% depending on the HBsAg status of the source individual whilst that for HCV is approximately 1.8%. This is compared with less than 1% after exposure to HIV-infected blood.

The study by Cleveland et al., which reviewed the literature between 2003 and 2015, revealed three published reports of HBV and HCV transmission in dental health care settings. These reports highlight the importance of infection control in disease prevention. The Centres of Disease Prevention and Control (CDC) have set guidelines for the stringent infection control measures which should be implemented in dental practice to prevent disease infection. These include a designated Infection Control Co-ordinator who will monitor activity, the use of separate water systems for each dental unit which can be monitored regularly for water quality, routinely documenting percutaneous injuries and the use of safer medical devices.

HBV vaccine is part of the South African Expanded Programme of Immunisation (EPI-SA) programme; administered to babies in three doses at six, 10 and 14 weeks. The vaccine is also available to all health care personnel who are in contact with patients (dentists, medical doctors, dental nurses, cleaners, porters, etc.) at three intervals as follows: first dosage soon after employment, second dose a month later and a third dose six months after the first dose. Staff employed in private practice may purchase the vaccine at leading pharmacies. Following vaccination, continuous monitoring of anti-HB antibody titres is mandatory to evaluate immunity. Vaccination for HBV also confers immunity to hepatitis D virus (HDV), whose infectivity occurs only when encapsulated by hepatitis B surface antigen (HBsAg).

For all other non-vaccinated individuals who contract HBV infection, the World Health Organization (WHO) guidelines recommended Tenofovir (after exclusion of HIV-co-infection) or Entecavir (children 2-11 years) antiviral therapy in patients who are not presenting with elevated alanine aminotransferase (ALTs) liver enzymes and HBV DNA of >20 000 IU/ml. Individuals who are infected with HBV reactive for HBsAg should be monitored every six months for HCC development, every 12 months for treatment response and disease progression, and every 12 months for treatment-associated toxicity.

There is currently no vaccine available for the prevention of HCV infection. Previously, the pegylated interferon (PegINF) based treatments were mainstream therapy, with associated severe side effects which at times were fatal. Currently, interferon-free direct acting antiviral agents (DAAs) show promising results with shorter treatment duration associated with few side effects and an overall high viral efficacy. Due to the increased risk of HBV reactivation during treatment, individuals have to be tested for HBV infection prior to initiating DAA therapy for HCV.

**HBV and HCV Screening**

All blood donated in South Africa is screened against transfusion-transmissible infections (TTIs including hepatitis B and C). A WHO African regional survey has shown that in South Africa, 3% of donated blood was discarded due to, amongst others, infections of HBV (0.069% of discarded blood) and of HCV (0.014%). The WHO has recommended guidelines for chronic HBV and HCV testing in order to implement prevention and treatment. These guidelines recommended the use of a standardized quality-assured serological in vitro diagnostic test (IVD) or a rapid diagnostic test (RDT) to detect HBsAg and HCV antibody. In an individual infected with HBV, a positive HBsAg is compatible with HBV infection but is not definitive for cirrhosis. A second laboratory test, a quantitative HBV DNA nucleic acid test (NAT), should be used to assess for treatment in a HBsAg-positive individual with elevated alanine aminotransferase levels (ALTs) and clinical disease (decompensated cirrhosis). Recommendation for serological HCV infection includes testing of anti-HCV antibody with a laboratory-based immunoassays, confirmation of viremia using a qualitative or quantitative HCV NAT test to detect HCV RNA or core antigen and treatment assessment using clinical criteria and aspartate aminotransferase (AST) to platelet ratio index (APRI) of >2.

**CONCLUSION**

Occupational exposure to blood borne pathogens particularly HBV, HCV and HIV remains a major concern in dental practice. Not only do dental health care personnel have to be concerned about acquiring the infections from patients through occupational exposure but inadequate infection control practices will allow infections to be transmitted from patient to patient or personnel to patient. Efforts are in place to reduce viral transmission and new infections. With stringent blood screening, vaccination programmes and proper infection control measures, Hepatitis B and C viral hepatitis may soon be problems of the past.

**Reference**

16. WHO. Guidelines for the Screening, Care and Treatment of Persons with Chronic Hepatitis B infection. April 2016.
VELscope: shedding light on its ideal application

SADJ March 2018, Vol 73 no 2 p71 - p77

J Fourie.

SUMMARY
Oral squamous cell carcinoma (OSCC) is a deadly and disfiguring disease. Despite the fact there are readily identifiable precursor lesions and ample opportunity for detection during dental visits, patients continue to succumb to the disease due to late diagnosis. Adjunctive diagnostic aids have been designed to change the natural history of oral cancer by promoting screening practices and allowing for the early identification of OSCC and precursor lesions. The VELscope is one such device that is available in South Africa, where it is marketed by Inter-Africa Dental. This article will look at the current evidence for the use of the VELscope in different practice scenarios.

INTRODUCTION
Oral and pharyngeal cancers, when grouped together, are the sixth most common cancer in the world. More than 90% of oral malignancies are squamous cell carcinomas and more than 80% of these can be attributed to tobacco or alcohol consumption. Despite the surgical and chemoradiotherapeutic treatment advances, the five year survival rate is still only 50% and this has not improved over the past three decades. People who do survive are often left with disfiguring and debilitating scarring from surgery or radiation therapy. Seventeen to 35% of oral squamous cell carcinomas (OSCC) develop from pre-existing leukoplakic lesions. Early recognition of these precursor lesions should make OSCC an essentially preventable disease.

In order to improve the outcome of OSCC, both in terms of mortality and morbidity, new cases should be prevented through behaviour modification and existing cases diagnosed at the earliest opportunity. Known risk factors, such as cigarette smoking, should be eliminated in order to prevent the development of precursor as well as definitive oral cancer lesions.

DEFINITIONS
Sensitivity: Probability that a patient with PMD/OSCC will generate a positive result when measured against the gold standard of scalpel biopsy.
Specificity: The probability that a patient who does not have a PMD/OSCC will generate a negative finding.
Positive predictive value: Probability that a patient with a positive test result actually has a PMD/OSCC.
Negative predictive value: Probability that a patient with a negative test result does not have a PMD/OSCC.

ACRONYMS:
COE : Conventional oral examination
FAD : Flavin adenine dinucleotide
FVI : Fluorescence visualisation intensified
FVL : Fluorescence visualisation loss
FVR : Fluorescence visualisation retained
LOH : loss of heterozygosity
OCCFP : Oral Cancer Case Finding Program
OLP : oral lichen planus - plaque type or erosive type
OSCC : Oral squamous cell carcinoma
PMD : Potentially malignant disorder
PPV : positive predictive value
SPT : second primary tumour
VELscope : Visually Enhanced Lesion scope

Despite the accessibility of the oral cavity for inspection, and the opportunities presented by routine dental appointments, many oral cancers still present at a fairly late stage. Precursor lesions such as leukoplakia may therefore have been missed by practitioners who did not examine the soft tissues thoroughly or wrongly diagnosed the lesions as innocent.

The conventional oral examination (COE) cannot reliably diagnose potentially malignant disorders (PMD) or OSCC. Even common mucosal pathology is wrongly diagnosed in 43% of cases and cancer in 5.6%. Frictional hyperkeratosis and leukoplakic lesions are admittedly very hard to tell apart.

Besides the difficulty in identifying visible lesions, it is also possible that the initial malignant transformation of keratinocytes is subclinical, and the dysplastic or molecularly altered epithelium associated with cancer progression may not be observed by COE. It has been demonstrated that dysplasia can be seen in the clinically normal appearing mucosa at sites distant from the presenting OSCC/PMD. Diagnostic aids have been developed for the early detection of oral cancer. The VELscope (visually enhanced lesion scope) has been developed to enhance the visualisation of oral mucosal abnormalities that ‘may not be apparent or visible to the naked eye, such as oral cancer or pre-malignant dysplasia’ and to establish appropriate surgical margins during the removal of PMD/OSCC lesions (LED Dental, Vancouver, British Columbia, Canada).

The purpose of this article is to evaluate the current literature in the quest to identify the most appropriate application of the VELscope, considering:
1. Screening: application of a test in a population who are apparently free from disease to sort those with disease from those without disease as compared with the gold standard of the COE.14
2. Case finding: application of a test in patients with a lesion to determine the diagnosis of that lesion as compared with the gold standard of a scalpel biopsy and histopathological diagnosis.14
3. Monitoring of patients with oral dysplasia or malignancy.

SCIENTIFIC BACKGROUND OF VELSCOPE

The VELscope was first introduced by Lane et al.10 in a proof of concept study to aid in the discrimination of high risk PMD and invasive SCCs from normal oral mucosa.

The VELscope is a simple hand-held device that can be used to directly visualise the oral mucosa (Figure 1). Oral tissues are illuminated by a blue/violet light source (400-460 nm) and then visualised through long pass and notch optical filters which allow the passage of long wavelength green and red autofluorescence. Under direct fluorescent visualisation (FV), normal mucosa appears pale green and is defined as FV retained (FVR), while tissues which do not emit the natural pale green autofluorescence and therefore appear darker are classified as FV loss (FVL). 10,15 The distinction is based on the passage of long wavelength green and red autofluorescence. The interaction of light with the tissues highlights changes in structure and metabolic activity. FV Fluorescent visualisation loss reflects changes in intrinsic fluorophore distribution, the breakdown of the collagen matrix, a decrease in flavin adenine dinucleotide (FAD) concentration because of tissue remodelling and increased metabolism, as well as increased haemoglobin absorption which is associated with neoplastic changes.10,17 The structural changes of the epithelium and the lamina propria associated with neoplastic development (thickening of epithelium, hyperchromatism, increased cellular pleomorphism, increased microvascularity) lead to increased absorption or scattering of light which result in altered autofluorescence. 10,18 However, some of these structural and cellular changes are not confined to the malignant process, and many benign lesions also undergo changes that become accentuated during fluorescence visualisation.

Kordbacheh et al.19 correlated the fluorescence visualisation findings with different histological groups and the differentially expressed genes in these groups. The results provided molecular evidence of the cellular pathways involved in FVL, which include the immune response, cell-cell and cell-extracellular matrix adhesion, stromal remodelling and angiogenesis. The results also supported the association between fluorescent diascopy and inflammation: lesions that blanched had upregulated T-cell mediated inflammation. The greatest differences between lesions with FVL and FVR were regarding cell cycle regulation and apoptosis-related genes. Studying a rat tongue carcinogenesis model, Ohnishi et al.17 found that FVL of the progressive dysplastic field surrounding the tumour was primarily due to the breakdown of the collagen matrix increased haemoglobin absorption with secondary increased dispersion in the epithelium, thickening of the epithelium and a decrease in FAD concentration.

CONVENTIONAL ORAL CANCER SCREENING PRACTICES

Oral cancer screening can be defined as an oral mucosal examination that is performed together with an assessment of the individual’s health history.20 The intention should be to identify asymptomatic lesions.21 Screening may be ‘population based’ when a sample of the general population is screened; ‘opportunistic’ when a patient presents to a health care provider with an unrelated problem; and ‘targeted’ when high risk patients are involved.22

Population: The lack of available evidence and low prevalence of oral cancer does not currently support population based screening.23 A population based study conducted in India24 was the only randomised controlled trial to date, and the only one to be included in the 2010 Cochrane review.22 The study demonstrated that screening of a high risk subgroup of subjects resulted in a decreased mortality rate due to a greater proportion of cases having been diagnosed early. Similar results were obtained in Cuba with the nationally implemented Oral Cancer Case Finding Program (OCCFP) which demonstrated that focused screening is able to increase the number of oral cancer cases which were diagnosed early.22

Opportunistic: Screening during regular dental visits offer the opportunity to discuss lifestyle modifications that will lower the risk of oral cancer, such as cessation of smoking.20 Screening of high risk individuals between the age of 40 and 60 during regular dental visits has proven to be cost effective.27 However, screening should be extended to everybody as OSCC is increasingly being documented among young patients19 and patients who have never smoked or drank alcohol, especially it seems, among white females.29 Unfortunately, high risk patients may not be frequent dental attenders110 but people who do visit their dentist regularly are far more likely to have the advantage of early diagnosis of any OSCC which may present.22

Targeted screening can also be implemented when patients self-select to attend screening clinics due to worries signs and symptoms, explaining why 47% of patients attending such a clinic have been found to have abnormal findings.26 Yet, only 5% were suspicious of a malignancy, and only a disappointing 30% of these patients returned for follow up.23

USE OF THE VELSCOPE AS A SCREENING ADJUNCT

The question is whether the use of adjunctive diagnostic aids, such as the VELscope, will reasonably benefit the screening process. Diagnostic aids may not even be indicated for screening which is not supposed to be a diagnostic process.23 The aim of the oral mucosal examination in general practice should simply be to detect oral mucosal abnormalities.13,14 For this purpose the VELscope may promote improved screening practices among clinicians if only by stimulating the procedure of careful mucosal examination.25,36

In any study, the intended target population as well as the skill-set of the examiner should clearly be defined as the findings of the VELscope are influenced by the risk of the population involved and the experience of the clinician. There are currently no guidelines regarding the use of the VELscope in general practice27 or settings for screening 13,30 and no studies of the diagnostic accuracy of the use of a light based detection system to screen for disease in apparently healthy individuals.29 In addition there is definitely no reliable evidence that the VELscope can identify apparently ‘invisible’
oral cancer lesions in the general population.\textsuperscript{40}

Pilot and case studies done by specialists in cancer and dysplasia clinics are often used to demonstrate the remarkable sensitivity and specificity of the VELscope.\textsuperscript{10,14} These have been inappropriately referenced to other clinical scenarios. Case studies have never been strong enough to change general practice, because when done in specialist clinics, a spectrum bias is introduced due to the differing risk profiles of the patients attending specialist practice\textsuperscript{41} Clinical decision-making should rest on evidence-based recommendations, and so far the only criterion being satisfied is the desire of the patient to know that he/she is being screened for oral cancer.\textsuperscript{39} For the purpose of reassuring our patients a COE by a general dental practitioner is still the best method of determining the presence or absence of disease because dentists are more adept at recognising a disease-free state than necessarily classifying the presence of disease.\textsuperscript{39}

In the general population, where there is a low prevalence of oral cancer, there is the very real risk of cancer over-diagnosis with the VELscope, resulting in a significant emotional and economic cost. When the VELscope is routinely used in general practice among all patients 40 years and older, it will incorrectly test positive more than 90% of the time.\textsuperscript{40}

The principal weaknesses of light based detection systems are their low specificity, the fact that there is no evidence to support their cost effectiveness in comparison with COE, and the uncertainty of whether the application of the test has reduced mortality.\textsuperscript{14,40} Therefore, multicentre controlled studies conducted by general dentists are needed to justify their application.\textsuperscript{14}

When the VELscope was used in community dental clinics, the consensus was that the practitioners required more training and experience with the device as well as in mucosal pathology\textsuperscript{30,41} and that any positive findings required reassessment to limit over-diagnosis.\textsuperscript{39} Yet it was not clear whether any clinical benefit had been derived from the use of the VELscope or whether FVL correlated with the clinical risk assessment of the lesions.\textsuperscript{31}

McNamara et al.\textsuperscript{42} designed their study to accord with a general practice protocol in that 130 consecutive patients were enrolled and that all mucosal abnormalities were included. No additional lesions were identified with the VELscope, which correctly highlighted one lesion that was clinically worrisome. Common inflammatory conditions and even anatomical variations will give the appearance of FVL. As such, the VELscope did not add any benefit beyond COE for routine screening of PMD/OSCC. The routine use of the VELscope in the screening of asymptomatic individuals is therefore not supported, and may even reduce the diagnostic performance of a general dentist.\textsuperscript{41}

The importance of clinical follow up and elimination of apparently benign lesions is illustrated by the decision-making protocol described by Bhatia et al.\textsuperscript{43} which attempts to improve the low specificity of the VELscope by ruling out inconspicuous findings. In this study general practitioners found that the VELscope enhanced lesion detection by increasing the visibility and border distinctness of lesions already detected under COE, and identified additional lesions which changed the provisional diagnoses. It seems that lesions located on the lower lip were particularly amenable to FV examination as eight out of 10 lesions which had been referred, based on FV findings, were from this site (including two that were not clinically visible) and all were finally diagnosed as actinic cheilitis with or without dysplasia. The remaining lesions from intra-oral sites rendered false positives. Therefore careful interpretation of FV findings combined with the COE can improve the value of this diagnostic test.\textsuperscript{42}

The study undertaken by Huff et al.\textsuperscript{44} is perhaps the only investigation to have been performed in a general, independent dental practice. The authors claim that the VELscope aided the diagnosis of occult abnormal mucosal findings, but this cannot be concluded as only ‘clinically’ abnormal lesions were investigated, and then histologically confirmed once a brush biopsy (subject to its own inherent errors) demonstrated abnormal results. There is also no evidence that the VELscope actually detected any new dysplastic lesions or even identified all lesions detected by COE.

To perform a surgical biopsy of clinically normal mucosa that displays FVL in this general population will require a strong conviction and burden of proof as it is arguably unethical to biopsy apparently healthy mucosa in an evidently healthy individual.\textsuperscript{21}

\section*{USE OF THE VELSCOPE AS A DIAGNOSTIC ADJUNCT DURING CASE FINDING}

When the general clinician identifies an area of mucosal abnormality a differential diagnosis is established which determines the need for histological confirmation of the lesion. At this point, the clinician can choose to either do nothing based on the perceived innocence of the lesion, in which case a PMD/OSCC may go undiagnosed, or biopsy a truly innocent lesion incurring unnecessary financial cost and causing emotional distress. The ideal diagnostic device would determine the appropriate action at this critical juncture.

The reality is that about 15% of patients seen in general dental practice have some mucosal pathology,\textsuperscript{34,44} with 4.2% of those lesions regarded as malignant or potentially malignant.\textsuperscript{34} The clinical features of PMD and early OSCC are varied and may be misdiagnosed as other conditions, such as mucosal inflammation, hyperkeratosis or traumatic ulceration.\textsuperscript{14,44} Chronic ulceration, induration and rolled margins, the classical signs of oral cancer, occur late in the progression of the condition.\textsuperscript{21}

Leukoplakia and erythroplakia are PMD which offer an ideal opportunity for the diagnosis and monitoring of high risk patients. The diagnosis of these conditions is made by excluding other white

\begin{table}[h!]
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\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
\textbf{Study} & \textbf{Patient population} & \textbf{Sample size} & \textbf{Sensitivity} & \textbf{Specificity} & \textbf{PPV} & \textbf{NPV} \\
\hline
Mehrotra et al., 2010\textsuperscript{40} & Low risk & 156 & 50\% & 38,90\% & 6,40\% & 90,30\% \\
\hline
Scheer et al., 2011\textsuperscript{49} & High risk & 64 & 100\% & 80,80\% & 54,50\% & 100\% \\
\hline
Koch et al., 2011\textsuperscript{50} & High and low risk & 78 & 94\% & 13-18\% & 44-46\% & 75-80\% \\
\hline
Awan et al., 2011\textsuperscript{51} & Red and white patches & 126 & 84,10\% & 15,30\% & 37.8\% & 61,10\% \\
\hline
Rana et al., 2012\textsuperscript{52} & High risk & 289 & 100\% & 74\% & & \\
\hline
Farah et al., 2012\textsuperscript{53} & High risk & 112 & 30\% & 63\% & 19\% & 75\% \\
\hline
\end{tabular}
\caption{Summary of studies that used the VELscope for case finding of OSCC/PMD}
\end{table}
and red lesions that carry no increased risk for oral cancer. 42

White lesions to consider include hyperplastic and pseudomembranous candidiasis, frictional hyperkeratosis, leukoedema and plaque type oral lichen planus (OLP) while red lesions include erythematous candidiasis, erosive OLP discoid lupus erythematosus and inflammation secondary to trauma. The question is whether the VELscope can help in making this distinction.

A number of studies have tested the application of the VELscope in a case-finding scenario, and according to a recent Cochrane review, light based detection systems had a sensitivity and specificity of 69% and 58% respectively in the accuracy of the diagnosis of PMD/OSCC relative to the gold standard of a scalpel biopsy. This means that among a population of 1000 patients, 45 patients with OSCC would wrongly be told that they are healthy, while 210 healthy patients would wrongly be told that they have OSCC. The studies were criticised for having a high risk of bias due to subject selection being restricted to high risk patients. 50

The merit of some of studies using the VELscope as a case-finding adjunct should be considered more closely (Table 1). Scheer et al.46 evaluated the use of the VELscope in patients referred to a specialist clinic to rule out PMD/OSCC which included patients with known histories of PMD/OSCC. Despite the 100% success rate in identifying dysplasia, the authors felt that the high rate of false positives limited the positive predictive value (PPV) to such an extent that the decision to biopsy or not should always rest on the clinical judgement of the clinician.

While Rana et al.51 also conducted their study among a high risk population with PMD, surprisingly, they also included patients with pemphigus vulgaris without clarifying how these provisional diagnoses were reached. Nor were all of these provisional diagnoses confirmed as only a select number of cases received biopsies. The VELscope was not used to supplement all examinations, instead the group was arbitrarily split into subjects that would or would not receive the examination and a side-by-side comparison can therefore not be made. In addition, greater care was exercised to eliminate false positives within the VELscope group by delaying biopsies for two weeks if there were any suspicions of an acute inflammatory reaction. Despite the impressive sensitivity rate achieved the authors concede that 64.23% of all lesions examined showed FVL while only 4.88% of these lesions were dysplastic and at these levels the VELscope is considered not acceptable for clinical use.

Both Awan et al.51 and Farah et al.53 evaluated the use of the VELscope among a population of patients with red and/or white oral mucosal lesions suspected of being PMD. The VELscope enhanced lesion visualisation51,53 and had a high sensitivity for detecting any mucosal disorder.51 However, the instrument could not discriminate between high risk and low risk lesions,51,53 and wrongly indicated 69.2% of the group was arbitrarily split into subjects that would or would not receive the examination and a side-by-side comparison can therefore not be made. In addition, greater care was exercised to eliminate false positives within the VELscope group by delaying biopsies for two weeks if there were any suspicions of an acute inflammatory reaction. Despite the impressive sensitivity rate achieved the authors concede that 64.23% of all lesions examined showed FVL while only 4.88% of these lesions were dysplastic and at these levels the VELscope is considered not acceptable for clinical use.

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the absence of proven surgical or medical measures that reduce the risk of recurrence or malignant transformation of PMD.\textsuperscript{5,4,64} Careful monitoring is most strongly advised.

There are also no reliable laboratory means of predicting which lesions will progress to cancer, although the histological characteristics of dysplasia,\textsuperscript{4} degree of dysplasia,\textsuperscript{64} and molecular features such as loss of heterozygosity (LOH),\textsuperscript{64} can be used to stratify individual risk to a degree.\textsuperscript{64} These techniques are not absolutely predictive, even more so because biopsies are not always completely representative.\textsuperscript{64} Conventional clinical factors such as the site of the lesion or tobacco habit cannot be relied upon, although larger (> 200 mm\textsuperscript{2}), non-homogenous leukoplasias are more likely to transform into malignancy.\textsuperscript{44}

In patients who were successfully managed for a primary OSCC, the very real risk of a recurrence or second primary tumour (SPT) exists, so that monitoring is integrally important. Over the course of ten years, up to 7\% of patients will experience a recurrence and 15\% an SPT.\textsuperscript{64} In patients with PMD/OSCC, high risk, molecular alterations may spread across a large as well as distant mucosal fields,\textsuperscript{26} so that dysplasia and even micro-invasive OSCC may be found at the clinically healthy oral site contra-latéral to that of the initially presenting dysplastic or OSCC lesion.\textsuperscript{1,2,4,5}

It is within this context that an adjunctive diagnostic aid finds value by: diagnosing disease early, perhaps even within clinically normal tissue; identifying high risk change in mucosa with PMD so that the need and ideal location of the biopsy site is determined; and allowing for the complete removal of an OSCC by identifying the surrounding area of field change. Patients with PMD and OSCC are frequently subjected to biopsies during follow-up, resulting in significant anxiety and discomfort while not guaranteeing that the mucosa is healthy or safe. According to Baley et al.\textsuperscript{4} the ideal application of the VELscope is in patients monitored in cancer and dysplasia clinics where the probability of OSCC is greater than 10\%.

Lane et al.\textsuperscript{10} conducted the first proof of concept pilot study for the use of the VELscope among patients with a history of dysplasia or OSCC. All lesions deemed suspicious on clinical grounds and toluidine blue findings were biopsied, and the histopathological diagnosis then retrospectively matched to FV. In this setting, the VELscope achieved a sensitivity of 98\% and specificity of 100\%, demonstrating the significant benefit within this particular patient population. These findings were subsequently confirmed by Ohnishi et al.\textsuperscript{17} who found that the VELscope had a 91\% sensitivity and 100\% specificity for detecting dysplasia and OSCC.

Subsequent case reports demonstrate some remarkable features of the VELscope. Poh et al.\textsuperscript{18} demonstrated that the VELscope can delineate the clinically occult high risk field surrounding the primary tumour before surgical resection. The field reliably corresponded to molecular risk (as determined by LOH at 3p and 9p) even before it was histologically visible, hinting at the fact that histology may not always be considered as the gold standard. The VELscope also proved to be of value in the monitoring of cancer and dysplasia patients by identifying new lesions in clinically healthy tissue, even at sites distant from the original lesion, emphasising the importance of whole mouth monitoring.\textsuperscript{4} Tsui et al.\textsuperscript{49} compared the VELscope with toluidine blue in visualising the field surrounding a tumour. While toluidine blue stained only isolated areas corresponding to early OSCC, the VELscope also identified a wider area corresponding to dysplasia.

These case reports\textsuperscript{15,16,65} show that the VELscope is useful in the monitoring of patients with a history of dysplasia as well as delineating the high risk field that surrounds the primary lesion. These reports are also used to substantiate the claim that the VELscope can detect clinically occult disease. However, inspection of the photographic documentation of the cases reveal clinically visible mucosal changes in the areas deemed to be ‘clinically occult’.

Delineating the surgical margin of OSCC and dysplasia significantly impacts on the lives of patients.\textsuperscript{13,14,15,16,48,70} by reducing the rate of tumour recurrences in the first year to 0\% as opposed to 25\% among patients in whom the margin was clinically determined.\textsuperscript{70}

Using a prototype of the VELscope, Moro et al.\textsuperscript{56} also confirmed the benefit of using FVL to delineate the field surrounding the primary lesion as well as in identifying more lesions than is clinically possible in the monitoring of patients with PMD/OSCC. Although it is arguably not feasible to define false negatives as the entire mucosa cannot be biopsied, patients in whom there was no FVL did not develop new tumours during the study. If true negatives are considered in this context, then a sensitivity of 100\%, specificity of 93\%, PPPV of 92\% and NPPV of 100\% can be derived.

The monitoring of patients with a history of PMD/OSCC is often complicated by the mucosal changes associated with previous surgery and radiation. These mucosal changes make clinical as well as fluorescent interpretation difficult so that in this setting the VELscope actually had a very limited sensitivity of 27.3\% and specificity of 77.8\%.\textsuperscript{71} The poor sensitivity that this study obtained is very worrisome as the sample was of the high risk population in which recurrences should be conclusively diagnosed. The subjective interpretation of the VELscope findings were again considered as an important limitation so that the VELscope was not deemed to be of any benefit in the monitoring of high risk patients.\textsuperscript{71}

CONCLUSION

Based upon these studies, Fedele's\textsuperscript{37} standpoint still stands true, that the use of the VELscope in general practice is anecdotal, and that its primary use is to help experienced clinicians improve their ability to detect PMD/OSCC in high risk individuals attending specialist centres. The primary difficulty in general practice is to reliably distinguish between lesions. To this end, there is no substitute for proper training and experience in oral mucosal pathology. Because a dentist may detect only one OSCC in 7-10 years,\textsuperscript{10} the danger of complacency and cursory oral mucosal examinations is very real. However, the impact on the life of that particular patient is devastating, and worth the extra two minutes of the time of the attending clinician.

Reference


APEXOGENESIS TREATMENT WITH MINERAL TRIOXIDE AGGREGATE: LONG-TERM FOLLOW-UP OF TWO CASES

ABSTRACT
Apexogenesis is the treatment of choice for traumatized or carious teeth which, at the time of exposure, have a vital pulp and open apex. This article describes two cases of permanent teeth with carious exposures, treated with direct pulp capping procedures using mineral trioxide aggregate (MTA).

METHODS
Radiographic and clinical examination, including testing reaction to cold, showed that both teeth were immature and in a stage of reversible pulpitis. The caries was identified using caries detector dye and removed using a rotary bur. Sodium hypochlorite solution was applied to the exposed pulp to achieve haemostasis. MTA paste was then placed on the pulp exposure and surrounding dentine. In the first case, the MTA was covered with a glass-ionomer restorative material; in the second case, the MTA was covered with a glass-ionomer cement and restored with composite resin.

RESULTS
Radiographic and clinical examinations on the initial and long-term follow-up visits showed that root development continued and apices formed. The teeth remained vital and functional, and no further endodontic intervention was necessary.

CONCLUSION
Under the conditions of this study, MTA proved to be a reliable pulp-capping material on direct carious exposures in immature permanent teeth using a one-visit protocol.

INTRODUCTION
Vital pulp therapy (e.g., pulp capping, partial or full pulpotomy) is generally the treatment of choice for traumatized or carious teeth with a vital pulp and open apex at the time of exposure.1,2 The treatment is very successful on traumatically exposed teeth3,4 because a healthy pulp is capped.4,5 Vital pulp therapy on cariously exposed pulp is not as successful,6 because the capping of inflamed tissue is less predictable.4,7,8 According to Trope,4 the area and depth of inflammation in cariously exposed pulps are very unpredictable, and pulp capping at the superficial exposure site can result in failure. After observing 49 teeth over a period of 9 years, Bogen et al.9 found that 97.96% of immature (with open apices) and adult (with closed apices) teeth with carious exposures capped with mineral trioxide aggregate (MTA), had favourable outcomes on the basis of radiographic appearance, no symptoms and normal responses to cold testing. Fifteen of the teeth were immature at the time of treatment, and all these subsequently demonstrated continued normal apexogenesis to complete root formation.

Vital pulp therapy on immature teeth allows for continuation of root formation, which leads to apical closure,10 preservation and maintenance of pulp vitality,7 stronger root structure and greater structural integrity.10,11 The most successful agent for pulp capping procedures is MTA. This material has a long history of use for both pulp capping and other applications.12-14 As a pulp capping material, MTA can induce hard tissue formation in pulpal tissues,13-18 produce a thicker dentinal bridge at a faster rate,19-20 promote longer-term sealing,21 reduce inflammation, reduce hyperaemia and reduce pulpal necrosis compared with calcium hydroxide.10,15,20-22
Despite its biocompatibility as a pulp capping material, it has a delayed setting time, poor handling characteristics and is costly. This article presents two case reports where MTA was used as a direct, single-visit pulp capping material in cariously exposed teeth with immature roots.

**CASE REPORT 1**

An 8-year-old boy was referred to our private practice by another practitioner who had exposed the pulp during removal of occlusal decay on the recently erupted mandibular right first premolar. The patient was seen at the endodontic practice thirty minutes after the carious exposure. The dentist had placed a moist, sterile cotton pledge over the exposure and covered it with a zinc-oxide eugenol temporary restoration. Radiographic examination showed that the root formation was immature (Figure 1a). The patient's medical history was noncontributory. A rubber dam was placed, and a caries indicator dye (Sable Seek, Ultradent, South Jordan, UT, USA) was applied to facilitate final caries excavation, which was done using a slow-speed carbide bur in a contra-angle hand piece under 12X microscope magnification (Figure 1b).

A 6% sodium hypochlorite solution (NaOCl) (Chlor-Xtra, Vista Dental, Racine, WI) was placed on the exposed pulp in order to achieve haemostasis. After three minutes, the NaOCl was rinsed away with water using a two-way syringe, and the area was blot-dried with sterile cotton pledges. Adequate hemostasis was seen to have been achieved. White ProRoot MTA (Dentsply Sirona, Philadelphia, USA) was mixed according to the manufacturer’s instructions, and a thick layer of the cement was placed directly over the exposure site and surrounding dentine (Figure 1c). The MTA was then directly covered with a glass-ionomer material (Fuji IX GP, GC Corporation, Tokyo, Japan), which was also used to restore the cavity. Figure 1d shows an immediate postoperative periapical radiograph.

The patient was instructed to call our clinic immediately if any pain or discomfort occurred. At the ten-day recall visit the patient was asymptomatic and had a normal response to cold testing. The patient was rescheduled for follow up after three months and at one, two, four and six years, with instructions to return immediately in case of any discomfort.

At the one-year follow-up visit, more root development was observed, with a thickening of root walls and a visible dentine bridge at the exposure site (Figure 2a). At a two-year recall visit, the tooth tested vital, and a periapical radiograph showed additional root formation (Figure 2b). The three-year follow-up visit confirmed complete root formation and apex closure (Figure 2c). Figure 2d depicts the four-year follow-up radiographic image of the asymptomatic tooth. At that stage, the tooth tested vital and a normal periodontal ligament was demonstrated.

**CASE REPORT 2**

A seven-year-old boy attended our practice for a routine checkup. A bitewing radiograph revealed an occlusal-cavity on his mandibular left first permanent molar. The patient’s medical history was noncontributory. Local anesthetic was administered, a rubber dam was placed, and the cavity prepared with a high-speed diamond bur. Caries indicator was used to ensure complete excavation of caries, which was carried out under 12X microscope magnification using a slow-speed carbide bur in a contra-angle hand piece.

Haemostasis was achieved by the application of a 3.5% NaOCl solution (Jik, Reckitt Benckiser, South Africa) on the exposed pulp for two minutes. The NaOCl was then rinsed away with water using a two-way syringe, and the area was blot-dried with sterile cotton pledges. Grey ProRoot MTA (Dentsply Sirona, Philadelphia, USA) was mixed according to the manufacturer’s instructions, and a thick layer of the cement was placed directly over the exposure site and surrounding dentine. Then, the MTA was covered with a light-cured resin-modified glass-ionomer cement (Vitrebond, 3M ESPE, St Paul, Minnesota, USA), and composite resin (TPH Spectrum, Dentsply Sirona, Philadelphia, USA) was used to restore the cavity. An immediate postoperative periapical radiograph showed that the roots of the molar were still immature with large open apices (Figure 3a).

The patient was instructed to call our clinic immediately if any pain or discomfort occurred. At the fifteen-day recall visit the patient reported that the tooth was asymptomatic. Testing with the application of cold resulted in a normal reaction. The patient was rescheduled for follow up at three months and at one, two, four and six years, with instructions to return immediately in case of any discomfort.

At a 14-year follow-up visit (Figure 3d), the tooth was still asymptomatic and had a normal response to cold testing. The periodontal ligament around the apical third of the mesial roots was noted.

**DISCUSSION**

Radiographic assessment of both teeth in the two case reports demonstrated that the roots had progressed to complete root formation and apex closure, and cold testing confirmed the preservation and maintenance of pulp vitality. Dentine bridge formation at the site of pulpal exposure was also noted in both cases.

Studies have shown that properties of a pulp capping material such as sealing ability, alkalinity and biocompatibility could be responsible for dentine bridge formation. MTA has the ability to induce hard tissue formation in pulpal tissues when used as a direct pulp capping material. The placement of MTA on
exposed pulp tissue stimulates the release of growth factors, which is necessary for pulpal cells to recruit and organize odontoblasts to lay down reparative dentine. Compared with calcium hydroxide (Ca(OH)\textsubscript{2}), MTA induces dentine bridge formation at a faster rate, develops more complete dentine bridges and demonstrates an improved ability to maintain pulp tissue integrity. Hilton et al. conducted a large, randomized clinical trial over a two-year period in a practice-based research network that showed the superior performance of MTA compared with Ca(OH)\textsubscript{2}.

Farsi et al. reported a success rate of 93% over a 24-month recall period in a clinical study in which 30 young, permanent, cariously exposed, asymptomatic teeth were pulp capped with MTA. Clinical and radiographic success was reported as all the teeth were asymptomatic, showed signs of vitality, lacked periapical radiolucencies and showed evidence of continued root growth.

The use of caries detector dye to confirm all caries had been removed, NaOCl for haemostasis and disinfection, MTA as a pulp capping material, glass-ionomer material to cover unset MTA material and enhanced magnification of all clinical procedures were all factors contributing to the success of these two one-visit pulp capping treatments.

Effective operative magnification and careful caries removal have been identified as important prerequisites for success, with the placement of a bioactive pulp capping material enhancing the innate healing capacity of the human dental pulp.

Haemostasis after pulp exposure was controlled by applying 3.5–6% NaOCl directly to the exposed pulp tissue for a few minutes, as suggested by several studies. NaOCl is an excellent haemostatic agent as it can disinfect microbiologically contaminated dentinal chips and micro-debris, inhibit fibrin clot formation, and disinfect the adjacent perforated dentin interface. NaOCl has potent cytotoxicity, and should therefore be handled with care.

The ideal capping material for vital pulp therapy should facilitate bridge formation to re-establish an enclosed, protected pulp, be easy to handle, be non-toxic to pulp, have antibacterial properties, be biocompatible, adhere to dentine sufficiently to create a tight seal, have sufficient mechanical strength including hardness, compressive strength and flexural modulus, and facilitate mineral tissue formation by stimulating the differentiation of pulp cells into odontoblasts/odontoblast-like cells. MTA has gained popularity for this purpose and is indicated for use as a pulp capping material.

ProRoot MTA (ProRoot MTA, Dentsply Sirona) is commercially available in both white (WMTA) and grey (GMTA) forms. MTA basically consists of calcium, silica and bismuth oxide, but the two products differ in terms of the presence of aluminium, magnesium and iron (GMTA has higher amounts of each). Previous studies have shown that there are no histological differences in the production of a calcified bridge or the pulp inflammatory response between WMTA and GMTA after pulp capping, which was also demonstrated in the two case studies presented here.

Several studies have highlighted the importance of achieving a coronal seal after pulp capping. Despite the fact that MTA provides some seal to tooth structure, the glass-ionomer material that was placed over the MTA also provided an excellent bacterial seal when used in close proximity to, but not in direct contact with, the pulp. Placement of glass-
ionomer material over MTA is also needed to protect the MTA during restoration placement, thereby allowing for a single-stage pulp capping procedure. Without this layer of glass-ionomer, it would be necessary to place a water-moistened cotton pellet directly over the unset MTA material, and the patient would need to attend a second appointment for the definitive restoration.

CONCLUSION

MTA proved to be a reliable pulp capping material on direct carious exposures in immature permanent teeth using a one-visit protocol.

Disclosure

The authors confirm that there are no conflicts of interest related to the case reports depicted in this article.

References

CASE REPORT

A 54-year-old female was referred to the Oral Medicine Clinic at the University of the Western Cape (UWC), Oral Health Centre, Tygerberg campus, by her general practitioner. She complained of persistent painful oral ulcers that had appeared approximately nine months previously. Small vesicles had been noted by the patient prior to the development of the oral ulcers. The patient reported having taken a course of antibiotics and using an antibacterial mouthrinse with no response to treatment. She also complained of a left chronic conjunctivitis, with itching, burning and tearing of the left eye, for which she had used numerous over-the-counter eye drops with no symptomatic relief. Her eye symptoms had started a few weeks following the onset of the oral ulcers. The patient’s medical history was otherwise unremarkable. She had no known drug allergies.

Extra-oral examination revealed diffuse erythema of the left ocular conjunctiva (Figure 1). Intra-oral examination disclosed multiple superficial, large, irregular areas of ulceration in the hard palate, soft palate, floor of mouth and buccal mucosa, all on a background of white-erythematous mucosa (Figures 2-4). Desquamative gingivitis of mandibular and maxillary gingiva was seen (Figure 5). The only unaffected oral sites were the tongue and the lips.

Based on the clinical features a differential diagnosis of pemphigus vulgaris and benign mucosal pemphigoid was considered. An incisonal biopsy of the intact buccal mucosa adjacent to the area of ulceration was performed under local anesthesia.

Histological evaluation of the biopsy specimen revealed squamous mucosa with an extensive cleft above the basal cell layer, with the basal cells remaining adhered to the basement membrane (Figure 6). The suprabasal cleft contained rounded acantholytic epithelial cells (Figure 7). The subepithelial connective tissue showed a chronic inflammatory cell infiltrate. Based on the clinical and microscopic features a final diagnosis of pemphigus vulgaris was established.

The patient was placed on a course of systemic steroids (prednisone 60 mg/day for seven days). For ocular symptoms an ocular lubricant

ACRONYMS

PV: Pemphigus vulgaris
and a topical corticosteroid were prescribed by the ophthalmologist. After seven days of treatment there was complete remission of the ocular and oral mucosal lesions. However, the patient developed small erythematous vesicles on extensor surfaces of both thighs and was subsequently referred to the dermatologist (Figure 8).

DISCUSSION

Pemphigus vulgaris (PV) is a rare vesiculobullous disease characterized by blistering of the skin and mucous membranes. Its incidence ranges from 0.42 to 1.62 cases per 100,000, affecting predominantly adults with a mean age of 50 years. The disease occurs equally in both genders. The term “pemphigus” originates from the Greek word “pemphis”, meaning blister. The aetiology of PV is autoimmune, and its main clinical characteristic is the development of blisters of the skin and mucous membranes due to the abnormal production of IgG autoantibodies against desmosomes (desmoglein 1 and desmoglein 3). Desmosomes are intercellular junctions that provide strong adhesion between the keratinocytes.

The loss of desmosomes by IgG autoantibodies results in intraepithelial separation forming a blister. PV has been shown to have a strong genetic basis with a racial/ethnic-specific incidence in Ashkenazi Jews and people of Mediterranean descent.

Initiating factors have been reported in the literature and include certain foods, infections, neoplasms, and drugs. The drugs commonly implicated are those in the thiol group – in particular captopril, pencillamine and rifampicin.

Blisters, irregular erosions and ulcerations are the main clinical features of PV. When the blister ruptures, it leaves an erythematous, extremely painful ulcerated base, with loss of fluid and electrolytes. Mucosal lesions usually precede skin lesions, and may be the sole manifestation of the disease. Erosions are usually seen in mucous membranes of the oral cavity, but may also be observed within the nasopharynx, larynx, oesophagus, genital and ocular mucosa. Cases with simultaneous involvement of mucous membranes of different anatomical sites have been described in the literature. The oral lesions of PV are extremely painful and result in abundant salivation, halitosis, difficulty in swallowing and phonation.
The most common sites of oral involvement include the buccal mucosa, soft palate, labial mucosa, and gingiva, although any oral site may be affected. 

Skin lesions may occur in any region of the body, affecting predominantly the trunk and the limbs, especially large areas of bending folds such as the neck.

When ocular involvement is present, conjunctivitis is the most common manifestation. Chronic conjunctivitis leads to loss of goblet cells that produce mucus, resulting in burning and tearing of the eyes. Adequate eye care is required to prevent infection, scar formation and corneal perforation, which may result in blurring or loss of vision.

The differential diagnosis of PV includes several autoimmune and infective diseases that present with blisters, erosions and ulcerations such as benign mucosal pemphigoid, systemic lupus erythematosus, epidermolysis bullosa, erosive lichen planus, erythema multiform, herpes simplex and zoster. For a definitive diagnosis, an incisional biopsy of a peri-lesional tissue should be performed and the clinical findings correlated with the microscopic features. In some cases, direct and indirect immunofluorescence studies may be used for confirmation of PV. Histopathological examination of the peri-lesional mucosa shows an intra-epithelial vesicle above the basal cell layer, with the basal cells remaining adhered to the underlying basement membrane (Figure 6). The vesicle often contains detached rounded keratinocytes with swollen hyperchromatic nuclei called Tzanck cells (Figure 7).

The mainstay of treatment for PV is systemic corticosteroids. Topical therapy of ocular and oral mucosal lesions may be required to relieve local pain and discomfort (e.g. creams, pastes, drops, intralesional injections). Prednisone is the drug of choice, the maximum daily dose of which is 120 mg (1-2 mg/kg/day). The initial dose of prednisone is typically about 0.75 to 1 mg/kg/day. If the initial dose is ineffective in controlling the disease, the dose is increased by 25% to 50% every five to seven days.

Immunosuppressive drugs (such as azatropion, cyclosporine, cyclosporiphamide, proctaglandin, chlorambucil levamizol and immunoglobulins) can be used in resistant lesions or aimed at reducing the corticosteroid dose and its side effects. Immunosuppressive therapy may result in the development of opportunistic infections such as candidiasis and herpes, and new therapy should be instituted for these conditions. Currently, low-level laser therapy combined with immunosuppressants has been shown to be effective in the management of PV.

Low-level laser therapy could result in immediate and significant analgesia and improved wound healing within the observation period and follow-up. Furthermore, a decrease in the discomfort of the patients has been reported as well as no recurrence of the pemphigus vulgaris lesions.

CONCLUSION

Dentists should be aware of the oral and ocular manifestations of PV, since these precede the appearance of cutaneous lesions. Therefore, the dentist may not only be the first but also the most important health care professional responsible for the diagnosis of the disease, as early treatment may prevent life threatening complications such as loss of vision. Due to the multisystemic nature of PV, a multidisciplinary approach for the management of the disease is required, involving dentists, oral medicine specialists, pathologists, dermatologists, ophthalmologists and immunologists. Steroids and immunosuppressive agents are commonly employed in the management of PV to reduce the production of autoantibodies.

Currently, low-level laser therapy has been shown to be an effective and recommended alternative therapeutic option, providing improvements in the health and quality of life of patients.

References

Hyalinising clear cell carcinoma of the maxilla in a young adult female

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F Bhamjee 1, A Jeftha 2, H Holmes3, R Roberts4, T Roberts5

CASE REPORT

A 23-year-old healthy female, with a history of smoking, presented to the Oral Medicine Clinic complaining of a growth on the right side of her upper jaw. She reported having noticed the lesion approximately one year prior to her initial presentation and explained that the absence of symptoms and the assumption that the growth was a dental abscess had delayed her seeking professional assistance. Recent symptoms of pain and accelerated enlargement were reported as having developed two months previously, the pain being described as mild and intermittent, but with increasing intensity while eating. This had motivated her to consult a private dental practitioner who subsequently referred her to the Oral Medicine Clinic for excisional biopsy.

Her dental history was limited to previous dental extractions without prosthetic replacement and she acknowledged usually presenting for dental treatment only when in pain. The Extra-oral examination demonstrated a right submandibular lymphadenopathy and facial asymmetry due to the displacement of the right cheek by the intraoral lesion. An intraoral examination revealed a state of poor oral hygiene with retained roots, carious teeth and a collapsed partially edentulous occlusal scheme. In the first quadrant, a large exophytic, broad-based mass enveloped tooth 15, extending from the distal aspect of the retained root of tooth 14 to the mesial aspect of tooth 18 (Figure 1). The margins of the growth were diffuse and integrated into the surrounding keratinized gingival tissues at both facial and palatal surfaces. In colour and texture it also closely matched the surrounding tissues, being smooth surfaced, firm and not blanching on palpation. Minor surface ulcerations were noted on the occlusal surface of the lesion which contacted the lower edentulous ridge during mastication. A list of differential diagnoses for the clinical presentation included pyogenic granuloma, peripheral giant cell granuloma, fibrous epulis, and peripheral ossifying fibroma. A salivary gland neoplasm was suspected and included in the differential list once the destructive nature of the lesion was seen radiographically (Figure 2).

Assessment of the orthopantomogram (OPG) revealed the presence of radiolucency in the first quadrant from the 15 to 18 regions, with obliteration of the sinus floor. The root of tooth 15 was mesially displaced and appeared to be “floating” up against the root remnant of tooth 14. Caries was noted on teeth 18, 38, 37 and 48 (Figure 2). An axial CT image confirmed infiltration into the right maxillary sinus (Figure 3).

ACRONYMS

AE1 and AE3: Cytokeratin
CEA: Carcinoembryonic antigen
CT: Computed tomography
DPAS: Periodic acid-Schiff-Diastase
EMA: Epithelial membrane antigen
H&E: Haematoxylin and Eosin stain
HCCC: Hyalinising clear cell carcinoma
OPG: Orthopantomogram
PAS: Periodic acid-Schiff stain
p63: Tumour suppressor protein
SMA: Smooth muscle actin

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Figure 1: The clinical presentation of the lesion
A 1cm wide elliptical incisional biopsy was taken from the area immediately distal to tooth 15. The vertical incision was approximately 1-1.5cm deep. The biopsy specimen was placed into a 10% formaldehyde solution and sent to the pathology laboratory for histopathological evaluation. The histopathological report was consistent with a diagnosis of a hyalinising clear cell carcinoma. The biopsy was extensively assessed by multiple consultant oral pathologists in order to establish the diagnosis. The final consensus histopathological finding of HCCC was based on the following findings:

At 40x objective magnification (Figure 4, H&E) showed infiltrative nests and trabeculae of malignant cells, invading into a desmoplastic stroma. Peri-tumoural retraction artefact was noted.

At 100x magnification (Figure 5), the H&E highlighted the epithelial nature of the carcinoma, with the malignant cells showing cellular cohesion and moderate amounts of cytoplasm. Figure 6 at 400x objective magnification shows the tumoural cellular morphology, with large nuclei, single central nucleoli, irregular and notched nuclear membranes, moderate amounts of pale eosinophilic-to-clear cytoplasm and defined cell borders. In areas, the cytoplasm had a finely vacuolated appearance.

At 400x objective magnification (Figure 6, H&E) showed infiltrative nests and trabeculae of malignant cells, invading into a desmoplastic stroma. Peri-tumoural retraction artefact was noted.

A PAS and DPAS at 400x (Figures 7 and 8) highlighted the observation that the tumoural cells contain intracytoplasmic PAS positive, Diastase PAS sensitive glycogen. AE1/AE3, p63 and EMA showed immunopositivity.

The patient was immediately referred to Head and Neck Oncology Unit at Groote Schuur Hospital for further management. Of considerable importance was the confirmation that the presenting lesion was the primary, R

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with no evidence of metastases. The complete patient work-up included serial blood tests, head and chest radiographic studies, head and body CT scans and regional lymph node biopsies. Surgical intervention included a partial maxillectomy with submandibular and cervical node neck dissection and tracheostomy. Postoperative radiotherapy was initiated after postoperative healing and stabilisation.

DISCUSSION

Hyalinizing clear cell carcinoma (HCCC) is a rare low-grade malignancy with an infiltrative growth pattern. It affects mainly the minor salivary glands of adult women and accounts for less than 1% of all salivary gland tumours. The WHO classifies HCCC as being a variant of a clear cell epithelial-myoepithelial carcinoma. Many researchers, however, now think it should be classified as a separate entity with its own characteristic histological features. In the oral cavity, HCCC generally arises from the minor salivary glands, with the most frequent site of occurrence being the tongue, followed by the palate, floor of the mouth, buccal mucosa, retromolar trigone and jaws. Other sites include the parotid glands, the hypopharynx and the nasopharynx. HCCC generally develops in women in the fifth to seventh decades presenting as a slow-growing, painless submucosal mass without surface ulceration, unless it has been secondarily traumatized. Numbness, pain and even limitation of movement have been noted in lesions involving the tongue. Bone destruction and movement of teeth have been reported when the lesion affects the jaws.1 The presented case is unique as the age of presentation is significantly younger than that recorded in previous literature. Microscopically, these tumours contain a significant proportion of neoplastic cells with a clear cytoplasm and morphologically do not fit into other categories of salivary gland malignancies. The microscopic diagnosis of HCCC is challenging as the spectrum of its microscopic features frequently overlaps those of other salivary gland neoplasms which also contain clear cells.2 Similarly, non-salivary, metastatic and odontogenic tumours that show clear cells should be included in the histologic differential diagnosis. To be excluded are the salivary gland tumours with a clear cell component such as epithelial-myoepithelial carcinoma, myoepithelial carcinoma, clear cell mucoepidermoid carcinoma, acinic cell carcinoma, polymorphous low-grade adenocarcinoma and clear cell oncocytoma. Metastatic possibilities include renal cell carcinoma and balloon cell melanoma. Odontogenic tumours with a clear cell component include entities such as calcifying epithelial odontogenic tumor (Pindborg tumour) and clear cell odontogenic carcinoma. Generally, the hyalinizing nature of the stroma can be a feature that points to a diagnosis of HCCC as well as the PAS and DPAS positive glycogen rich clear cells.3,4 Treatment of HCCC involves local excision with healthy margins followed by reconstruction. If lymph node metastases are detected or considered to be likely based on clinical and radiographic investigation, partial or modified neck dissection is performed.5 Postoperative radiotherapy, used to improve metastatic control in malignant salivary gland tumours in general, is suggested when the surgical margins are unclear or if the lesion demonstrates aggressive behaviour. Chemotherapy has generally not been considered to be effective in the management of salivary gland tumours. The rare nature of the lesion as well as the paucity of documented literature, limits our ability to draw conclusions regarding optimal management of these lesions.3

CONCLUSION

A diagnosis of hyalinising clear cell carcinoma of the maxilla in a female in the second decade of life is a rare entity. The diagnostic protocol followed was in keeping with the admittedly scant current evidence from the literature of this tumour of minor salivary gland origin. Thankfully, the patient had no lymphatic involvement and was clear of all malignancy at the one year follow-up.

Tumours of the minor salivary glands remain rare in occurrence but this experience emphasizes the need for prompt diagnosis of swellings within the oral cavity at any age.

Declaration: No conflict of interest declared.

References

THE ROLE OF LASER THERAPY IN IMPLANT DENTISTRY

INTRODUCTION
As dental implants are becoming more common in dental practice, so the question may arise: what is the role of laser therapy in Implant Dentistry and can it be used to improve the treatment of the patient? In fact, lasers may be used at all stages, from preplacement of implants through to controlling and eliminating infection in the area of the final implant.

Light amplification by stimulated emission of radiation leads readily to the acronym: LASER. The light emitted by a laser is measured in wavelengths, which vary with the type of laser. In Dentistry, the lasers used and their wavelengths cover a wide range – visible light from 400 to 700 nm, Diodes 830-1,064 nm, Nd: YAG 1,064 nm, Erbium 2,790-2,940 nm, and CO2 9.3-10.6 micrometers. Each laser has a wavelength which has a specific thermal output and produces a specific tissue interaction that is always predictable. Dental lasers are classified by various methods according to the lasing medium, such as: gas laser and solid laser; according to tissue applicability: hard tissue and soft tissue lasers; according to the range of wavelength. The risk associated with laser application also influences the classifications. Erbium lasers are used for treatment of hard tissue, for example in the preparation of cavities, but they may also be applied in the treatment of soft tissues. However, Diode lasers can be used only for the treatment of soft tissue and pain management.

DISCUSSION
All the lasers including CO2 may be beneficial for pre-treatment and post-treatment of the area where implants may be placed.

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ACRONYMS

nm: nanometers
DNS: Dental Neurosciences

Lasers can enhance conventional treatment by decreasing bleeding and reducing swelling, by promoting better healing and by delivering an antibacterial effect.

Diode lasers are manufactured to produce different wavelengths, with 810, 940, 980, and 1064 nm being the most common. The energy from these lasers targets pigments such as haemoglobin and melanin in the soft tissue. The energy generally is delivered by a fibre in contact mode. By conditioning, or carbonizing, the fibre, the tip heats up to between 500° and 800° C. The laser effectively cuts by vaporizing the tissue, which occurs through physical contact of the heated tip of the laser, rather than from the optical properties of the laser light itself.

Absorption of the wavelength is the primary desired laser–tissue interaction; the better the absorption, the less the collateral thermal heat directed toward the implant. The 980-nm wavelength is absorbed into water at a slightly higher rate than the 810-nm wavelength, making the 980-nm diode laser potentially safer and therefore more useful around implants. The 980-nm diodes are safe to use near titanium surfaces even at higher power settings. Studies show that the 810-nm diode laser creates a high temperature rise at the implant surface. Romanos also reported that 810-nm diode lasers may damage the surface of the implant.

Diode lasers are considered to be similar to neodymium doped yttrium–aluminum–garnet (Nd:YAG) lasers in dental applications. The advantage of a diode is that this produces less depth of penetration than with the Nd:YAG laser. This more limited effect allows the operator greater control of the laser and reduces the risk of lateral thermal damage.

Disadvantages include slowness in speed of cutting and a gated-pulse delivery mode that translates into potential heat build-up in tissue, which could in fact lead to lateral thermal damage.
The clinician should therefore be aware of the power density of the diode, especially when working close to the surface of implants.

The fibre delivery system of diode and Nd: YAG lasers allows debris to build up on the fibre tip. Consequently, frequent cleaning and cleaving of the tip are necessary. Second stage exposure of implants when the tissues are relatively thin, is an appropriate use for a diode laser. A full-thickness flap raised for the placement of implant fixtures, in more challenging for lasers.

By vaporizing water molecules within the hard tissues, erbium lasers create microexplosions in the hydroxyapatite that break down the hard tissue during the ablation process. This effect is achieved without charring or carbonization, and the heat generated is minimal. It is most effective in lightly vascularized tissue where bleeding will not be an issue. As the energy is absorbed into water, the erbium laser is safe to use around implants and can be applied in the treatment of peri-implantitis and mucositis. This laser will leave the bony surface bleeding (for healing), so curettage is not necessary, but it will not harm the surface of the implant. Erbium lasers have excellent bactericidal properties because when absorbed into intracellular water the energy ruptures the cell membranes of bacteria. It has been confirmed that lasers show high effectiveness in decontamination of zirconia implants.

Using laser energy to make any incision has several benefits. First, a sterile cut is less likely to become infected. Lasers incise tissue without creating the cascade of events that leads to swelling and inflammation. Because lasers seal off lymphatics and blood vessels, a clinically measurable reduction in pain, swelling, and other postoperative complications has been documented for these incisions. Analgesics and antibiotics are needed less frequently, and often in lower doses and with fewer drug interactions. Because patients experience a significantly less traumatic postoperative course. These benefits apply in both minor and more advanced surgical procedures.

CONCLUSION

Laser therapy could be used as an adjunct to conventional treatment for peri-implant diseases, provided the appropriate strength and wavelength are selected.

References:
Maxillofacial Radiology Case 158

Below are photos of various stages of a lesion that may present in the jaws. Studies published in the literature found this lesion to be most common in black middle-aged (≈40yrs old) women. Discuss the radiological features. What is the most important clinical test that you will perform on the patient before making a final diagnosis?

INTERPRETATION

In the first stage (Fig.1) the radiograph shows well defined apical radiolucencies apical to the teeth. The teeth are intact, as are the periodontal ligament spaces. In the second or intermediate stage (Fig.2) the lesion is partly radiolucent and partly radiopaque. Usually the hard tissue formation is initiated centrally in the lesion. In the third stage (Fig.3), also called the mature stage, the lesion is transformed into a mineralized, radiopaque mass which is surrounded by a narrow radiolucent zone (green arrow). A clinical diagnosis of periapical cemental dysplasia was made. Apical cemental dysplasias (apical cementomas) are benign lesions that contain cementum-like tissue and originate from cellular elements of the periodontal space. They are non-expansile radiolucencies in the early or mature stage. There may be single or multiple lesions. Bone expansion is absent, and pain is not a feature and no treatment is required. As the lesion matures, increasing amounts of cementum-like material are laid down in the lesion. In the mature stage, the radiographic appearance of a cementoma is a well-defined radiopaque lesion (Fig.4) usually bordered by a thin radiolucent line or band (white arrow).

It is the radiographic feature of the radiolucent band separating the calcified mass from the bone that distinguishes the apical cementomas from osteosclerosis and condensing osteitis. As the lesion progresses, the fibroblasts differentiate into cementoblasts and the formation of cementum begins. Usually cementum is formed as cement-like structures (Fig.5) which later coalesce to form solid masses (yellow arrow). Apical cemental dysplasia is not commonly seen in the upper jaw (Fig. 6). In the early radiolucent stages of a developing apical cemental dysplasia it is important to check the vitality of the involved tooth to exclude the possible presence of an apical infection.

References:
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Prevention of infective endocarditis associated with dental interventions

SOUTH AFRICAN HEART ASSOCIATION POSITION STATEMENT, ENDSORED BY THE SOUTH AFRICAN DENTAL ASSOCIATION

ABSTRACT
Infective endocarditis (IE) is associated with significant morbidity and mortality. Prevention is therefore an important clinical entity. The maintenance of optimal oral health is likely to play the most important role in protecting those at risk for IE. Both patients and health care practitioners must be educated in this regard. Guidelines have recommended that antibiotic prophylaxis should be limited to individuals (undergoing certain high-risk dental procedures) with underlying cardiac conditions that are associated with the greatest risk of an adverse outcome from IE. These conditions include prosthetic valves, congenital heart disease and previous IE. In South Africa, and other developing countries, IE is often a disease of young patients with rheumatic heart disease (RHD) and carries a very poor prognosis. In contrast, IE in Europe/North America, where guidelines and indications for antibiotic prophylaxis have been reduced, has a different spectrum of factors. These patients are older with degenerative valve disease. IE may also occur as a result of invasive health care associated procedures or in the setting of prosthetic valves and implantable cardiac devices. Recently published international guidelines cannot be automatically applied to countries where RHD is common and oral hygiene is poor. We therefore recommend that patients with RHD should also receive antibiotic prophylaxis prior to the listed dental procedures. Antibiotic prophylaxis should be prescribed after stressing the role of good oral health and why the approach differs in South Africa. There should be close cooperation between the dental practitioner and clinician as to who should receive prophylaxis and who should not.

INTRODUCTION
Infective endocarditis (IE) is a rare, but severe, disease and occurs when circulating microorganisms colonise cardiac valves (both natural and prosthetic), the endocardium, or intracardiac devices. Certain pre-existing conditions render an individual more susceptible. Because of the serious associated morbidity and mortality, prevention of IE is an important clinical issue. IE in South Africa, and in other developing countries, is predominantly a disease of young patients with rheumatic heart disease (RHD) and carries a very poor prognosis. In contrast, IE in Europe/North America, where guidelines and indications for antibiotic prophylaxis have been reduced, has a different spectrum of risk factors. These patients are older, suffer mainly with degenerative valve disease/mitral valve prolapse. IE may also occur as a result of invasive health care-associated procedures or in the setting of prosthetic valves and implantable cardiac devices. The Stellenbosch University conducted a 3-year prospective epidemiological study of IE in the Western Cape. RHD was the major predisposing condition in 76.6% and 17% of the patients had prosthetic valves. Degenerative valve disease, intravenous drug use and HIV infection were not important risk factors. Outcome was extremely poor; 6-month mortality was 35.6% (much higher compared to reported international rates of 6% - 27%), while nearly half of the patients required subsequent valve replacement. Cardiac failure developed or worsened in just over 75%, which may partly be due to late referral and other inefficiencies in local health care services. A more recent publication from Baragwanath Hospital has highlighted the increasing incidence of right sided endocarditis in HIV positive patients injecting themselves with intravenous Nyoape, a street drug encountered in South Africa. Nyoape is a variable drug combination of an antiretroviral, heroin, methamphetamine and cannabis.

RHD markedly elevates the risk of IE. In a case review from the northern territories of Australia, IE incidence in patients with native valve RHD was 290 per 100 000 person-years. This corresponded to a relative risk of 58 in comparison to those without native valve RHD. This association is well documented in the developing world, but is no longer seen in many higher income countries, where the prevalence of rheumatic fever has declined. The use of intravenous recreational drugs is more common.

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It is obvious that the first step in the prevention of IE in developing countries would be to reduce the pool of patients who are susceptible to this infection. This would require effective programmes to prevent rheumatic fever (and recurrences) and, hence, RHD. Regrettably, this has not happened.\textsuperscript{7}

The rationale for antibiotic prophylaxis is based on the assumption that bacteraemia subsequent to medical procedures may cause IE, particularly in those with predisposing cardiac disease. Prophylactic antibiotics might prevent IE by minimising bacteraemia, or by altering bacterial properties leading to reduced adherence to the endocardium.\textsuperscript{12-22} This concept led to the recommendation of antibiotic prophylaxis in a large number of patients with predisposing cardiac conditions, undergoing a wide range of procedures.

Antibiotic prophylaxis has been accepted for decades, even though the efficacy has not been confirmed in a prospective randomised controlled trial. It is also unlikely that such a study will ever be conducted. Assumptions are based on non-uniform expert opinion, findings from animal models, case reports and contradictory observational studies.\textsuperscript{1,2,12-22}

In the majority of those who suffer IE, no potential index procedure can be identified beforehand. The estimated risk of IE following dental procedures is very low.\textsuperscript{1,10} Prophylaxis may therefore avoid only a small number of IE cases, as shown by estimations of 1 case of IE per 150 000 dental procedures (in intermediate risk patients) with prophylaxis and 1 per 46 000 for procedures unprotected by antibiotics.\textsuperscript{15}

Bacteria originating from the mouth account for a significant proportion of cases of IE. Transient bacteraemia occurs not only following dental (and other) procedures, but also after routine oral activities such as tooth brushing, flossing and chewing. The high incidence and cumulative effect of low-grade daily episodes, especially in those with poor oral hygiene, is a more important risk factor than sporadic bacteraemia occurring with a single dental procedure. Patients with underlying heart conditions that predispose to bacterial colonisation are therefore exposed to a low, but continual, lifelong risk of developing IE. Eliminating gingivitis would reduce the incidence and degree of spontaneous bacteraemia and hence IE.\textsuperscript{1,3,12-22}

Oral health in South Africa is generally quite poor and addressing this at policy level will have more impact on the prevalence of IE than antibiotic prophylaxis.\textsuperscript{12} A recent SA study concluded that inadequate attention is paid to the maintenance of oral hygiene in patients with severe rheumatic heart disease (RHD) requiring cardiac surgery.\textsuperscript{22}

All Expert Committees on IE prevention agree that the maintenance of optimal oral hygiene (by regular professional dental care and the appropriate use of manual, powered and ultrasonic toothbrushes, dental floss and other plaque-removal devices) is the most effective intervention for the prevention of IE of oral origin.\textsuperscript{1,3,12-22}

It is recommended that patients with valvular heart disease be referred to a dentist/oral hygienist for ongoing treatment and advice. Patients and attending clinicians need to be educated in this regard. A medical history should be obtained from every patient before any dental treatment. A full oral examination, including dental radiography, should be performed. Further examinations at frequent and regular intervals will ensure maintenance of good oral hygiene, as well as early diagnosis and treatment of any oral infections. It is advisable to issue patients with a warning card to record their cardiac condition, drug therapy and suggested prophylactic measures to be taken before dental treatment.\textsuperscript{2,10,11}

Patients should be informed about their valve disease and the possible development of what constitutional symptoms might be associated with IE. They should be advised to seek prompt medical care in the event of suspicious symptoms such as fever that is more than transient.

SA Heart is an affiliated member of the European Society of Cardiology (ESC) and hence adopts the practice guidelines of the ESC as its own.

### Infective Endocarditis Prevention

In 2009, the “Guidelines on the prevention, diagnosis and treatment of infective endocarditis” were endorsed by the European Society of Clinical Microbiology and Infectious Diseases, and by the International Society of Chemotherapy for Infection and Cancer.\textsuperscript{12} The task force justified revision of their previous position with respect to prophylaxis of IE. The existing evidence did not support the extensive use of antibiotic prophylaxis recommended in previous guidelines. The intention was to avoid extensive, nonevidence-based use of antibiotics for all at-risk patients undergoing interventional procedures, but to limit prophylaxis to the highest-risk individuals. The indications for antibiotic prophylaxis for IE were therefore reduced in comparison with previous recommendations. The recently updated “2015 ESC Guidelines for the management of infective endocarditis” maintains the same principles and recommendations.\textsuperscript{13}

The ESC Guidelines state that antibiotic prophylaxis should be limited to those with the highest risk of IE (Table 1), undergoing the highest risk dental procedure (Table II). High-risk is defined as those with underlying cardiac conditions associated with the greatest risk of adverse outcome from IE, and not necessarily those with an increased lifetime risk of endocarditis.\textsuperscript{14} Prophylaxis was not recommended for any other form of native valve disease, with a small but increased life-time risk of IE, including the most commonly identified conditions, bicuspid aortic valve, mitral valve prolapse and calcific aortic stenosis.\textsuperscript{14}

Although the American Heart Association/American College of Cardiology recommend prophylaxis in cardiac transplant recipients who develop cardiac valvulopathy,\textsuperscript{15} this is not supported by strong evidence and is not recommended by the ESC Task Force.\textsuperscript{19}

It is the opinion of SA Heart that recently published guidelines cannot be automatically applied in developing countries where RHD is common and oral hygiene is poor. We concede that the evidence in favour of prophylaxis is not robust; however, patients with RHD (undergoing dental procedures) represent a higher risk for IE (and poor outcome) and should thus receive antibiotic prophylaxis prior to the dental procedures listed below (Table II). This recommendation is made, given our prevailing circumstances and the absence of...
Antibiotic prophylaxis should only be considered for procedures requiring manipulation of the gingival or peri-apical region of the teeth or perforation of the oral mucosa, where bleeding is anticipated. In such situations, this may include intra-ligamental local anaesthetic infiltration and placement of orthodontic bands. Guidelines from other countries with populations with similar high RHD prevalence, have also kept RHD on the list of conditions for prophylaxis. The Infective Endocarditis Prophylaxis Expert Group has recommended that indigenous Australian patients with RHD and a special population at high risk for IE (and for adverse outcomes) should receive antibiotic prophylaxis. An Australian survey has however since reported that RHD-associated IE was not confined to indigenous Australians, with 42% being non-indigenous. It was therefore recommended that the indications for prophylaxis prior to procedures which cause bacteremia, should be broadened to include all with RHD, as do the New Zealand guidelines. In India, there are no recommendations issued by any local professional organisation, and hence the decision is left to the discretion of the individual physician/dentist. RHD is the major cause of valvular heart disease in Brazil where the oral health of the general population is extremely poor and has not improved over decades. The Brazilian Society of Cardiology and the Inter-American Society of Cardiology therefore recommends prophylaxis to all with valvular or CHD (that represents a risk for IE), before dental interventional procedures.

HIV infection is not associated with an increased risk of IE. A significant number of patients with IE may be coincidentally HIV infected, given the high prevalence of both HIV and RHD in Africa. In a South African prospective observational study that examined the risk factors for IE, only one of their cohort of 92 patients was HIV seropositive. The main risk factors included RHD, in addition to prosthetic valves, CHD and a previous history of IE. Antibiotic prophylaxis, in the setting of HIV, is therefore indicated only in those with high-risk cardiac lesions/factors (Table I), undergoing the procedures outlined in Table II.

The use of dental implants raises concerns with regard to potential risk due to foreign material at the interface between the buccal cavity and blood. Very few data are available. The opinion of the ESC task force is that there is no evidence to contraindicate implants in all patients who may be at risk. The decision should be discussed on a case-by-case basis. The patient should be informed of the uncertainties and the need for close follow-up.

Antibiotic prophylaxis should only be considered for patients at highest-risk described in Table 1 (in addition to those with RHD) undergoing any of the at-risk procedures (Table II), and is not recommended in other situations. Oral streptococci are the main targets for prophylaxis. A single dose of antibiotic should be given before the procedure. There is no proven value to administering a follow-up dose 6 hours later. Table III summarises the main regimens of antibiotic prophylaxis recommended before dental procedures. Fluoroquinolones and glycopeptides are not recommended due to their unclear efficacy and the potential induction of resistance.

Clindamycin is not always available in a suspension form in certain State clinics. It is therefore suggested that suitable alternatives are azithromycin or clarithromycin, 500mg for adults and 15mg/kg in children.

Antibiotic administration carries a small risk of anaphylaxis, which may become more significant in the event of widespread use, however the risk of lethal anaphylaxis is extremely low when using oral amoxicillin. In fact, no fatal case has been reported (over at least a 35-year period) after oral administration for IE prophylaxis.

Curative antibiotics must be prescribed for any focus of bacterial infection. Periodontal and endodontic infections are mainly due to gram-negative bacteria. Merely covering these with amoxicillin will not be effective, and broader therapy is required. The choice of antibiotics should be determined and administered as instructed by local practice. The ESC also strongly recommends that potential sources of dental sepsis (which may pose a risk for post-operative sepsis and IE) should be eliminated at least 2 weeks before implantation of a prosthetic valve, other intracardiac or intravascular foreign material, unless the procedure is urgent.

In addition to antibiotic prophylaxis of IE, pre-procedural antiseptic mouth rinses (chlorhexidine or povidone-iodine) may reduce the incidence or magnitude of bacteremia occurring during invasive dental procedures. The results of studies of “oral degemming” have however been variable, and there is no conclusive evidence for this approach. The ESC protocol makes no reference to the use of antiseptic prophylaxis before at-risk dental manipulation. Further research is required to determine the effectiveness of pre-procedural mouth rinsing and to investigate new antiseptic protocols.

In 2008 the National Institute of Health and Clinical Excellence (NICE) radically recommended complete cessation of antibiotic prophylaxis, in any patient with valvular heart disease, whatever their risk. It was concluded that in the absence of prospective, randomised trials, there is a lack of proof for antibiotic prophylaxis, which is cost-ineffective. As a result, the United Kingdom is now the only place that does not recommend antibiotic prophylaxis for high-risk individuals and this has been a particular cause for concern amongst many dental practitioners. In addition, Dayer, et al., have recently reported a substantial fall in antibiotic prophylaxis prescribing in the 5-years following the NICE recommendations, as well as a highly significant increase in the incidence of IE. There were 419 more cases of IE per year, than would have been expected from projection of the pre-NICE trends. These findings require cautious interpretation with respect to confounding factors, and in particular to an increase in healthcare-associated IE. Microbiological details were also not reported. It is therefore not clear whether the increased incidence of IE was due to bacteria covered by antibiotic prophylaxis or not. After further review of the effectiveness of prophylaxis against IE, NICE (www.nice.uk.org) has since found no need to change their existing guidance. They concluded that the longstanding increase in the incidence of IE is not well understood, and may be due to other factors.

**INFECTIVE ENDOCARDITIS PREVENTION**

The risk assessment suggests that it would be safer to recommend antibiotic prophylaxis (for those with high-risk cardiac disease), while waiting for a randomised controlled trial. It is likely that cumulative regular small bacteraemias from daily activities pose a significant threat to patients at risk of IE; this does not mean that occasional large bacteraemias from invasive dental procedures do not. Our aim should be to minimise all causes of bacteremia in susceptible individuals.
individuals. The evidence suggests that antibiotic prophylaxis may prevent a number of cases of IE, and at least for those without a history of penicillin allergy, oral amoxicillin prophylaxis is safe, with a low likelihood of anaphylaxis.

SA Heart recommends antibiotic prophylaxis to individuals with the greatest risk of an adverse outcome with IE (outlined in Table 1, in addition to those with RHD, undergoing the procedures described in Table II). We again emphasise the maintenance of optimal oral health, which is likely to play the most important role in protecting those at risk of IE, in addition to the education of patients in this regard. There should be close cooperation between the dental practitioner/physician/paediatrician/cardiologist/cardiac surgeon as to who should receive prophylaxis and who should not.

Conflict of Interest: The authors declare no conflict of interest and all authors have approved the final manuscript submitted.

References
INTRODUCTION
A health-care practitioner is an individual who provides preventive, curative, promotional or rehabilitative health care services in a systematic manner to people, families or communities. Sadly, many clinicians could rather be called disease treaters as they are more concerned with handling the symptoms of a disorder (which also pays the bills), than on promoting or supporting the health of the individual. This applies to an even greater extent in Dentistry where the field of focus is already small, and it is tempting to talk of patients in terms of “the tooth” or “the case”. This paper presents a more holistic approach towards patient management during different stages of life from birth to adulthood.

Patients as PEOPLE
Dentists are amongst the few health care providers who treat patients throughout their lives. The first consultation is often during infancy, soon after a child’s deciduous teeth begin to erupt, while the last visits may continue long after the permanent teeth have been lost, and often until death. The acronym PEOPLE can be used to guide the discussion of the many facets of a person’s life that a clinician should consider during childhood, adolescence and adulthood.

CHILDREN (BIRTH TO ADOLESCENCE)
A child’s first encounter with the dentist can have a major influence on his/her future attitudes towards oral health and dental care. The dental team has a pivotal role to play in their interaction with the child/patient, as well as with the parents. Ideally, the first visit should be used to establish effective communication channels, alleviate fear and anxiety, build a trusting relationship, and promote the child and family’s positive attitude toward oral health care. While dental practitioners are expected to recognize and effectively treat childhood dental diseases, no actual treatment should be carried out at the first visit, unless the child is in pain or has visible signs of infection. Subsequent safe and effective management requires an understanding of childhood behaviour patterns and the different child-patient personalities. A dentist who treats children should be able to assess their developmental level, dental attitudes, and temperament and to anticipate the child’s reaction to care. Knowledge of behaviour guidance, communication skills, empathy, tolerance, cultural sensitivity, and flexibility are requisite to this process. The dentist should also be aware that factors such as developmental delay, physical or mental disability, and acute or chronic disease could lead to noncompliance. An uncooperative child is not necessarily a naughty child. They may merely be reacting negatively to any of a number of frightening external influences such as the smell of the surgery, the sterile ambience in the rooms, bright operatory lights, loud noises from the dental drills, and their own feeling of vulnerability. Other contributory obstacles to treatment include fear, general or situational anxiety, a previous unpleasant or painful medical experience, and inadequate preparation for the encounter. The dentist or parent should never punish misbehaviour, assert their power, force a child into compliance, or use any other strategy that hurts, shames, or belittles the child. Cultural factors and language barriers can also have an effect on understanding and behaviour making it important for dentists to understand how to interact with patients from different backgrounds, and if necessary, to use an interpreter.

Parents also have a major influence over their child’s behaviour. They may themselves have undergone negative dental experiences and may then transmit their own anxiety or fear to their child which adversely affects his/her response to care. Sometimes parental factors such as economic hardship, depression, anxiety, irritability, or substance abuse may result in decreased protection, caregiving or discipline. Positive oral health care practices should be instilled into both parents and children, as early preventive programmes will lead to less dental disease, decreased treatment needs, and fewer opportunities for negative experiences.

Prior to beginning any dental treatment it is important for the dentist to try to evaluate the child’s cooperative potential. Information can be gathered through questioning the parents, as well as by observing the child’s cognitive level, temperament, personality, anxiety, fear, reaction to strangers, and behaviour at previous visits. Where the child appears to be in severe pain or under major duress that cannot be managed, the procedure may have to be aborted. This is providing the procedure can safely be discontinued at that stage and that appropriate tempora- tion measures can be implemented to prevent further pain.

The clinician should also be sensitive to the body language of a child who is scared or in pain, but trying to conceal this in order to comply with unrealistic parental expectations (such as to not cry) or to ‘please the doctor’. At the same time, “the dentist’s attitude, body language and communication skills are critical in creating a positive dental visit for the child and to gain the trust of the child and their parents.”

ADOLESCENTS
Treating adolescent patients may require a different approach. It is often difficult to gauge their personality types, attitudes towards oral health and personal care, body image, desires and expectations. They may have unrealistically high aesthetic demands, often pinning their hopes for an improved psycho-social
life on changing their (oral) appearance. Some teenagers develop ‘crushes’ on adult figures and treat them as role models or potential allies, while others may be rebellious of anyone in a position of authority, including the dentist. The former will usually be very compliant with treatment and home care maintenance, while the latter may neglect their oral hygiene. This often depends on their disposition and personal circumstances at that point in time and may change from one visit to the next. The clinician should try to engage with the adolescent in an empathetic manner that will foster trust and encourage communication and cooperation. Zhou et al. endorsed using an appropriate level of physical contact accompanied by verbal reassurance to reduce patient anxiety. However, the authors believe it is more prudent to avoid all forms of non-therapeutic physical contacts, and rather provide verbal reassurance along with non-intrusive and empathetic facial expressions and body language.

There are a number of oral and dental problems that are germane to adolescents, being linked to their stage of dental developmental, or lifestyle. The clinician needs to be cognisant of these and alert to indicative signs during the examination. If problems are identified, they should be suitably managed by the dentist, or by referral to a specialist related to that field. The former group may include assessing the need for orthodontic treatment to improve aesthetics, masticatory function, and oral hygiene access; and monitoring third molars for signs and symptoms of pain, infection, cysts, tumours, damage to adjacent teeth, periodontal problems, or decay which may justify their removal.

The latter group of problems concern lifestyle choices, including drug taking where the dentist may be the first to notice the habit. When detected or suspected the dentist has a moral and professional duty to counsel the patient. However, these practices are often a result of a social environment where the patient may feel pressured to conform or may be under the influence of peer pressure. This puts the clinician in a difficult position when deciding if the parents should be informed, requiring a careful weighing up between the ethical obligations to maintain patient confidentiality versus the possible long term risks and dangers to the adolescent.

Smokers should be informed that all forms of tobacco are harmful to their oral and general health. They need to be made aware of its less obvious side effects and risks such as bad breath, stained teeth and tongue, dulled sense of smell and taste, slow healing after tooth extraction or soft tissue injury, periodontal disease, tooth loss and oral cancer.

Mouth jewellery, oral piercing, tongue splitting, grillz and a number of other oral and dental adornments may be popular and fashionable, but patients need to be informed of their potential oral and general health dangers. The dentist should try to be non-judgmental and authoritarian, and clearly explain how the mouth harbors millions of bacteria, which can infect damaged mucosa associated with these adornments. Serious infections from oral piercing can also lead to more serious life-threatening systemic infections, including hepatitis or endocarditis. Swelling of the tongue could close off the airway, while broken pieces of jewelry may lead to choking or be aspirated. The metal trinkets can also cause tooth chipping or complete fracture if bitten into, while grillz are damaging to tooth structure, may interfere with occlusion, and hamper adequate oral hygiene.

Meth Mouth is a term used to describe the particular damage caused by the use of the illegal and highly addictive drug methamphetamine. This drug is a potent central nervous system stimulant that can cause shortness of breath, hyperthermia, diarrhea, irregular heartbeat, high blood pressure, penile and brain damage, muscle spasms, jaw clenching, nausea, vomiting and rampant tooth decay. The teeth appear blackened, stained, rotting, crumbling or falling apart, and are often unrestorable. This particular decay pattern is thought to result from users vomiting, and then passing out. The pooled vomitus which is highly acidic then bathes the teeth for hours on end. The damage is compounded in those who also consume high caffeine/sugary energy drinks, and where personal and oral hygiene is neglected.

Eating disorders such as anorexia, bulimia and binge eating, “arise from a variety of complex physical, emotional and social issues, and can all be devastating to oral health”. The malnutrition associated with anorexia has far reaching systemic and oral implications. The latter are all inter-related and may include altered taste sensations, burning mouth, halitosis, swollen salivary glands, xerostomia, gingival and mucosal bleeding, and cervical caries. The regurgitation associated with bulimia results in the strong stomach acid repeatedly flowing over teeth. It is particularly noticeable as enamel loss on the palatal surfaces of the maxillary anterior teeth, resulting in thin brittle teeth that may also exhibit a change in colour, shape and length. Non-healing ulceration of the corners of the mouth in adolescents is a little known but common indicator of bulimia. Full coverage restorations should not be placed until the habit has been controlled as acid damage to cervical restorative margins can cause more devastating secondary caries.

In all addictive behaviour patterns, the chances of successful rehabilitation and positive outcomes are far greater if the patients receive early guidance, counselling and cessation intervention, than when the patterns have become longstanding habits.

Perhaps one of the most difficult areas in dentistry is trying to manage and fulfill patient expectations. This is because they may be both unpredictable and unrealistic. During the transition from childhood to early adulthood there is often an associated increased body awareness. The face becomes the centre of attention, and impacts on the ego and self-confidence of a teenager. It is usually the first body part noticed by strangers, and regularly used by others to describe a person. Appearance can also be used to ‘impart an identity’ onto others. In 1955, psychologist Lee Joseph Cronbach described this as the “implicit personality theory / Halo effect” and is based on stereotypical perceptions such as: less attractive people are less intelligent; those with good teeth and appealing smiles are more sociable, popular, confident and suited to leadership positions; ugly suspects are more likely to be considered guilty and given harsher sentences; and attractive males are more healthy, powerful and fertile. The media can perpetuate this further with caricatures of persons with a severe Class II malocclusion being portrayed as weak and idle and those with a severe Class III as being aggressive.

Awareness of body and facial perception is essential for dentists as the eyes and mouth are considered the two most significant facial features. This is perhaps because they are generally the first physical characteristic to be noticed, are difficult to conceal and are involved in many functions. The mouth in particular is central to life as well as being the first contact one has with others when greeting, is used for communication, expression of emotion, mastication and sustenance, speech and expression of thought. It is no wonder that tooth aberration can have such a profound effect on a person’s self-esteem, with some patients blaming any number of personal hardships on their appearance. The magnitude of this may not be related to the extent of the deformity at all. This is perhaps because the reaction of strangers to a small imperfection is far less predictable than that to a larger defect, the unpredictability being the stressor. They may also suffer from depression if the abnormality leads to teasing, or if they simultaneously have unattainable ideals of how they wish to look. Advertisers and social media feed into these vulnerabilities by promoting images of perfect smiles as good and attractive to potential partners, while people with tooth aberrations are undesirable.

ADULTS

Most adult patients will have had some form of dental contact, experience or knowledge before they present to a new practitioner. The nature of these interactions can play a major role in determining how they will approach this first consultation, with many having preconceived ideas, based on their prior encounters, about both
the treatment and the clinician. It is important to differentiate between dental phobia and dental anxiety. Diagnosing dental phobia cannot be made on the anxiety level of the patient at the time of presentation, as the previous history has to also be considered. Patients with high levels of anxiety may appear non-compliant or as a dental phobic. However if such a patient is able to air any anticipatory fears, successful treatment may be possible.

A past negative incident can result in distress and apprehension about future treatment, with some patients avoiding subsequent dental visits despite being in pain. A study on African Americans adults who had experienced at least one oral health symptom in the past, for which they had avoided seeking dental care listed a variety of dental stressors. These included fear of pain, terror of needles, distress from the dental drill, anxiety about having teeth extracted, concern about contracting an illness (e.g., HIV/AIDS) from unsanitary instruments, dislike of having X-rays taken and concern that they may once again receive poor quality care or mistreatment. While negative experiences may be barriers to seeking dental care, it is often personality types and expectations that dictate the outcomes, acceptance and success of the treatment.

Obstacles to treatment may be psycho-social in nature and include both problems with access to dental care as well as avoidance due to past life experiences. Factors such as socio-economic status, ethnic backgrounds, age, and gender, perception of need, dental anxiety, and feelings of vulnerability are often the reasons for avoidance of dental care and non-compliance with treatment and preventive care. These factors do not act independently of each other but act in unison. Although socioeconomic status may prevent a patient from seeking dental treatment, it is a sad misconception amongst some dentists that patients from lower socio-economic backgrounds do not value dental treatment as much as they do other types of goods and services, and that they do not believe dental care is important. Thus the barrier to utilization of dental service is financial status, while that to provision may actually be due to the interpersonal dentist-patient relationship.

In other situations, the problems may be clinician-related. In Dentistry, as in all fields of work, it is always best to do a job right the first time. However, this does not always happen, and there will be occasions when one dentist is called upon to contend with problems that have been iatrogenically created by a colleague. The patient, having already suffered a bad experience, may be aggravated, aggressive, impatient, demanding, skeptical, in more pain or discomfort than before, and disproportionately cautious. He/she may also scrutinize every aspect of treatment far more critically than they did the initial work. This places undue pressure on second clinician, who is now faced with trying to restore a mutilated dentition, as well as placate an emotional patient. The task is made even more onerous in situations where the patient’s funds have been exhausted. As the saying goes “if you don’t have time to do it right, make sure you are ready to redo it later”.

Life happens, and events in life will impact on dental access, utilisation and outcomes. Barriers to seeking care may be due to financial, time, transport, family or physical constraints. These factors may also impact on how the clinician handles disparities between desires, needs and hopes. While past negative experiences may be barriers to seeking dental care, it is often life events, personality types and expectations that dictate the acceptance and the outcomes and success of the treatment.

A Google search on “Personality Types” will reveal more theories and classifications than there are implant systems on the market. No clinician can ever accurately assess a patient’s nature, and almost every dentist will have an unhappy story-or ten.... to tell about how they misread someone’s disposition, resulting in a failed treatment outcome. However there are a few common Red-Flags!

Beware the patient who: has sought dental advice from other dentists/friends/family members/ work colleagues/glossy magazines/any of the Kardashians or Dr Google before seeing you; who flatters you excessively; who arrivers bearing gifts; who promises gifts after treatment; who arrives bearing a bag of old dentures; who promises to bring in old dentures and never does; who runs down all previous dentists; who has sued previous doctors; who is related to a lawyer and makes a point of telling you this; who is getting married in a week but needing a year’s worth of treatment; who is going overseas in a week but also wanting a discount price; who comes in with pictures of movie stars / old photographs and wants to look like the star / their teenage self; who is clearly disinterested; who is over-willing to please; who defers all responsibility and decision making to you, and finally – the one who is also a family member!

CONCLUSION

Patients are not mouths, cases, teeth, numbers on a file, jobs or problems. Patients are people. Like you and I, they have lives, families, jobs, homes, dreams and expectations. They have lived through many events, may be dealing with current issues, and all have an unknown road ahead. Take the time to communicate, get to know them, and try to manage them in a holistic manner while still maintaining your professional and ethical demeanour.

References

You are invited to join an excellent line up of International and Local speakers sharing innovative technology and services from within a melting pot of the best in oral health care that the world has to offer.

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Sun Time Square Arena and Conference Centre, Pretoria
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Welcome Note

2018 promises to be a year of great growth and exhilarating advances in the Dental industry, so in order to echo this sentiment, we are proud to announce a new name and identity for this premier congress, ensuring its brand and value are sustainable and contemporary.

Please join us at the 45th annual, SADA Dental & Oral Health Congress & Exhibition. After last year’s roaring success, we are proud to officially open the 2018 Congress to our valued members as well as the Dental and Oral Health community.

The objective of this annual event is to promote learning of new ideas and techniques at all levels within the dental fraternity. A platform to offer opportunities for all role players in dentistry in South Africa. Come rekindle relationships with colleagues and friends.

A congress of this magnitude is not possible without the support of our members and others parties with an interest in the dental industry. As the largest primary event of its kind on the African continent, we will be hosting in our capital, Pretoria, at the newest Sun International establishment, Times Square in the heart of Menlyn. This state-of-the-art entertainment and conference centre will host days of inspiring presentations, speaking engagements and dynamic, hands-on workshops, and we will enjoy an evening of networking and cocktails.

As one of our valued members we would love to host you at our biggest, but most focused and significant Congress to date, an event that will change your world.

Join the conversation #sadacongress18

*Plenary Session

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<td>15:45 - 16:15</td>
<td>Lasers in Endodontics - Fact or Fiction Norbert Gutknecht</td>
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<td>Strategies to improve clinical colour matching of restorative materials for the replacement on teeth and gingiva Alvin Wee</td>
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<td>Managing the deep carious lesion “MI” way! - take it or leave it Avijit Banerjee</td>
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<td>13:30 - 14:10</td>
<td>Clinical cases can present as difficult in several aspects: as sites, sextants, full arches or full mouths Andrea Pilton</td>
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<td>14:10 - 15:00</td>
<td>What can Orthodontics do to improve the smile aesthetics of the patient Juan Carlos Perez Varela</td>
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<td>08:00 - 10:00</td>
<td>Lasers in Endo Workshop SCIVISION Norbert Gutknecht</td>
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<tr>
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<td>10:30 - 12:30</td>
<td>Lasers in Endo Workshop SCIVISION (repeat of 08:00 -10:00 Session) Norbert Gutknecht</td>
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| 08:00 - 10:00 | 1) Anaphylaxis and other life-threatening emergencies & 2) Sedation, the basics and pearls  
James Roelofse |
| 10:00 - 10:30 | Tea Break & Tradeshow                                                   |
| 10:30 - 12:30 | 3) Pitfalls in sedation practice & 4) The single operator sedationist and drugs during sedation  
James Roelofse |

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| 08:00 - 10:00 | The role of the Dentist in Dental Sleep Medicine  
Leif Bruinseth, Jeff King, Clyde Keevy, Kevin Rossman |
| 10:00 - 10:30 | Tea Break & Tradeshow                                                   |
| 10:30 - 12:30 | Sleep Apnea: Fundamental theoretical and practical concepts in the use of mandibular advancement devices to treat snoring and obstructive sleep  
Alvin Wee |

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| 08:00 - 10:00 | Young Dentist Programme: Not all great dentists are successful / Getting the patient to trust you  
Jean van Lierop, The Business of dentistry  
Corne Smith |
| 10:00 - 10:30 | Tea Break & Tradeshow                                                   |
| 10:30 - 12:30 | Young Dentist Programme Continue: What I would do differently if I had the chance - My journey in dentistry  
Avish Jagathpal |

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</table>
| 08:00 - 10:00 | Composite restorations: Protocols for anterior aesthetics  
Frederico Ferraris |
| 10:00 - 10:30 | Tea Break & Tradeshow                                                   |
| 10:30 - 12:30 | Composite restorations: Protocols for anterior aesthetics (Continued)  
Frederico Ferraris |

<table>
<thead>
<tr>
<th>Time</th>
<th>Room 7</th>
</tr>
</thead>
</table>
| 08:00 - 10:00 | All systems go for effective practice management  
Dayna Johnson |
| 10:00 - 10:30 | Tea Break & Tradeshow                                                   |
| 10:30 - 12:30 | All systems go for effective practice management (Continued)  
Dayna Johnson |

<table>
<thead>
<tr>
<th>Time</th>
<th>Room 8</th>
</tr>
</thead>
</table>
| 08:00 - 09:00 | Laser applications in the young patient  
Nicola Verloop |
| 09:00 - 10:00 | Biomaterials in paediatric dentistry  
Riaan Mulder |
| 10:00 - 10:30 | Tea Break & Tradeshow                                                   |
| 10:30 - 11:30 | Nitrous Oxide/Oxygen minimal sedation: Profitable practice  
Mark Gillman |
| 11:30 - 12:30 | Substance abuse, addiction and nicotine addiction  
Mark Gillman |

**Parallel Programmes (Cont’d)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Dental Assistant Programme</th>
</tr>
</thead>
</table>
| 08:00 - 10:00 | 5 Ways you can crush your Dental Assisting career  
Kevin Henry |
| 10:00 - 10:45 | Tea Break & Tradeshow                                                   |
| 10:45 - 11:30 | 3 Battles Between the Back and the Front and how to solve them  
Kevin Henry |
| 12:00 - 13:00 | Essential dental equipment maintenance and care  
Riaan Els |
| 13:00 - 14:15 | Lunch Break & Tradeshow                                                   |
| 14:15 - 15:45 | What the entire team needs to know about instrument management  
Mary Govoni |
| 15:45 - 16:15 | Tea Break & Tradeshow                                                   |
| 16:15 - 17:45 | Battling and beating the demons of dental assisting  
Kevin Henry |

<table>
<thead>
<tr>
<th>Time</th>
<th>Practice Management Programme</th>
</tr>
</thead>
</table>
| 08:00 - 10:00 | All systems go for effective practice management  
Dayna Johnson |
| 10:00 - 10:45 | Tea Break & Tradeshow                                                   |
| 10:45 - 13:00 | The Practice Manager’s Role in Creating a Collaborative Positive Practice Culture  
Lizelle van der Walt |
| 13:00 - 14:15 | Lunch Break & Tradeshow                                                   |
| 14:15 - 15:45 | The Practice Manager’s Role in Creating a Collaborative Positive Practice Culture (continue)  
Lizelle van der Walt |
| 15:45 - 16:15 | Tea Break & Tradeshow                                                   |
| 16:15 - 17:45 | The Practice Manager’s Role in Creating a Collaborative Positive Practice Culture (concl)  
Lizelle van der Walt |

<table>
<thead>
<tr>
<th>Time</th>
<th>SASO Programme</th>
</tr>
</thead>
</table>
| 08:00 - 10:00 | Introduction - The importance of the high torque (Full smile) in the occlusion, aesthetic of the smile and biology in complex cases  
Juan Carlos Pérez Varela |
| 10:00 - 10:45 | Tea Break & Tradeshow                                                   |
| 10:45 - 13:00 | Treatment of Skeletal Class II in Adult Patients  
Juan Carlos Pérez Varela |
| 13:00 - 14:15 | Lunch Break & Tradeshow                                                   |
| 14:15 - 15:45 | Treatment of Skeletal Transverse Problems in Adult Patients  
Juan Carlos Pérez Varela |
| 15:45 - 16:15 | Tea Break & Tradeshow                                                   |
| 16:15 - 17:45 | Treatment of Skeletal Class III in Adult Patients & Conclusions  
Juan Carlos Pérez Varela |

<table>
<thead>
<tr>
<th>Time</th>
<th>SASPPO Programme</th>
</tr>
</thead>
</table>
| 08:00 - 09:30 | Geometry of the infrabony lesion and quality and quantity of the soft tissue  
Andrea Pilloni |
| 09:30 - 10:15 | Understanding clot, from early phases to final organized tissues  
Andrea Pilloni |
| 10:15 - 11:00 | Tea Break & Tradeshow                                                   |
| 11:00 - 11:45 | “Closing” vs “sealing” the flap margins  
Andrea Pilloni |
| 11:45 - 12:30 | When biomaterials are necessary: choice, manipulation and long term expectations after their use  
Andrea Pilloni |
| 12:30 - 13:30 | Light Lunch & Tradeshow                                                   |
| 13:30 - 15:00 | Join Plenary Session                                                       |

*Programme subject to change*
Excellent lineup of Speakers

International
- Avijit Banerjee
- Frederico Ferraris
- Norbert Gutknecht
- Dayna Johnson
- Alasdair McKelvie
- Andrea Pilloni
- Miguel Stanley
- Steven Eckert
- Alvin Wee
- Andrea Pilloni
- Thomas Salinas
- Michael Lynch
- Mary Govoni

Local
- Leif Brauteseth
- Heinrich Dippenaar
- Riaan Els
- Avish Jay Jagathpal
- Jeff King
- Masihdeco Mophoti-Peri
- Jeanne Oosthuysen
- Kevin Rosman
- Meritang Thokoane
- Jean van Lierop

Motivational
- Elsabe Aldridge
- Jonathan Jansen
- Siphiwe Moyo

Fabulous Social Function
A fabulous Carnival Style themed Welcome Function will be hosted, offering a superb opportunity for VIP’s, Speakers, Delegates, and other important guests as well as Exhibitors, to mingle whilst being entertained in the Exhibition Arena. Come and enjoy this luxurious evening of networking and cocktails in this state-of-the-art entertainment arena.

Accommodation

The Maslow Hotel Time Square Casino
The Maslow Hotel Time Square Casino
236 rooms
R 1750.00 – Single Occupancy
R 3100.00 – Double Occupancy
Address: 239 Anri Avenue, Waterkloog
Tel nr: 011 780 7855
Email: crobook@suninternational.com
Website: https://www.suninternational.com/
Special Congress Rate!

The Capital Melrose Main
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From R 1 600.00
Address: 194 Barossa Avenue, Melrose, 0001 Pretoria, South Africa
Tel nr: 011 260 9700
Email: reservations@thecapital.co.za
Website: https://www.thecapital.co.za
0.4 km from Times Square

Town Lodge Menlo Park
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From R 998 to R 1165
Address: 106 Atterbury Rd & Klarinet Rd, Menlopark, Pretoria, 0102
Tel nr: 012 349 2711
Email: tlmr@trust.com
Website: https://www.townlodge.co.za
Website: https://www.menlynhotel.com
2.6 km from Times Square

Protea Hotel Fire and Ice by Marriott
27 rooms
From R 1 500 pp
Address: 309 Tugela Road, Ashoka Gardens, Menlyn, 0081 Pretoria, South Africa
Tel nr: 012 471 0500
Email: ashoka@hotmail.com
Website: http://www.marriott.com
3.3 km from Times Square

Menlyn Boutique Hotel
27 rooms
From R 1 500 pp
Address: 309 Tugela Road, Ashoka Gardens, Menlyn, 0081 Pretoria, South Africa
Tel nr: 012 471 0500
Email: reception@menlynhotel.com
Website: http://www.menlynhotel.com
3.3 km from Times Square

General Information

Congress objectives
To promote learning of new ideas and techniques at all levels within the dental fraternity. A platform to offer opportunities for all role players in dentistry in South Africa and for you and your company to rekindle relationships with colleagues and friends.

Target audience
All people involved in dentistry in South Africa. Our main target groups are General Dental Practitioners, Dental Specialists, Dental Technicians, Dental Assistants, Oral Hygienists, Dental Therapists, Practice Managers and other professionals with an interest in dentistry and dental Traders.

Expected number of delegates
900 Delegates

Invited speakers
The organising committee has been successful in signing up excellent local and international speakers from Europe and America to present at the Congress.

Scientific Committee

Prof Dale Howes (Scientific Convenor 2018)
Dr Mark Bowes
Dr Paul Brandt
Dr Nosipho Mzobe (Head Of Education SADA)
Dr Nadeem Osman (SADA OPSCOM Chair)
Dr Boela van der Merwe
Prof Andre van Zyl

Follow us on:
sadacongress.co.za

#sadacongress18
**Delegate Registration Form**

**12 - 14 October 2018**

**Online registration:** www.sadacongress.co.za

---

**SECTION A**

**PERSONAL INFORMATION**

(PLEASE PRINT IN BLOCK CAPITALS AND INDICATE THE APPROPRIATE BLOCKS WITH AN ‘X’)

SURNAME: ___________________________  FIRST NAME: ___________________________

ID NO: ___________________________  INITIALS: ___________________________

NAME ON BADGE: ___________________________  HPCSA REG NO (not practice no): ___________________________

NAME OF PRACTICE/ACADEMIC INSTITUTION: ___________________________

POSTAL ADDRESS: ___________________________

TELEPHONE NO (W): ___________________________  CELLPHONE NO: ___________________________

E-MAIL: ___________________________

FAX NO: ___________________________  COMPANY VAT NO: ___________________________

---

**ACCOMPANYING PERSON**

SURNAME: ___________________________  FIRST NAME: ___________________________

---

**SECTION B**

**REGISTRATION FEES (VAT INCLUDED)**

25% CANCELLATION FEE WILL BE LEVIED ON CANCELLATIONS ON OR BEFORE 31 JULY 2018

50% CANCELLATION FEE WILL BE LEVIED ON CANCELLATIONS BETWEEN 1-31 AUGUST 2018

NO REFUND FOR CANCELLATION OR NON-ATTENDANCE FROM 1 SEPTEMBER 2018

---

**REGISTRATION SECTION (MARK WITH AN ‘X’)**

**DENTAL CATEGORY**

<table>
<thead>
<tr>
<th>DENTAL CATEGORY</th>
<th>FULL REGISTRATION: 12 - 14 OCT 2018</th>
<th>DAY DELEGATE REGISTRATION FEES PER DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FULL 3 DAYS BEFORE 31 JULY 2018</td>
<td>MARK X</td>
</tr>
<tr>
<td><strong>SADA Educational Member</strong></td>
<td>R 3 840</td>
<td>R 4 540</td>
</tr>
<tr>
<td><em>SADA Core Member</em></td>
<td>R 4 840</td>
<td>R 5 540</td>
</tr>
<tr>
<td>SASO - SADA Educational Member</td>
<td>R 4 650</td>
<td>R 5 350</td>
</tr>
<tr>
<td>SASO - <em>SADA Core Member</em></td>
<td>R 5 650</td>
<td>R 6 360</td>
</tr>
<tr>
<td>Non-SADA Member</td>
<td>R 5 740</td>
<td>R 6 860</td>
</tr>
<tr>
<td>Dental Technician/Therapist</td>
<td>R 2 580</td>
<td>R 3 040</td>
</tr>
<tr>
<td>Oral Hygienist</td>
<td>R 2 060</td>
<td>R 2 430</td>
</tr>
<tr>
<td>Dental Assistant/Practice Management</td>
<td>R 1 630</td>
<td>R 1 950</td>
</tr>
<tr>
<td>Registrar/Post Graduate Student</td>
<td>R 1 830</td>
<td>R 2 180</td>
</tr>
<tr>
<td>Exhibition ONLY Visitor</td>
<td>R 1 010</td>
<td>R 1 420</td>
</tr>
<tr>
<td>Spouse Visitor</td>
<td>R 810</td>
<td>R 1 220</td>
</tr>
<tr>
<td>Undergraduate Student (5th year only)</td>
<td>R 710</td>
<td>R 1 110</td>
</tr>
</tbody>
</table>

**TOTAL R**: 0

**TOTAL SECTION B R**: 0

---

* SADA Core Member - This member gets a preferential rate of R900 less on the Annual SADA Congress full registration fee which is not available to non - SADA Members.

** SADA Educational Member - This member who has purchased the Educational membership top - up package is entitled to a further discount of R1000 (total discount of R1900) on the Annual SADA Congress full registration fee.
**SECTION C: PROGRAMME SESSION BOOKINGS**

Please note due to lecture room limited seating all bookings are processed on a first come first served basis. If you do not indicate which lecture you wish to attend you will not be registered to attend the lecture on that day. Please indicate your option with an ‘✓’. Your registration will not be accepted, if the selection was not done.

**FRIDAY 12 OCTOBER: MASTER CLASS / HANDS-ON**

<table>
<thead>
<tr>
<th>TIME</th>
<th>SESSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 - 12:30</td>
<td>Room 1: Miguel Stanley Master Class</td>
</tr>
<tr>
<td>08:00 - 10:00</td>
<td>Room 2: Lasers in Endo Workshop              (This session is repeated at 10:30 to 12:30)</td>
</tr>
<tr>
<td>10:30 - 12:30</td>
<td>Room 2: Lasers in Endo Workshop              (This session is a repeat from 08:00 to 10:00)</td>
</tr>
<tr>
<td>08:00 - 12:30</td>
<td>Room 3: 1) Anaphylaxis 2) Sedation 3) Pitfalls in sedation 4) The single operator sedationist</td>
</tr>
<tr>
<td>08:00 - 12:30</td>
<td>Room 4: Sleep Apnea</td>
</tr>
<tr>
<td>08:00 - 12:30</td>
<td>Room 5: Young Dentist Programme</td>
</tr>
<tr>
<td>08:00 - 12:30</td>
<td>Room 6: Federico Ferraris Master Class</td>
</tr>
<tr>
<td>08:30 - 10:00</td>
<td>Room 7: Dyana Johnson: Practice Management</td>
</tr>
<tr>
<td>08:00 - 10:00</td>
<td>Room 8: The Paedodontic Society: 1) Laser Applications in the Young Patient 2) Biomaterials in Paediatric Dentistry</td>
</tr>
<tr>
<td>10:30 - 12:30</td>
<td>Room 8: The Paedodontic Society: 1) Nitrous Oxide/Oxygen Minimal Sedation: Profitable Practice 2) Substance Abuse, Addiction, Nicotine Addiction and Dental Practice</td>
</tr>
</tbody>
</table>

**SATURDAY 13 OCTOBER: PARALLEL PROGRAMMES**

<table>
<thead>
<tr>
<th>TIME</th>
<th>SESSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 - 17:45</td>
<td>Oral Hygienist Programme</td>
</tr>
<tr>
<td>08:00 - 17:45</td>
<td>Dental Assistant Programme</td>
</tr>
<tr>
<td>08:00 - 17:45</td>
<td>Practice Management Programme</td>
</tr>
<tr>
<td>08:00 - 17:45</td>
<td>SASO Member Programme</td>
</tr>
</tbody>
</table>

**SUNDAY 14 OCTOBER: PARALLEL PROGRAMME**

<table>
<thead>
<tr>
<th>TIME</th>
<th>SESSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 - 12:30</td>
<td>SASPID Member Programme</td>
</tr>
</tbody>
</table>

**SECTION D: CONGRESS WELCOME FUNCTION**

Please indicate whether you will be attending the Carnival Style Theme Party on Friday 12 October 2018 by marking the appropriate block

**SECTION E: DIETARY REQUIREMENTS**

Food served at the venue is not from a Halal friendly kitchen. If you require a Strictly Halal menu, please indicate this below. If you require a Strictly Kosher menu, please indicate this below.

If you have any allergies, please indicate this below.

- **Strictly Halal Requirements**
- **Strictly Kosher Requirements**

**DELEGATE**

**ACCOMPANYING PERSON**

No food surcharge* is applicable for Halal food.

A food surcharge** is applicable for Kosher food only.

Indicate your allergies if applicable: √

**DELEGATE**

**ACCOMPANYING PERSON**

Indicate any other allergies you have

**TERMS AND CONDITIONS**

- Full payment of registration fees are required to confirm registration.
- Delegates are responsible for their own accommodation and travel arrangements.

**CANCELLATIONS**

- 25% Cancellation fee will be levied on cancellations on or before 31 July 2018.
- 50% Cancellation fee will be levied on cancellations between 1-31 August 2018.
- No refund for cancellation or non-attendance from 1 September 2018.
- Cancellation must be received in writing.
- If notification is not received in writing and confirmed by this office, you will be liable for the full registration fee.

**INTERNATIONAL TRANSFERS**

**SADA BANKING DETAILS**

Account name: The South African Dental Association
Bank: Investec Bank Limited Branch: Sandton Branch Code: 58 01 05
Account Number: 10011847744 Swift Code: IWESA2JH
Reference: Account no as appeared on invoice & name of individual/company

**PAYMENT DETAILS**

- R SECTION D + R SECTION E = R

- DEBIT / CREDIT CARD PAYMENTS ONLY: Please fill in details below.
- SADA does not store or record any card details.

- Charge my: Visa Master Amex Diners

- To the amount of R

- Initials and surname of cardholder

- Surname

**SIGNATURE**

I have read and understand the Terms & Conditions and Cancellation clause, as indicated above.

**DATE**

| 0  | 0  | 1 | 8 |

**SADA BANKING DETAILS**

Account name: The South African Dental Association
Bank: Investec Bank Limited Branch: Sandton Branch Code: 58 01 05
Account Number: 10011847744 Swift Code: IWESA2JH
Reference: Account no as appeared on invoice & name of individual /company

**INTERNATIONAL TRANSFERS**

**SADA BANKING DETAILS**

**ACCOMMODATION ARANGEMENTS**

Delegates are responsible for their own accommodation and travel arrangements, we have secured preferential rates for congress delegates at The Maslow Hotel.

For a comprehensive list of more accommodation visit www.sadacongress.co.za
What’s new for the clinician?
Excerpts from and summaries of recently published papers

1. The maintenance of peri-implant health: air-abrasive debridement with glycine powder versus manual debridement and chlorhexidine


Replacing lost teeth by artificial tooth roots (implants) in combination with artificial dental crowns has become part of mainstream dentistry and is now regarded as a routine procedure with predictable results and success rates over long term (greater than five years) being routinely reported in the published literature. Concomitantly though, we are witnessing a number of complications related mainly to the soft and hard tissues surrounding the implant.

A reversible inflammation around the implants is called peri-implant mucositis, while peri-implantitis occurs when the disease involves the loss of peri-implant bone, thus causing irreversible injury. 1 Peri-implant mucositis can progress to peri-implantitis which might finally lead to implant loss. The relation between these diseases and plaque accumulation is well established 1 and the problem is worryingly common, exceeding 80% of the implant population. 1

Mechanical debridement has been proposed for the maintenance of healthy tissues around implants. 1 The administration of chlorhexidine seems to promote the reduction of inflammation parameters. 1 Air polishing with glycine powder has showed adequate ability to remove plaque and biofilm from both the dental and the implant surfaces without altering their surface structure. 1 Furthermore, this powder has been used in the treatment of peri-implantitis and recently of mucositis. Lupi and colleagues (2017) 1 reported on a trial that sought to evaluate air polishing with glycine powder compared with manual debridement and chlorhexidine administration for the maintenance of peri-implant tissue health and to evaluate its effectiveness for the prevention of peri-implantitis.

ACRONYMS
AAD: air-abrasive debridement with amino acid glycine powder
BOP: bleeding index
BS: bleeding score
BS = 0: No signs of inflammation
CAL: clinical attachment level
MDA: mechanical debridement and antiseptic therapy
PD: probing depth
PI: plaque index

MATERIALS AND METHODS
This trial was a single-masked, randomized six-month clinical intervention trial with two study groups.

The following criteria were used to exclude subjects from the study: (I) poorly controlled diabetes mellitus (HbA1c > 7.0); (II) the use of anti-inflammatory medications, or antibiotics within the preceding three months or during the study; (III) the use of medications known to have an effect on gingival growth; (IV) subjects requiring prophylactic antibiotics; (V) smokers and (VI) patients with severe periodontal problems (CPI > 2). The following criteria were used for the selection of patients: (i) the presence of at least one sandblasted and etched surface screw implant with a fixed or removable prosthetic rehabilitation; (ii) the absence of clinical (i.e. probing depth (PD) ≥4 mm; suppurations) and radiographic signs (bone resorption ≥30% compared with the initial situation) of peri-implantitis; (iii) lack of implant mobility; (iv) single or multiple restorations without overcontours; (v) the absence of occlusal overloading; (vi) the presence of at least 2mm of keratinized peri-implant mucosa and (vii) the absence of systemic diseases that could somehow affect the results of treatment. Hollow cylindrical implants were excluded from the study.

The study population consisted of 46 patients with partial or total edentulism where the peri-implant tissues had no signs of inflammation or sign of mucositis. The implants were randomly assigned (coin toss) to the following procedures...
by the same operator: (i) air-abrasive debridement with amino acid glycine powder (AAD) or (ii) mechanical debridement using plastic curettes and antiseptic therapy with chlorhexidine digluconate (MDA).

Four weeks before the start of treatment, each patient was subjected to a single session treatment of oral hygiene on teeth and implants with rubber cups and polishing paste and was given oral hygiene instruction according to the individual needs. From the beginning of treatment (baseline, T0) and on a monthly basis, all patients were subjected to oral hygiene sessions with air-abrasive or manual technique and chlorhexidine.

Clinical measurements were performed by a single experienced operator, from whom the specific treatment was concealed, and the data was reported on a special form. Study subjects were instructed not to discuss therapy with the study examiner.

The clinical measurements were performed with a plastic periodontal probe with a standardised probing force of 0.2N.

At the beginning (T0) and after three (T3) and six months (T6), the following periodontal indices were evaluated and recorded: (i) plaque index (PI) (ii) bleeding index (BOP), scored as positive if bleeding occurs within 30 seconds from the stimulation, conversely, negative, (iii) probing depth (PD), measured from the gingival margin to the apex of the probing pocket, (iv) clinical attachment level (CAL), measured from the implant platform to the apex of the probing pocket and (v) bleeding score (BS) assessed as the bleeding of the peri-implant mucous tissue giving a score from 0 to iii as follows: (0) the absence of bleeding, (i) a point bleeding, (ii) a line of bleeding and (iii) the formation of a drop of blood.

The primary outcome variable was PD, this and CAL being evaluated in six positions for each implant, that is, mesio-vestibular, vestibular, disto-vestibular, disto-lingual, lingual and mesio-lingual. BOP and PI were assessed in four positions for installation, that is, mesially, buccally, lingually and distally. BS was assessed along the entire circumference of the implant as a unique result. The evaluations were performed by a previously purposely trained blinded observer.

All treatments were performed by the same experienced operator. Air polishing was performed by means of air-abrasive device (AIR-FLOW Master 4) with glycine powder (AIR-FLOW Powder SOFT). The active treatment lasted less than half a minute for each implant in the simplest cases and up to two minutes on the most difficult cases.

Mechanical debridement was performed using plastic curettes (Implant Deplaquers) followed by pocket irrigation with a 0.1% chlorhexidine digluconate solution (CHX) and submucosal application of 1% CHX gel. The active treatment lasted from two minutes in simple cases to more than five minutes per implant in more difficult cases. In this group, treatment was applied until the operator felt that the implant surfaces were adequately debrided. All the procedures were performed without anaesthesia.

RESULTS
A total of 46 patients (24 air polishing group (AAD); mean age 54.58 ± 15.52 and 22 MDA; mean age 53.77 ± 12.18) were enrolled with a total of 88 implants. Thirty-five patients were partially, and 11 were totally, edentulous, with no statistical difference between the two groups. No signs of inflammation (BS = 0) were observed in eight patients and 16 implants in the air polishing group, and in one patient and four implants in the MDA group. All subjects completed the study, and no implant was lost.

On average, each subject carried 1.91 ± 0.93 implants, with no statistically significant differences between the two groups (P > 0.05). PD did not differ statistically significantly between the two groups at baseline (average: AAD = 2.51 mm; MDA: 2.39 mm, P = 0.89). In the AAD group, probing depth reduced significantly in six months (P < 0.001), while in MDA group a slight and not significant increase was observed after three (P = 0.78) and six months (P = 0.09). In addition, the PD mean values were significantly different at three (P < 0.05) and at six months (P < 0.001) in the two groups.

In summary, the AAD treatment was found to be effective in reducing PD at six months, while in group MDA no modification was observed, and the differences between the two treatments were significant.

PI did not appear to be different in the two groups at baseline (average: AAD = 85%, MDA = 85%, P = 1). In both groups, the PI decreased although not significantly at three months (AAD: P = 0.15; MDA: P = 0.71); at six months, AAD group showed a significant decrease (P < 0.001), while the MDA did not (P = 0.62). In addition, the two groups appeared similar at three months (P = 0.94), but not at six (P < 0.05). CAL did not appear to be different in the two groups at baseline (average: AAD = 1.06 mm, MDA = 0.55 mm, P = 0.51). In the AAD group, a non-significant decrease in the average value of the index was observed at three and six months. In the MDA group, a minimal but not significant loss of attachment was observed at either three or six months.

The AAD and MDA groups were found to be different at baseline with regard to the evaluation of the indexes BOP and BS. In the AAD group, a significant decrease in BOP by 25% at six months (P < 0.001) and a significant decrease in BS at three (P < 0.05) and six months (P < 0.01) were observed. In the MDA group, a BOP significant decrease by 14% at six months (P < 0.05) and also a BS decrease at three (P < 0.05) and six months (P < 0.01) were observed.

CONCLUSIONS
Within the limits of the study, treatment with glycine powder is effective in maintaining periodontal indices of the peri-implant tissues and is more effective than the traditional treatment with plastic curette and chlorhexidine.

IMPLICATIONS FOR PRACTICE
Maintenance therapy with glycine powder was effective in reducing PD at six months, while in group MDA no modification was observed, and the differences between the two treatments were significant.

The AAD and MDA groups were found to be different at baseline with regard to the evaluation of the indexes BOP and BS. In the AAD group, a significant decrease in BOP by 25% at six months (P < 0.001) and a significant decrease in BS at three (P < 0.05) and six months (P < 0.01) were observed. In the MDA group, a BOP significant decrease by 14% at six months (P < 0.05) and also a BS decrease at three (P < 0.05) and six months (P < 0.01) were observed.

CONCLUSIONS
Within the limits of the study, treatment with glycine powder is effective in maintaining periodontal indices of the peri-implant tissues and is more effective than the traditional treatment with plastic curette and chlorhexidine.

IMPLICATIONS FOR PRACTICE
Maintenance therapy with glycine powder was effective in maintaining periodontal indices of the peri-implant tissues within physiological parameters. The time taken for treatment was shorter. Clinicians should be aware that this trial had a six month follow up. Long term (beyond six months) trials are needed to confirm longer term effectiveness.

Reference
2. The effects of different levels of brush end rounding on gingival abrasion: a double-blind randomized clinical trial

Hennequin-Hoenderdos NL, Slot DE, Van der Sluijs E, Adam R, Grender JM, Van der Weijden GA. Int J Dent Hygiene 15, 2017; 335–44.

Effective plaque control is critical in the maintenance of oral health, because plaque is the primary etiological factor in the introduction and development of both caries and periodontal disease. Plaque removal with a manual toothbrush is the most frequently used method of oral hygiene in Western Society.

The most recent development in toothbrush manufacturing technology has been in the individual filaments of the toothbrush. Now, in addition to the standard round shape, filaments are available in square, hexagonal and other shapes with varying surface textures ranging from smooth to rough. There are also variable lengths of toothbrush filaments and those with tapered and/or feathered ends. The degree of hardness and stiffness of the filaments is influenced by the their diameter and length and the material from which they are made. Toothbrushes with larger filament diameters (>0.2 mm) are harder and less flexible. This increased stiffness results in the filament ends not bending back during brushing, with the potential of damaging the gums, thus destroying the protective keratin layer.

Gingival abrasions (GAs) are often related to sharp filament tips. Terms such as soft tissue or gingival abrasion, damage, injury, laceration, lesion, recession and ulceration are used interchangeably. The depth of epithelial lesions caused by tooth brushing is influenced by the quality of rounding of the filament end. Soft nylon filaments with rounded ends are less traumatic to the tissue than medium or hard bristles, and they can be directed into the gingival sulcus, minimizing pain, laceration or gingival or cervical abrasions. The American Dental Association (ADA) recommends that the toothbrush bristle ends be 'free of sharp or jagged edges and endpoints' to minimize gingival and dental abrasion. The degree of filament end rounding found in commercially available manual toothbrushes shows great variation, ranging from rounded to sharp edged. Although information on the stiffness of the bristles is generally provided by manufacturers, many products still do not contain information on their bristle end-rounding properties. Each toothbrush may have a different level of filament end rounding. Hennequin-Hoenderdos and colleagues (2018) reported on a trial that sought to assess the effect of different levels of filament end rounding on GAs. In addition, the size of the abrasions and their location were evaluated.

MATERIALS AND METHODS
This was a three-treatment, crossover, contra-lateral, split-mouth, double-blind, randomized study with professional brushing by a hygienist. A double randomization (DES) was performed a priori for the three different test products and professional brushing in two contra-lateral quadrants (1st and 3rd quadrants OR 2nd and 4th quadrants). The randomization resulted in 12 sequences (block size = 4 × 12 and allocation ratio = 1:1), in which every product was tested at two visits (out of three), once in the 1st and 3rd quadrants and once in the 2nd and 4th quadrants.

Participants were randomized to one of the 12 sequences. The examiner and the participant were blind to the treatment randomization, and the records of earlier examinations were not available at each re-examination. All brushing took place in an area separated from the examination area so that the examiner was not aware of the test products and location used by the hygienist.

Forty six (n=46) non-dental students were recruited and screened based on the following eligibility criteria: ≥18 years of age, in good general physical and oral health, minimum of five evaluable teeth per quadrant, no crowns, no carious lesions requiring immediate treatment, no orthodontic appliances or removable partial dentures, and no periodontitis or active treatment for periodontal disease (by investigator description, anyone presenting a probing depth ≥ 5 mm with bleeding on probing and attachment loss ≥ 2 mm). Participants were considered systemically healthy through assessment with a medical questionnaire.

Use of any antibiotics within two weeks prior to study initiation, anticipation of taking any antibiotics during the course of the study, and self-reported pregnancy or nursing were prohibited. Participants received SMS (Short Message Service) reminders before screening to ensure that all oral hygiene procedures were stopped 48 h before each appointment.

Home-use products sufficient for approximately four weeks were distributed in labelled kit boxes by the clinical research coordinator (and dental hygienist) at the screening visit. The kit boxes contained a manual toothbrush and two 75 ml tubes of dentifrice (NaF containing 1450 ppm F). The soft manual toothbrush was an Oral-B® Indicator 40 (>90% end-rounded filaments). Participants were instructed to use these home-use study products twice daily (morning and evening) in their customary manner for the duration of the study. The home-use dentifrices were weighed before distribution at the screening and after collection at Visit Three.

The test products used for the professional brushing exercise were Oral-B Indicator 40 Soft manual toothbrushes with 0% end-rounded filaments (prototype), 40–50% end-rounded filaments (prototype) and >90% end-rounded filaments (commercially available). The percentages refer to the degrees of end rounding, which is a gradual process that ranges from blunt cut filaments with no end rounding (0%) to those that have a perfect, dome-shaped tip (100%).

At the screening, a comprehensive oral soft tissue examination was conducted to evaluate the oral and perioral regions, including hard and soft tissues.

Participants visited the clinic after refraining from all oral hygiene procedures for approximately 48 h prior to the first assessment appointment. An oral soft tissue examination was carried out, similar to that performed at the screening visit. The gingiva was stained with disclosing solution for
better visualization of the areas where the surface of the oral epithelium had been abraded. After staining, participants were instructed to rinse their mouths with water (one sip only) and to expectorate carefully.

The gingiva was dried with an air blast. A GA assessment was undertaken, and abrasions were recorded for both buccal and lingual quadrant of the incisor and canine, premolar and molar regions. Marginal (cervical-free gingiva), interdental (papillary-free gingiva) and mid-gingival (attached gingiva) aspects of the gingiva were assessed for small (Ø ≤ 2.5 mm), medium (Ø > 2.5 mm, but ≤ 5 mm) and large (Ø > 5 mm) GAs. A lesion in the interdental area between two teeth was assigned to the closest tooth area. The mid-gingival area comprised the gingival tissues up to the muco-gingival junction. In the upper jaw, this area included the whole palate.

A PQ-William’s periodontal probe, placed across the long axis of the lesions, was used to measure the size of the abrasions. The greatest diameter of the abrasion lesion determined the size. Loosely attached discolorations were excluded from evaluation. When plaque or abrasions at the gingival margin were difficult to assess, the examiner carefully tried to remove the staining. Staining that could not be removed was assessed as an abrasion. The number and site location of the GAs were recorded on the case record form, with the exclusion of the third molars and central incisors. The rationale for not including the central incisors was to avoid results from overlapping brushing of adjacent quadrants.

In the next phase of the study, a trained dental hygienist brushed the 1st and 3rd quadrants with the assigned toothbrush according to the randomization sequence. Brushing was performed using the modified Bass method. No dentifrice was used. A timer was used to control the duration of a one-minute brushing procedure per toothbrush and a 15-second procedure per buccal/lingual aspect of one quadrant. This process was repeated for the 2nd and 4th quadrants with the alternate toothbrush. Following brushing, the comprehensive oral soft tissue examination was repeated and the gums and the teeth were re-stained for post-brushing GAs. Throughout the study, all examinations were performed by the same examiner under the same conditions.

Participants visited the clinic for second and a third appointment. To minimize carry-over effects, the minimum time between visits was approximately seven days. Visits Two and Three involved the same procedures as Visit One and described previously: prebrushing measurements, professional brushing exercise and post-brushing measurements.

RESULTS

In total, 56 participants were screened and six participants were excluded. Thus, 50 participants were enrolled in the study, and of those, four dropped out before visit One. In total, 46 participants, 14 males (30%) and 32 females (70%) with a mean age of 22.5 (SD 2.51) years, and a range of 18–31 years, completed the study and were included in the analyses.

With regard to overall Gingival Abrasions (GAs), the 0% end-rounded brush showed an increase of 10.38, while the 40–50% brush had an adjusted mean increase of 8.56 abrasions and the >90% brush had an increase of 8.80 abrasions. The difference between the pre- and post-brushing adjusted mean scores differed significantly (P < 0.001) for the 0%, 40–50% and >90% end-rounded brushes. The average pre-brushing scores were comparable (P = 0.713) for the three brushes. All brushes showed a significant (P = 0.002) increase in the total numbers of abrasions post-brushing. The 0% brush differed significantly from the 40–50% brush (P = 0.001) and the >90% brush (P = 0.005) regarding abrasion increase (pre- to post-brushing).

There was no statistically significant difference between the 40–50% and the >90% brushes (P = 0.671) Sub-analyses relevant to the size of the GAs showed a statistically significant increase from pre-brushing for small- and medium-sized abrasions for all brushes. For small-sized abrasions, the 0% brush had a significantly higher increase in abrasions compared with the 40–50% brush (P = 0.002) and the >90% brush (P = 0.008).

There were small-sized GAs in the marginal, interdental and mid-gingival areas. Analysing the data relative to the marginal abrasions in each of the regions showed a significant difference between the 0% brush compared with both the 40–50% brush (P = <0.001) and the >90% brush (P = <0.001).

CONCLUSIONS

Based on the results of this experiment involving professional brushing, it can be concluded that 40–50% or greater end-rounded filaments can provide a significant reduction in gingival abrasions compared with non-end-rounded filaments.

Implications for practice: This trial showed that a 0% end-rounded manual toothbrush is unsafe to use. A 40–50% (or higher) end-rounded brush provides a significant reduction of gingival abrasions. Manufacturers should consider including bristle end-rounding data in their product information for dental care professionals and consumers.

Reference:
Hepatitis B and Hepatitis C viruses, revisited.
1. The presence of serum markers HBeAg and HBV-DNA indicates active viral replication.
   a. True
   b. False

2. HBV vaccine should be administered to health personnel at three intervals as follows: first dosage soon after employment, second dose a month later and a third dose six months after the first dose.
   a. True
   b. False

3. Even with stringent blood screening, vaccination programmes and proper infection control measures, Hepatitis B and Hepatitis C are likely to continue unabated.
   a. True
   b. False

4. Risks for occupational exposure from a needle stick injury or cut exposure in susceptible (not vaccinated) individuals for:
   i.) HBV ranges from 6%-30% depending on the HBeAg status of the source individual
   ii.) HCV infection is approximately 1.8%.
   iii.) HIV-infection is less than 1% after exposure to infected blood.
   a. True
   b. False

Apexogenesis treatment with mineral trioxide aggregate: Long-term follow-up of two cases
5. An emergency root canal is the treatment of choice for traumatically exposed immature permanent teeth.
   a. True
   b. False

6. MTA is preferred above Calcium Hydroxide for vital pulp therapy because:
   c. It develops incomplete dentine bridges
   d. It stimulates hyperaemia
   e. It maintains pulp vitality better
   f. It inhibits the release of growth factors
   a. True
   b. False

7. A contra-indication for vital-pulp therapy is:
   g. An open apex
   h. Spontaneous pain
   i. Cold sensitivity
   j.Trauma

VELscope: shedding light on its ideal application.
8. Identify the CORRECT statement.
   a) The VELscope can accurately distinguish between oral cancer and any other abnormalities of the oral mucosa.
   b) The bright red appearance of tissue when viewed through the VELscope is due to bacterial porphyrins.
   c) The ultrastructural changes of tissue which results in FVL is unique to PMD/dysplasia.
   d) The VELscope preferentially detects areas of white mucosal change.

9. Identify the CORRECT statement.
   Regarding the management of patients with leukoplakia:
   a) The complete surgical removal of a leukoplakic lesion eliminates the risk of cancer development.
   b) It is easy to predict which leukoplakic lesions will transform into OSCC based upon the histological degree of dysplasia.
   c) Molecular techniques can reliably be used to predict malignant transformation of leukoplakic lesions.
   d) Careful monitoring of the patient with leukoplakia is necessary as there is no reliable treatment available.

10. The VELscope is able to accurately determine the high risk molecular field surrounding the OSCC, even if this is not histologically visible.
    a) True
    b) False

Oral pemphigus vulgaris with skin and ocular involvement.
11. In treating Oral Pemphigus vulgaris:
    Prednisone is the drug of choice, the maximum daily dose of which is 120 mg (1-2 mg / kg/ day). The initial dose of prednisone is typically about 0.75 to 1 mg/kg/day. If the initial dose is ineffective in controlling the disease, the dose is increased by 25% to 50% every five to seven days.
    a. True
    b. False

Prevention of infective endocarditis associated with dental interventions
12. Eliminating gingivitis would reduce the incidence and degree of spontaneous bacteraemia and hence Infective Endocarditis.
    a. True
    b. False
13. SA Heart recommends antibiotic prophylaxis to ALL individuals undergoing extractions.
   a. True
   b. False

14. SA Heart recommends antibiotic cover in high risk individuals for dental procedures where perforation of the oral mucosa is expected and suggests that oral amoxicillin prophylaxis is safe for non-allergic patients, with a low risk of anaphylaxis.
   a. True
   b. False

The role of laser therapy in implant dentistry
15. Identify the INCORRECT statement:
   Using laser energy to make any incision has several benefits, including
   a. a sterile cut, less likely to become infected.
   b. Reduced swelling and inflammation.
   c. Reduced pain
   d. significantly less traumatic postoperative course.
   e. Reduced operating costs
   f. None of the above
   g. All of the above

Hyalinising clear cell carcinoma of the maxilla in a young adult female
16. The most frequent site of occurrence of hyalinising clear cell carcinoma is the tongue with symptoms including numbness, pain and even limitation of movement.
   a. True
   b. False

Maxillo-Facial Oral Radiology
17. Periapical cemental dysplasia is successfully treated with root canal therapy.
   a. True
   b. False

18. Periapical cemental dysplasia is more common in black females.
   a. True
   b. False

Clinical Windows
19. In a cross-over trial, patients:-
   a. Get exposure to both the test and control products
   b. Get exposure only to the placebo
   c. Get exposure only to the gold standard
   d. Get exposure only to the test product
   e. None of the above
   f. All of the above

20. In the Hennequin-Hoenderdos trial, the 0% brush had a significantly higher increase in small-sized abrasions compared with the 40–50% brush and the >90% brush.
   a. True
   b. False

Ethics: Patients are people
21. A dentist who treats children has the professional responsibility to be able to assess their developmental level, dental attitudes, and temperament and to anticipate the child’s reaction to dental care.
   a. True
   b. False

22. When drug taking is detected or suspected, the dentist has a moral and professional duty to counsel the patient.
   a. True
   b. False

23. In deciding whether to inform the parents of an adolescent patient who is taking drugs, the clinician must carefully weigh up the ethical obligations to maintain patient confidentiality versus the possible long term risks and dangers to the adolescent.
   a. True
   b. False

24. Patients should be informed in a non-judgmental and authoritarian manner of the potential threats to oral and general health posed by mouth jewellery, oral piercing, tongue splitting, grillz and a number of other oral and dental adornments which are popular and fashionable.
   a. True
   b. False

25. In managing patients the dental practitioner should take the time to communicate, get to know them, and try to manage them in a holistic manner while still maintaining a professional and ethical demeanour.
   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.

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As many as 1 in 3 people suffer from dentine hypersensitivity. New Sensodyne Rapid Relief is clinically proven to deliver fast relief in just 60 seconds and long-lasting protection from dentine hypersensitivity, helping to bring everyday improvements to your patients’ lives.

References:
3. Accepted for presentation at AADR 2017, Abstract no: 2635085.
5. GSK Data on File RH01897.
6. Touchstone research December 2016. For any product safety issues, contact GSK on +27 745 6001 or 0800 118 274. 

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