

VOL. 9 NO. 6 In this issue

#### Johan Christian Julyan and Marius Coetsee Class II Division 2 deep bite treatment using a combination of fixed orthodontic appliances and an acrylic splint

#### Johan Hartshorne

Antibiotic stewardship in dentistry – review of evidencebased clinical recommendations on appropriate antibiotic prescribing in dental practice Part 1: The antibiotic resistance crisis and the principles and practices of appropriate antibiotic prescribing

Naheed Mohamed, Yosi Nahmias and Ken Serota The cortical window

Vincenzo Santomauro Immediate loading of post-extraction implant in a high-esthetic value area: digital workflow advantages

#### Johan Hartshorne

Antibiotic stewardship in dentistry – review of evidencebased clinical recommendations on appropriate antibiotic prescribing in dental practice Part 2: Clinical guidelines and recommendations for antibiotic prescribing in dental practice

# WHY this bond? 81% MORE BETTER BET



### Ybond Universal Self-etching Universal Adhesive





#### A TV without HD is like a... A MIRROR WITHOUT HD



Experience high-definition quality. The brighter the workspace, the better the illumination and visibility. With ZIRC's Crystal HD<sup>®</sup> lens, you are visually working in a 40% brighter environment compared to the Rhodium lens that is currently the industry standard. If you haven't made the change to HD - what are you waiting for?

#### **CUTTING EDGE IMAGERY**



Rhodium = Reflects color 75% accurately Crystal HD<sup>®</sup> = Reflects color 99% accurately Provides exceptionally bright, shadow-free images!

Your mirror

40%

BRIGHTER Than Rhodium Mirrors

Crystal HD<sup>®</sup>















- <u>Pretoria</u>: Patrick: 082 375 3699 - Brandon: 082 555 4406 - <u>Johannesburg</u>: Gerhard: 082 373 1548 Johan: 082 829 6804 - <u>Port Elizabeth</u>: Leon: 079 501 5880 - <u>Cape Town</u>: Danielle: 082 551 6146

foo 012 342 8551 "Passionate about Dentistry!" Dental Ultrasonic Scalers With or Without Detachable/LED Handpieces VRN A VRN A5 RN K08 DIFFERENT MODELS TO F 0 (M) X Softer Vibration for your Patients Portable or Fixed Efficient and thorough supragingival scaling No pain ultrasonic periodontal treatment VAFU Cordless ED Curing Light ight Cordless LED Curring Light

second curing

Caries Detection

Wireless

Charging

/RN/

Stability Powerful **Metal Handpiece** 

- Smart Battery
- Wireless
- Colourful
- Stronger LED
- Supreme Luminance

 Reliable www.interafricadental.com - orders.iad@gmail.com - 0861-DENTAL(336825) - (T) 012 342 8551 - (F) 087 809 5940 Address: 1315 Stanza Bopape Street, Hatfield, Pretoria, 0028 | PO BOX 11050, Hatfield, 0028, South Africa

Comfort







# Contents

December 2019/January 2020

Volume 9 No.6

#### 6 Clinical

Class II Division 2 deep bite treatment using a combination of fixed orthodontic appliances and an acrylic splint Johan Christian Julyan and Marius Coetsee

#### 24 Clinical

Antibiotic stewardship in dentistry - review of evidencebased clinical recommendations on appropriate antibiotic prescribing in dental practice Part 1: The antibiotic resistance crisis and the principles and practices of appropriate antibiotic prescribing Johan Hartshorne

#### 42 Clinical

The cortical window Naheed Mohamed, Yosi Nahmias and Ken Serota

#### 54 Clinical

Immediate loading of post-extraction implant in a high-esthetic value area: digital workflow advantages Vincenzo Santomauro

#### 66 Clinical

Antibiotic stewardship in dentistry – review of evidencebased clinical recommendations on appropriate antibiotic prescribing in dental practice Part 2: Clinical guidelines and recommendations for antibiotic prescribing in dental practice Johan Hartshorne



- 82 Products and News
- 84 Classifieds



# WHY this bond? 81% MORE BETTER BETTER ADHESIVE VALUE PRICE

R450.00

Works with or without acid conditioning

For every substrate: enamel, dentin, zirconia and metal alloys.

Reduced postsurgical sensitivity.

# 5ml YLLER Adesivo odontológico autocondicionante universal Ybond Universal Self-etching **Universal Adhesive**

More effective polymerization: outstanding adhesion stability

Soft bottle: more control during the application

Single bottle: no need for pre-mix



Prices include VAT. Pictures used may be for representation only. E&OE. © 0860 100 200 | © @wrightmillners | f Wright Millners Dental Suppliers 2% discount if you order on www.mywrightplace.co.za | www.wright-millners.co.za





Vol. 9 No. 6, December 2019/January 2020 ISSN 2226-1567

**PUBLISHING EDITOR** Ursula Jenkins

**EDITOR** Prof Simone Grandini

ASSOCIATE EDITORS Prof Cecilia Goracci Prof Andre W van Zyl

**EDITOR-IN-CHIEF EMERITUS** Prof Dr Marco Ferrari

#### EDITORIAL REVIEW BOARD

Prof Paul V Abbott Dr Marius Bredell Prof Kurt-W Bütow Prof Ji-hua Chen Prof Ricardo Marins de Carvalho Prof Carel L Davidson Prof Massimo De Sanctis Dr Carlo Ercoli Prof Roberto Giorgetti Dr Patrick J Henry Prof Dr Reinhard Hickel Dr Sascha A Jovanovic Dr Gerard Kugel Prof Ian Meyers Prof Maria Fidela de Lima Navarro Prof Hien Ngo Dr Hani Ounsi Prof Antonella Polimeni Prof Eric Reynolds Prof Andre P Saadoun Prof Errol Stein Prof Lawrence Stephen Prof Zrinka Tarle Prof Franklin R Tay Prof Manuel Toledano Dr Bernard Touati Prof Laurence Walsh Prof Fernando Zarone

DESIGN & LAYOUT C Designz

PRINTED BY Novus Print

International Dentistry African Edition is published by Modern Dentistry Media CC, PO Box 76021 Wendywood 2144 South Africa Tel: +27 11 702-3195 e-mail: dentsa@iafrica.com www.moderndentistrymedia.com

#### © COPYRIGHT. All rights reserved.

No editorial matter published in International Dentistry African Edition may be reproduced in any form or language without the written permission of the publishers. While every effort is made to ensure accurate reproduction, the authors, publishers and their employees or agents shall not be held responsible or in any way liable for errors, omissions or inaccuracies in the publication whether arising from negligence or otherwise or for any consequence arising therefrom.

> DENTISTRY'S INFORMATION CENTRE

Published in association with

FMC





### Cranberry® INSPIRE™ Nitrile Powder Free Dental Exam Gloves



Cranberry<sup>®</sup> INSPIRE<sup>™</sup> Nitrile Powder Free Dental Exam Gloves are their fittest, lightest glove yet! They feature InSoft formulation for increased comfort while still maintaining uncompromised superior tactile sensitivity.

#### FEATURES INCLUDE:

InSoft formulation for increased soft comfort and minimized hand fatigue Exceptional fit (conforms to hand without being restricting). Enhanced fingertip texture for superior grip in any condition.

Aegean blue color helps hide stains

300-Box space saving packaging (XL size is 250/box) Available in sizes XS-XL. Use the dropdown menu to select your size.

#### R239.95 ea BUY 5, GET 1 FREE



#### **EURONDA MONOART®**

is the disposable product line for dental practices which offers a wide range of equipment and accessories for the protection of dentists, assistants and patients. Enjoy a touch of style and joy for your dental practice thanks to its wide color palette.

#### R459.00 box of 1000







#### MONOART® PLASTIC CUPS

Disposable plastic cups with rounded edges. Available in numerous colours to customize your dental practice. Monoart<sup>®</sup> plastic cups are made of a certified material with rounded edge in order to offer the maximum comfort and a safe grip to patients.

#### R390.00 box of 1000

#### **MONOART® PATIENT BIBS**

Patient bibs are made of pure cellulose which is highly absorbent. It is embossed and bonded with a waterproof polyethylene film. Thanks to the innovative packaging with a resealable open/close system, the bibs are handled one at a time and they stay protected

from dust and contamination, for maximum hygiene and highly practical use.

#### R366.85 box of 500





Johannesburg Durban Johannesburg Durban Building 2, No 106 16<sup>th</sup> Road, Midrand, 1686 51A Musgrave Park, Musgrave Road, Berea, Durban, 4001 Tel: 011 719 9111 • Fax: 011 719 9031 Tel: 031 312 6130



Taking care of everything dental 🔌 0800 111 796 🖾 admin@dentalwarehouse.co.za

#### CLINICAL

# Class II Division 2 deep bite treatment using a combination of fixed orthodontic appliances and an acrylic splint

Johan Christian Julyan<sup>1</sup> and Marius Coetsee<sup>2</sup>

#### Abstract

This case report describes the management of a 15 year old female patient that presented with a Class II Division 2 malocclusion and a severe deep bite. Intra-oral examination showed severely retroclined incisors and a unilateral posterior crossbite. Other findings included a deep curve of Spee and moderate crowding in the maxilla and mandible. The treatment plan made use of a pre-adjusted fixed MBT bracket system with the use of a removable acrylic splint in the mandible to facilitate bite opening for the first 6 months of treatment. A non-extraction treatment protocol was used to prevent any further deepening of the bite. The treatment resulted in improvement of the deep bite and incisor angulation as well as a Class I molar and canine relationship with improved function and aesthetics.

Keywords: Orthodontic treatment, Class II Division 2, Deep bite, Acrylic splint, Fixed orthodontic treatment

#### Introduction

Class II malocclusions are very common and can be subdivided into Class II Division 1 or Class II Division 2. Both divisions have their own set of clinical appearances and treatment difficulties. Characteristics of Class II Division 2 malocclusions include: retroclination of two or more of the maxillary incisors; retroclined mandibular incisors; a Class II molar relationship and an increased overbite or deep bite (vertical overlap of the maxillary incisors to the mandibular incisors). A very important feature of Class II Division 2 malocclusions is the high position of the lower lip in relation to the maxillary incisors contributing further to the retroclination of the maxillary incisors.<sup>1</sup>

The majority of Class II Division 2 malocclusions present with a deep bite.<sup>2</sup> A deep bite is however not limited to Class II Division 2 cases and is seen as a characteristic of many other malocclusions. Deep bites can be as a result of over erupted maxillary incisors, over erupted mandibular incisors, or a combination of both. In many of the patients that present with a deep bite the incisors are retroclined.<sup>3</sup> Underdevelopment of the mandible is seen in most Class II Division 2 cases and flaring of the mandibular anterior teeth and retroclination of the maxillary anterior teeth results due to a compensatory mechanism.<sup>4</sup> In Class II Division 2 cases the main complaint typically includes the increased vertical overlap of the incisors, crowding of the maxillary and mandibular arches and decreased overjet.<sup>5</sup>

The treatment success lies in correcting the antero-posterior, vertical and transverse discrepancies. Correcting the inter-incisal angle is also paramount for a stable long term result.<sup>6</sup> Potential treatment alternatives for Class II Division 2 malocclusion include maxillary molar distalisation, extraction of maxillary first premolars and mandibular second premolars or extraction of only first premolars in the maxilla.<sup>7</sup> Overbite reduction

<sup>1</sup> JC Julyan BChD (UP), PDD (UWC), MSc (UWC)

<sup>2</sup> M Coetsee BChD (Stell.), MChD (Medunsa)

#### Corresponding author

Dr. JC Julyan Tel: 021 975 7478 Cell: 074 136 3505 E-mail: jcjulyan@gmail.com

#### CLINICAL



is often critical to correct the incisor relationship of Class II Division 2.<sup>8</sup> Overbite reduction can be achieved by incisor intrusion or by extrusion of the buccal segments with minimal intrusion and proclination of the incisors.<sup>9</sup>

Different treatment options exist for the correction of Class II Division 2 malocclusions depending on the baseline presentation. Removable appliances can be used during the growth phase and in the post-adolescent phase the treatment aims to achieve dentoalveolar compensation with the use of fixed orthodontic appliances.<sup>10,11,12,13</sup> When the maxilla is the cause of the malocclusion, distalization of the maxillary teeth or extraction treatment is often considered.<sup>14,15,16</sup> Other techniques include the use of intermaxillary elastics or fixed rigid or flexible bite jumping Class II correction appliances.<sup>17,18,19,20,21,22</sup> Another option includes the use of orthodontic treatment in combination with orthognathic

#### surgery.<sup>23</sup>

Class II Division 2 malocclusion treatment in an adolescent patient can often lead to an excellent result if growth, compliance and treatment mechanics are favourable.<sup>24</sup>

#### **Case Report**

A 15-year-old female patient (Figures 1 a-h) presented to private practice with a main complaint that she "doesn't like her front teeth". Nothing abnormal was detected in her medical history.

Upon clinical examination the patient presented with a Class II Division 2 malocclusion with a very deep bite. Extra-oral examination revealed that the patient was brachycephalic with a convex profile. She had good facial symmetry and her maxillary midline was co-incident with her mid sagittal plane. She presented with competent lips.

#### JULYAN / COETSEE



Figure 2: Pre-treatment orthopantomogram.

Intra-oral examination revealed that the patient was in her permanent dentition stage. She had healthy gingiva but buccal caries on tooth 45. She had an Angle Class II molar and canine relationship bilaterally. In occlusion she had an overjet of 1 mm and an increased overbite, also referred to as a deep bite or deep overbite. There was a unilateral posterior crossbite (26:36) and moderate crowding in the maxilla and mandible with retroclined incisors.

#### **Radiographic findings**

The radiographic analysis of the patient's initial orthopantomogram showed a permanent dentition stage

with the maxillary and mandibular second molars erupting. There were also early signs of impacted third molars in the mandible but no other abnormalities. (Figure 2).

The cephalometric analysis (Table 1), conducted before treatment, revealed a Class II skeletal relationship. Figures 3 (a and b), show the pre-treatment cephalogram and the cephalometric analysis done with Dolphin® orthodontic software.

#### Diagnosis

#### Soft tissue

The patient presented brachycephalic with a convex profile.



Figure 3: (a) Pre-treatment cephalogram and (b) cephalometric analysis.



# High strength, high esthetics

Since its introduction, IPS e.max<sup>®</sup> lithium disilicate has been relied upon for its high strength and high esthetics by clinicians worldwide. Now, after 10 years of continuous quality testing, IPS e.max lithium disilicate has demonstrated an average biaxial flexural strength of 500 MPa\*. Due to the material's long-term clinical success and proven record of strength, crowns with only 1 mm material thickness are now possible when adhesively bonded.

The IPS e.max® you know, but even more versatile!

- Minimally invasive preparation
- New translucency options
- 500 MPa for maximum confidence

For your next case choose the trusted, most prescribed" all-ceramic in the world. IPS e.max... all ceramic – all you need.

\*Source: R&D Ivoclar Vivadent AG, Schaan, Liechtenstein \*\*Based on sales figures

ivodent 0860 456 123 IPS **e.max**® is now even more versatile!



#### Table 1: Pre-treatment cephalometric analysis

Cephalometric values	Normal	Pre - Treatment
SNA (°)	82.0	85.3
SNB (°)	80.9	79.8
ANB (°)	1.6	5.6
WITS (mm)	-1.0	3.8
Interincisal angle (°)	130.0	163.2
U1 – SN (°)	102.4	85.9
U1 – NA (mm)	4.3	-4.0
U1 – NA (°)	22.8	0.6
L1 – NB (mm)	4.0	-O.8
L1 – NB (°)	25.3	10.7
FMIA (L1 – FH) (°)	63.5	78.9
IMPA (L1 – MP) (°)	95.0	84.1
Lower lip to E-Plane (mm)	-2.0	-2.5
Upper lip to E-plane (mm)	-3.3	-4.8
Soft tissue convexity (°)	135.7	127.3
Convexity (A-NPo) (mm)	1.5	3.2
Nasolabial angle (°)	102.0	107.9
Facial angle (°)	87.2	91.4
Upper lip thickness at A-point (mm)	17.0	11.4
Upper lip thickness at Vermilion border (mm)	13.1	14.2

#### Skeletal

Class II skeletal malocclusion [Steiner - ANB (5.6°) and WITS (3.8)] with a prognathic maxilla [SNA (85.3°) and Convexity (3.2 mm) and a horizontal growth pattern.

#### Dental

Angle Class II Division 2 with retroclined and retrusive maxillary and mandibular incisors. An overbite of 100% and an overjet of 1 mm due to the retroclined maxillary incisors. The patient had a severely enlarged interincisal angle of 163.2°.

#### Treatment objectives

The treatment objectives were: to improve the deep bite and achieve a Class I molar and canine relationships with well aligned maxillary and mandibular arches; to improve the incisor inclination and interincisal angle; and to ensure good interdigitation with a functionally and aesthetically acceptable result.

#### **Treatment options**

There are different ways to treat an Angle Class II Division 2 malocclusion. When making use of functional appliances in Class II Division 2 malocclusions a working overjet first needs to be developed by proclining the maxillary incisors. The treatment options for this Class II Division 2 malocclusion included camouflage or surgical correction seeing as the patient was already past her growth spurt.

**Camouflage treatment** which makes use of fixed orthodontic treatment in conjunction with inter-arch elastics and/or extractions and/or skeletal anchorage depending on the severity of the case.

**Surgical correction** which includes a combination of fixed orthodontic treatment and orthognathic surgery. This treatment option can only be done after the age of 18 years.

The treatment option of choice in this case was to do camouflage by making use of fixed orthodontic appliances and inter-arch elastics with the addition of an acrylic splint in the mandible to facilitate in treating the severe deep bite.

#### **Treatment Plan:**

The following steps were followed for the chosen treatment plan:

- 1.Completed all necessary basic restorative dentistry, tooth 45 buccal caries was restored using composite.
- 2. Impressions were taken for the fabrication of an acrylic splint for the lower arch to extend from the 35 to the 45.
- 3.Pre-adjusted MBT (022 slot) fixed orthodontic brackets were placed and a standard wire progression followed in the maxilla. Buccal tubes were placed on the 46 and 36 in the mandible with inter-arch elastics to facilitate overeruption of the mandibular first permanent molars to open the bite.
- 4. Every month the acrylic occlusal guard was adjusted to facilitate over-eruption of the posterior teeth.
- 5. After contact was achieved up until the second premolars the acrylic splint was removed and MBT pre-adjusted fixed orthodontic appliances were placed on all the remaining mandibular teeth.
- 6.Class II elastics were utilized to reduce the overjet and correct the Class II molar and canine relationships.
- 7.Teeth were torqued and the case finished on 0.019 x 0.025 natural arch stainless steel archwires.
- 8.Ensured good interdigitation of the permanent teeth in order for them to settle in the new Class I position.
- 9.Retention Placed fixed retainers in the maxilla and mandible and a clear removable retainer in the maxilla.

#### **Progress of Treatment**

The MBT pre-adjusted orthodontic system was used to conduct the treatment (Figures 4 a-e). The fixed appliance system was placed only in the maxilla at the start of treatment with an acrylic splint (AS) in the mandible. A button was placed palatal of tooth 26 and buccal tubes were placed on the 36 and 46 to serve as attachments for the inter-arch elastics that facilitate the over eruption of the mandibular posterior teeth to open the bite. The inter-arch elastic of the 26 to the 36 extended from palatal of the 26 to buccal of the 36 to correct the unilateral posterior crossbite of the 26 with the 36 (Figure 4 e).

Once the first permanent molars were in contact the acrylic splint was trimmed to extend only from the 34 to the 44 and orthodontic brackets were placed on the 35 and 45 with inter-arch elastics to facilitate over eruption of the mandibular second premolars. Once the molars and second premolars were in contact the acrylic splint was removed and fixed appliances were placed on the rest of the mandibular teeth, see (Figures 5 a-e).

Once the maxillary and mandibular teeth were aligned and in stainless steel wires (Figures 6 a-c), Class II interarch elastics were used to reduce the overjet and correct the Class II molar and canine relationships, see Table 2. The Alignment in the maxilla and mandible was done using Nickel Titanium (NiTi) archwires and the case was



Figure 4 (a-e): Start of treatment with maxillary fixed appliances and mandibular acrylic splint.

#### JULYAN / COETSEE



Figure 5 (a-e): Placement of mandibular fixed appliances.

finished on stainless steel (SS) wires. The following archwire sequence was used, see Table 2.

The final archwire for both arches was a  $0.019 \times 0.025$ 

SS. The Inter-arch Class II elastics that were used during the treatment were stopped for the last 2 months of the treatment to evaluate if the patient had a stable Class I bite.

#### Table 2: Archwire and Inter-arch elastics sequence used for the treatment

Archwires		Inter-arch elastics		
Maxilla	Mandible	Size and force	Direction	
0.014 NiTi	AS with buccal tubes on 36 and 46	4 Oz 4.8 mm	Teeth 16 to 46 (buccal) and 26 to 36 (through the bite)	
0.016 NiTi	AS with buccal tubes on 36 and 46 and fixed brackets on 35 and 45	4 Oz 4.8 mm	Teeth 16,15 to 46,45 and 26,25 to 36,35	
0.018 NiTi	0.014 NiTi	-	-	
0.018 NiTi	0.016 NiTi	-	-	
0.018 NiTi	0.018 NiTi	-	-	
0.018 x 0.025 NiTi	0.018 x 0.025 NiTi	-	-	
0.019 x 0.025 SS	0.019 x 0.025 SS	6 Oz 6.4 mm	Class II ( maxillary canines to mandibular first permanent molars)	

# Bring your business into the foreground

# **Increase your profits**

#### DWX-42W



Wet Mill Master

#### DWP-80S



Dental 3D Printer

#### DWX-52D



**Efficiency Expert** 





**Dry Mill Solution** 

#### DWX-52DCi





#### DWX-52DC



Automated Digital Milling

#### DWX-4W



Wet Mill Solution



The Orginal



www.rolanddg.co.za | sales@rolanddg.co.za 0800ROLAND (76 5263) | +27(11) 875 9300 You are – I am – We are, team...



#### JULYAN / COETSEE



Figure 6 (a-c): Final archwire for both arches (019 x 025 SS).

#### **Treatment outcome**

The treatment resulted in well aligned arches with Class I molar and canine relationships (Figures 7 a-h). The deep bite improved significantly with the maxillary and mandibular midlines corresponding to the patient's midsagittal plane and the teeth were settled in the new occlusion. The unilateral posterior crossbite was resolved and the inclination and

interincisal angle of the maxillary and mandibular incisors improved.

### Comparison of Initial and final orthodontic study models

A comparison was made of the pre-treatment and posttreatment orthodontic study models to show the change that



occurred from all the different views (Figures 8 and 9 a-e).

**Frontal view:** Vertical and transverse correction showing deep bite correction and correction of the unilateral posterior crossbite of tooth 26 with 36.

**Lateral views:** Improvement in the anteroposterior dimension with correction of the Class II molar and canine relationships to Class I as well as correction of the retroclined

maxillary and mandibular incisor inclinations.

**Maxillary and mandibular occlusal views:** Well aligned arches without any residual spaces or rotations.

#### **Cephalometric values**

Table 3 below shows the values of the cephalometric analyses from the start to the completion of treatment and



Figure 8 (a-f): Pre-treatment orthodontic study models.



Figure 9 (a-e): Post-treatment orthodontic study models.

#### JULYAN / COETSEE

Figures 10 (a and b) shows the cephalograms before and after treatment.

#### Discussion

It is estimated that between 2% and 5% of a population have a Class II Division 2 malocclusion.<sup>25,26,27</sup> Class II Division 2 malocclusions are regarded as difficult to treat and they have the tendency to relapse after treatment.<sup>28,29</sup> Relapse tends to occur more frequently in adult cases than adolescents.<sup>17</sup>

A recurring deep overbite, crowded maxillary incisors and a steep axial maxillary incisor inclination is often seen after retention.<sup>11</sup> The maxillary incisor inclination should be corrected as close as possible to normal, keeping in mind that overcorrection is more prone to relapse.<sup>30,31</sup> An interincisal angle of less than 140 degrees after treatment is an important treatment objective to ensure long term stability.<sup>32</sup> The presence of a high lower lip line is frequently seen in Class II Division 2 malocclusion patients and is said to cause



Figure 10 (a and b): Cephalograms before treatment (a) and after treatment (b).

the steep maxillary incisor inclinations as well as the high frequency of relapse.<sup>33,34,35</sup> Removing the excessive overlap of the maxillary incisors by the lower lip is therefore an

Cephalometric values	Normal	Pre - Treatment	Post treatment
SNA (°)	82.0	85.3	80.8
SNB (°)	80.9	79.8	76.6
ANB (°)	1.6	5.6	4.2
WITS (mm)	-1.0	3.8	2.3
Interincisal angle (°)	130.0	163.2	135.5
U1 – SN (°)	102.4	85.9	95.5
U1 – NA (mm)	4.3	-4.0	0.6
U1 – NA (°)	22.8	0.6	14.7
L1 – NB (mm)	4.0	-0.8	4.1
L1 – NB (°)	25.3	10.7	25.6
FMIA (L1 – FH) (°)	63.5	78.9	63.2
IMPA (L1 – MP) (°)	95.0	84.1	98.3
Lower lip to E-Plane (mm)	-2.0	-2.5	-0.9
Upper lip to E-plane (mm)	-3.3	-4.8	-4.2
Soft tissue convexity (°)	135.7	127.3	128.3
Convexity (A-NPo) (mm)	1.5	3.2	2.3
Nasolabial angle (°)	102.0	107.9	95.9
Facial angle (°)	87.2	91.4	90.6
Upper lip thickness at A-point (mm)	17.0	11.4	12.3
Upper lip thickness at Vermilion border (mm)	13.1	14.2	14.1

#### Table 3: Cephalometric values before and after treatment

# YOUR PATIENTS ARE NOT STATUES, AND THAT'S OK.

Patient movement is the number one contributor to compromised image quality. Our new **Planmeca CALM**<sup>\*\*</sup> corrective algorithm will allow you to eliminate movement artefacts from CBCT images and succeed every time.

Without Planmeca CALM"



With Planmeca CALM™



Now available for all Planmeca 3D imaging units!

Find more info! www.planmeca.com



PLANMECACALM<sup>™</sup> Movement artefact correction for CBCT images

Planmeca Southern Africa Adriaan van der Spuy • tel. 076 821 6239 • email: adriaan.vds@planmeca.com

important objective when treating Class II Division 2 cases.<sup>30</sup>

It has been found that molar correction appeared to be stable after orthodontic treatment <sup>36</sup>, but it's also important to remember that the amount and direction of mandibular growth after treatment has an influence on the stability of the overbite correction as well as the molar relationship after treatment of Class II Division 2 cases. <sup>37,38</sup> A minimum of 5 years is recommended to follow up treated Class II Division 2 cases since many skeletal, soft-tissue, and dental variables have shown significant changes from 2-5 years post-retention.<sup>39</sup>

Although there is some controversy surrounding the dentofacial characteristics of Class II Division 2 malocclusions,<sup>40,41</sup> some general agreement does exist and includes a normal maxillary prognathism in combination with a retrognathic mandible when the B-point is used as the reference.<sup>42,43</sup> Another characteristic feature is the retroclination of the maxillary incisors as well as a deep bite.<sup>1</sup> In severe cases vertical skeletal factors are evident. <sup>44,45</sup> When a high lower lip line is present with its associated resting pressure on the maxillary incisors, a retroclination of the maxillary incisors is commonly seen.<sup>28,29</sup>

Evidence from prospective studies show that in order to maximise favourable soft tissue and dentoalveolar changes during treatment, the facial growth pattern should be diagnosed early and the correction of the deep overbite done as soon as possible. <sup>46</sup> The increased overbite can be corrected with several techniques, but the success thereof will largely be determined by how well the interincisal angle is altered. <sup>47</sup> The interincisal angle can be corrected by proclining the maxillary or mandibular incisors or a combination of both. The mandibular incisor should occlude onto the cingulum of the maxillary incisor after the interincisal angle has been altered. <sup>48</sup> In order to ensure that the corrections to the interincisal angle and overbite is maintained in Class II Division 2 malocclusion cases, a long term retention protocol should be followed. <sup>49</sup>

Prospective international studies are required (either case control or randomized control trials) to provide stronger evidence on the treatment options and stability for Class II Division 2 malocclusions in children and adolescents.<sup>39</sup>

#### Conclusion

Class II Division 2 remains one of the most difficult malocclusions to treat.

A deep bite is a common feature in Class II Division 2 malocclusions and can be corrected using various techniques. In this case the use of a removable acrylic mandibular splint in combination with MBT fixed orthodontic appliances were used to correct the deep bite and Class II Division 2 malocclusion.

The success of this case was completely dependent on the compliance of the patient regarding wearing of the acrylic splint and inter-arch elastics to correct the deep bite, unilateral posterior crossbite and Class II molar and canine relationships.

#### References

1. Van Der Linden FPGM. Development of the dentition. Quintessence Publishing Co: Chicago 1983.

2. Sana S, Bansal A, Sami L, Tapashetti R, Gaikwad S. Anterior Deep Bite Malocclusion Treated with Connecticut Intrusion Arch: Biomechanical Consideration. Journal of Clinical and Diagnostic Research 2014; 8(5): 30 – 32.

3. Lewis P. Correction of deep anterior overbite – A report of three cases. American Journal of Orthodontics and Dentofacial Orthopedics 1987; 91(4): 342 – 345.

4. Rao SA, Thomas AM, Chopra S. Use of a modified anterior inclined plane in the treatment on the dentoskeletal Class II division 2 patient. Journal of Indian Society of Pedodontics and Preventive Dentistry 2010; 3(28): 237 – 240.

5. Selwyn-Barnet BJ. Class II division 2 malocclusion: a method of planning and treatment. British Journal of Orthodontics 1996; 23(1): 29 – 36.

6. Houston W, Tulley J. A Textbook of Orthodontics. Wright: Bristol 1993.

7. Juneja A, Sharma P, Shetty D, Verma T. Extraction vs Non-Extraction approach to Class II Division 2 Malocclusion Treatment: Report of Two Cases. Journal of Dental Specialities 2014; 2(1): 61 – 67.

8. Sultana S, Hossain MZ. Correction of Class II Division 2 Malocclusion with Traumatic deep bite – Nonextraction Therapy. Bangladesh Journal of Orthodontics and Dentofacial Orthopedics 2015; 5(1): 33 – 36.

9. Al-Buraiki H, Sadowsky C, Schneider B. The effectiveness and long-term stability of overbite correction with incisor intrusion mechanics. American Journal of Orthodontics and Dentofacial Orthopedics 2005; 127(1): 47 – 55.

10. Bacetti T, Franchi L, Stahl F. Comparison of 2 comprehensive Class II treatment protocols including the bonded Herbst and headgear appliances: a double-blind study of consecutively treated patients at puberty. American Journal of Orthodontics and Dentofacial Orthopedics 2009; 135: 698 – 699.

11. Canut JA, Arias S. A long-term evaluation of treated

Class II Division 2 malocclusions: a retrospective study model analysis. European Journal of Orthodontics 1999; 21: 377 – 386.

12. Fuhrmann R, Berg R. Nachuntersuchung von Patienten mit Deckbiß des Typs Angle-Klasse II, 2. Praktische Kieferorthopädie 1990; 4: 11 – 20.

13. Pinzan-Vercelino CR, Janson G, Pinzan A. Comparative efficiency of Class II malocclusion treatment with the pendulum appliance or two maxillary premolar extractions and edgewise appliances. European Journal of Orthodontics 2009; 31: 333 – 340.

14. Locatelli R, Bednar J, Dietz VS, Gianelly AA. Molar distalization with super-elastic NiTi wire. Journal of Clinical Orthodontics 1992; 26: 277 – 279.

15. Wehrbein H, Feifel H, Diedrich P. Palatal implant anchorage reinforcement of posterior teeth: A prospective study. American Journal of Orthodontics and Dentofacial Orthopedics 1999; 116: 678 – 686.

16. Wilmes B, Drescher D. Application and effectiveness of the Beneslider: a device to move molars distally. World Journal of Orthodontics 2010; 11: 331 – 340.

17. Bock N, Ruf S. Post-treatment occlusal changes in Class II Division 2 subjects treated with the Herbst appliance. European Journal of Orthodontics 2008; 30: 606 – 613.

18. Obijou C, Pancherz H. Herbst appliance treatment of Class II, Division 2 malocclusions. American Journal of Orthodontics and Dentofacial Orthopedics 1997; 112: 287 – 291.

19. Pancherz H. The Herbst appliance – its biologic effects and clinical use. American Journal of Orthodontics 1985; 87: 1 – 20.

20. Pancherz H. The nature of Class II relapse after Herbst appliance treatment: a cephalometric long-term investigation. American Journal of Orthodontics and Dentofacial Orthopedics 1991; 100: 220 – 233.

21. Ruf S, Pancherz H. Orthognathic surgery and dentofacial orthopedics in adult Class II Division 1 treatment: mandibular sagittal split osteotomy versus Herbst appliance. American Journal of Orthodontics and Dentofacial Orthopedics 2004; 126: 140 – 152.

22. Bremen J, Bock N, Ruf S. Is Herbst-multi-bracket appliance treatment more efficient in adolescents than in adults? Angle Orthodontist 2009; 79: 173 – 177.

23. Schwestka-Polly R. Proceedings in orthognathic surgery with condylar positioning. Informationen aus Orthodontie & Kieferorthopädie 2004; 36: 205 – 218.

24. Alexander SA. The Class II Division 2 orthodontic

patient: Treatment. QDT 1993: 142 - 146.

25. Ast DH, Carlos JP, Cons NC. The prevalence and characteristics of malocclusion among senior high school students in upstate New York. American Journal of Orthodontics 1965; 51: 437 – 445.

26. Myllärniemi S. Malocclusion in Finnish rural children, an epidemiological study of different stages of dental development. Suom Hammasääk Toim 1970; 66: 221 – 264.

27. Ingervall B, Seeman L, Thilander B. Frequency of malocclusion and need of orthodontic treatment in 10-year old children in Gothenburg. Sven Tandlaek Tidskr 1972; 65: 7 - 21.

28. Lapatki BG, Klatt A, Schulte-Monting J, Jonas IE. Dentofacial parameters explaining variability in retroclination of the maxillary central incisors. Journal of Orofacial Orthopedics 2007; 68: 109 – 123.

29. Lapatki BG, Mager AS, Schulte-Monting J, Jonas IE. The importance of the level of the lip line and resting lip pressure in Class II, Division 2 malocclusion. Journal of Dental Research 2002; 81: 323 – 328.

30. Lapatki BG, Baustert D, Schulte-Mönting J, Frucht S, Jonas IE. Lip-to-incisor relationship and postorthodontic long-term stability of cover-bite treatment. Angle Orthodontist 2006; 76: 942 – 949.

31. Devreese H, De Pauw G, Van Maele G, Kuijpers-Jagtman AM, Dermaut L. Stability of upper incisor inclination changes in Class II division 2 patients. European Journal of Orthodontics 2007; 29: 314 – 320.

32. Berg R. Stability of deep overbite correction. European Journal of Orthodontics 1983; 5: 75 – 83. Berg 1983

33. Ridley DR. Some factors concerned with the reduction of excessive incisor overbite in Angle's Class II division 2 malocclusion. Transactions of the British Society for the Study of Orthodontics 1960: 118 – 140.

34. Nicol WA. The lower lip and the upper incisor teeth in Angle Class II division 2 malocclusion. Dental Practice 1963; 14: 179 – 182.

35. Posen AL. The influence of maximum perioral and tongue force on the incisor teeth. Angle Orthodontist 1972; 42: 285 – 309.

36. Kim TW, Little RM. Postretention assessment of deep overbite correction in Class II Division 2 malocclusion. Angle Orthodontist 1999; 69: 175 – 186.

37. Riedel RA. A review of the retention problem. Angle Orthodontist 1960; 30: 179 – 199.

38. Simons ME, Joondeph DR. Change in overbite: a ten-

#### JULYAN / COETSEE

year post-retention study. American Journal of Orthodontics 1973; 64: 349 – 367.

39. Binda SK, Kuijpers-Jagtman AM, Maertens JK, van 't Hof MA. A long-term cephalometric evaluation of treated Class II division 2 malocclusions. European Journal of Orthodontics 1994; 16: 301 – 308.

40. Karlsen AT. Craniofacial characteristics in children with Angle Class II div 2 malocclusion combined with extreme deep bite. Angle Orthodontist 1994; 64: 123 – 130.

41. Pancherz H, Zieber K. Dentoskeletal morphology in children with Deckbiss. Journal of Orofacial Orthopedics 1998; 59: 274 – 285.

42. Ingervall B, Lennartsson B. Cranial morphology and dental arch dimensions in children with Angle Class II, division 2 malocclusion. Odontology Review 1973; 24: 149 – 160.

43. Fischer-Brandies H, Fisher-Brandies E, König A. A cephalometric comparison between Angle Class II, Division 2 malocclusion and normal occlusion in adults. British Journal of Orthodontics 1985; 12: 158 – 162.

44. Brezniak N, Arad A, Heller M, Dinbar A, Dinte

A, Wasserstein A. Pathognomonic cephalometric characteristics of Angle Class II Division 2 malocclusion. Angle Orthodontist 2002; 72: 251 – 257.

45. Siriwat PP, Jarabak JR. Malocclusion and facial morphology is there a relationship? An epidemiologic study. Angle Orthodontist 1985; 55: 127 – 138.

46. Millett DT, Cunningham SJ, O'Brien KD, Benson PE, de Oliveira CM. Treatment and stability of Class II Division 2 malocclusion in children and adolescents: A systematic review. American Journal of Orthodontics and Dentofacial Orthopedics 2012; 142(2): 159 – 169.

47. Parker CD, Nanda RS, Currier GF. Skeletal and dental changes associated with the treatment of deep bite malocclusion. American Journal of Orthodontics and Dentofacial Orthopedics 1995; 107: 382 – 393.

48. Mills JR. The problem of overbite in Class II, division 2 malocclusion. British Journal of Orthodontics 1973; 1: 34 – 48.

49. Eberhard H, Hirschfelder U. Treatment of Class II, Division 2 in the late growth period. Journal of Orofacial Orthopedics 1998; 59: 352 – 261.



# Propex IQ® Apex Locator

Enjoy maximum flexibility during your treatment - thanks to both cordless motor handpiece and portable apex locator. Save time thanks to combined shaping and file progression indication.





#### A motor offering complete freedom of movement

- A slim, well-balanced and cordless handpiece
- Easy access and excellent visibility
- Quickly switch from reciprocating to continuous motion



#### dentsplysirona.com/q

### Endo IQ<sup>®</sup> App

#### Control all your IQ devices through the integrated Endo IQ® app

- Enhances the functionality of your IQ devices
- Enables apical-reverse and shaping target features (only with app)
- Supports all iPad<sup>®</sup> sizes in landscape mode





#### Attractive and ergonomic design

- Future proof. Firmware can be upgraded via an app update.
- Guarantees reliable monitoring of file progression
- Lightweight, ultra portable, weighing only 80 grams



### Please call 🕗 0860 444 330 to place your order today.

Dentsply Sirona South Africa Building 11a, Lower Ground Floor, The Woodlands, Woodlands Drive, Woodmead, Sandton, 2191 Tel: 0860 444 330 www.dentsplysirona.com





# Red Hot DEALS!

BUILT-IN

MODEL

BUILDER

No matter your workflow, the digital impressions you create can streamline your restorative, orthodontic and implant planning. With the CS 3600, the way you acquire digital impressions is truly made easy.

HINT

R 279,000

INCL VAT

**LIMITED OFFER!** 

# CS3600 Scanner

- + CS advantage
- + 5 year warranty
- + 5 year software updates
- + Dell Intra Oral Scanner Laptop (PIN-DELL)

## Full HD 3D colour images



# SHOW YOUR TRUE COLOURS

Prices include 15% VAT and are subject to Exchange Rate fluctuations. Terms & Conditions Apply. Discount cannot be used in conjunction with another discount. Pictures used may be for representation only. E&OE. While Stocks Last





# Red Hot DEALS!

# RVG5200 Sensor

# CS2100 X-Ray



Prices include 15% VAT and are subject to Exchange Rate fluctuations. Terms & Conditions Apply. Discount cannot be used in conjunction with another discount. Pictures used may be for representation only. E&OE. While Stocks Last Antibiotic stewardship in dentistry – review of evidencebased clinical recommendations on appropriate antibiotic prescribing in dental practice

# Part 1: The antibiotic resistance crisis and the principles and practices of appropriate antibiotic prescribing

Johan Hartshorne<sup>1</sup>

#### Acknowledgements:

I thank the following individuals for their expertise and assistance in reviewing and revising the manuscript scientifically and technically: Dr Cameron Meyer, Group Clinical Officer, Intercare Group, Pretoria; Dr Carl de Villiers, Clinical Advisory Committee and General Dentist, Intercare Medical and Dental Centre, Glen Marais; Dr Linton Brown, Clinical Advisory Committee and General Dentist Intercare Parow Medical and Dental Centre, Parow; Dr Harry Vermeulen, Clinical Advisory Committee and General Dentist, Intercare Wilgeheuwel Medical and Dental Centre Wilgeheuwel.

#### Executive summary

Rational

- The efficacy of antibiotics is slowly being compromised by a growing number of antibiotic resistant strains due to inappropriate use of antibiotics.
- Antibiotics are used inappropriately in 75% of cases involving dental conditions.
- Subsequent infections caused by antibiotic resistant pathogens are difficult, and at times impossible, and costly to treat.
- Implementing antibiotic stewardship efforts in dental practice are an opportunity to improve antibiotic prescribing practices and to curb the pandemic issue of antibiotic resistance.

#### Key Points

- The key to reducing antibiotic resistance and the number of adverse drug reactions is by avoiding unnecessary and inappropriate antibiotic prescribing.
- Antibiotics should be only prescribed when indicated for prophylactic therapy such as infective endocarditis, presence of regional or systemic body manifestations, or to fight infections in patients with immune suppressed or immune compromised conditions.
- A proper dental and medical history and clinical assessment is fundamental in minimizing misdiagnosis leading to overuse of antibiotics, for appropriate antibiotic selection to improve efficacy of antibiotic therapy, and to prevent adverse events and drug interactions.
- Antibiotics should be used in conjunction with, but not as an alternative or replacement to other appropriate interventions, such as endodontic therapy, periodontal debridement, or surgical extraction of a tooth.

<sup>1</sup> Dr Johan Hartshorne B.Sc, B.Ch.D., M.Ch.D., M.P.A., PhD. (Stell), FFPH. RCP. (UK) Intercare Dental Clinical Advisory Committee and General Dentist Intercare Tyger Valley Medical and Dental Centre, 43 Old Oak Rd., Tyger Valley, Bellville Email: johan.laptop@intercare.co.za Mobile No: 082 5512 993

#### Practical implications

- Narrow-spectrum antibiotics should be prescribed for the shortest duration possible until the clinical cure of the patient is obtained and to minimize disturbance of the normal gut flora.
- Recommend the use of a probiotic to prevent microbial disturbance when prescribing an antibiotic.
- Clindamycin should be used judiciously and with caution due to its high frequency of adverse effects.
- Safety and product cost should always be taken into consideration with antibiotic selection.
- In almost all situations where an oral infection shows signs of systemic spread, proper local management and initiating antibiotic use is of benefit and likely outweighs the risk.
- Every prescribing health care practitioner should have an authorative reference (e.g. MIMS) readily available.

#### Introduction

Antibiotics represent one of the most successful forms of therapy in medicine. However, the efficiency of antibiotics is slowly being compromised by a growing number of antibiotic resistant pathogens worldwide.<sup>1,2</sup> The overuse of antibiotics means that they are becoming less effective and has led to the emergence of "superbugs". These are strains of bacteria that have developed resistance to many different types of antibiotics. Antibiotic resistance is increasing at an alarming rate whilst a growing list of infections are becoming harder and at times impossible to treat due to antibiotics becoming less effective.<sup>3</sup>

Antibiotic resistance does not mean the body is becoming resistant to antibiotics; it is the bacteria that have become resistant to antibiotics designed to kill them.

The implications of antimicrobial resistance are that microbial pathogens are not killed and continue to grow and exchange genes through horizontal transfer and mutate.<sup>4</sup> Subsequent infections caused by antibiotic resistant pathogens are difficult, and at times impossible to treat.<sup>5,6</sup>

Antibiotic resistance can affect people at any stages of life, as well as healthcare, veterinary, and agricultural industries, making it one of the world's most urgent public health problems.<sup>5,6</sup>

Every time a new antimicrobial is introduced, drug resistance to that antimicrobial occurs swiftly, for antibiotics, antivirals and antifungal therapies.<sup>7</sup> Antimicrobial treatment places selective pressure on the organisms, favouring the emergence of drug resistant strains.

In the USA alone, at least 2 million people are infected

with antibiotic resistant bacteria, and at least 23000 people die as a result every year. <sup>5,6</sup> No one can avoid the risk of resistant infections, but some people are at greater risk than others e.g., people with chronic illnesses (i.e. periodontitis, diabetes, COPD, cancers, Alzheimer's disease, autoimmune diseases), immune-suppressed individuals, immunecompromised conditions, frail and elderly.

If antibiotics lose their effectiveness, then we lose the ability to treat infections and to control public health threats.

Antibiotic resistance is implicated in elevated mobidity and mortality rates, require extensive and expanded medical care, as well as increased treatment costs, extended hospital stays, and sometimes requires toxic therapeutic alternatives, and is increasingly being recognized as an emerging global public health threat.<sup>1,2,6</sup> Appropriate antibiotic stewardship by dentists is urgently needed in view of the pandemic issue of antibiotic resistance.<sup>8</sup>

Currently, there is a challenge to accelerate the fight against antimicrobial resistance across the globe.<sup>6</sup> The emerging antibiotic resistance crisis has prompted the World Health organization (WHO) and the Centers for Disease Control and Prevention (CDC) to take action to protect the public.<sup>1,6,9</sup>

Global antibiotic resistance together with the lack of newly developed antibiotics represents an alarming signal for both human and animal healthcare worldwide. <sup>10,11</sup>

#### Reasons for the antibiotic resistance crisis • Misuse and overuse of antibiotics

It is suggested that the overuse and misuse of antibiotics is the primary driver and cause of the evolution of bacterial resistance against antibiotics.  $^{3,4,5,12,13}$ 

Various studies have recently reported on the inappropriate use of antibiotics in dental practice.<sup>14-22</sup> Studies suggest that 30% to 50% of prescribed antibiotics are unnecessary or not optimally prescribed.<sup>5,23</sup> In another study it was reported that antibiotics are used inappropriately in 75% of cases involving dental conditions.<sup>24</sup> It is essential to understand that antibiotic therapy will fail if the source of infection is not removed. Primary dental and surgical procedures should always be the first line of care, with antibiotics serving as adjunctive therapy in indicated cases.<sup>25,26</sup> Antibiotics are not a replacement for surgical drainage or debridement.

Indications for the use of systemic antibiotics in dentistry are limited because most dental and periodontal disease is best managed by operative interventions and plaque control measures. The current use of antibiotics in dental practice is best characterized by empirical prescription based on

#### HARTSHORNE

clinical and bacteriologic epidemiological factors resulting in the use of a very small range of broad-spectrum antibiotics for short periods of time. Prolonged use of antibiotics only serves the purpose of selecting resistant bacterial species.<sup>27</sup> This has contributed towards the development of antibiotic resistance in a wide range of bacteria and subsequent inefficacy of commonly used antibiotics.<sup>28</sup> The increasing antimicrobial resistance over recent years is probably related to the over- and misuse of broad-spectrum antibiotics.<sup>28</sup>

Consequently, there is a clear need for the development of evidence-based antibiotic prescribing guidelines. Educational and policy initiatives to encourage the rational and appropriate use of antibiotics in dentistry and oral medicine are also needed. This may help to curb the increasing incidence of antibiotic resistance and other adverse effects of antibiotic use, including gut microbial dysbiosis, *Clostridiosis difficile* (formerly Clostridium) (*C. difficile*) infection and allergies.

#### • Bacterial genetic mutation and adaptation

Antibiotic resistance occurs naturally through evolution characterized by genetic mutations, acquisition of genetic material or alterations of gene expression and metabolic adaptation through the process of horizontal gene transfer between bacteria.<sup>4,29</sup>Bacteria possess an enormous diversity of genes, which are constantly changing through horizontal transfer of genes allowing antibiotic resistance to be transferred among different species bacteria that allow them sooner or later to counteract the action of newly invented antibiotics.<sup>1,4</sup> In addition, antibiotics remove drugsensitive competitors, leaving resistant bacteria behind to reproduce in a process of natural selection.<sup>4</sup> Every time a new antimicrobial is introduced, drug resistance to that antimicrobial takes place swiftly, and this occurs for antibiotics, antivirals and antifungal therapies.<sup>7</sup> Antimicrobial treatment thus places selective pressure on the organisms, favouring the emergence of drug resistant strains.

#### Diminishing pharmaceutical investment

In addition to the overuse and misuse of antibiotics, the lack of new antibiotic development by the pharmaceutical industry, due to reduced economic incentives and challenging regulatory requirements have contributed towards the antibiotic resistance crisis.<sup>2,9,30:36</sup> Of the 18 largest pharmaceutical companies, 15 have abandoned the antibiotic field.<sup>7,37</sup> Antibiotic development is no longer considered to be profitable or an economically wise investment for the pharmaceutical industry.<sup>37</sup>

Until recently we have escaped the dire consequences of antibiotic resistance because there has been a stream of new antibiotics. However, over the last two decades the number of pharmaceutical companies investing in this area has diminished from 18 to 3, inevitably leading to stalled drug development.<sup>7</sup>

### Principles and practices for optimal antibiotic prescribing in dentistry <sup>38</sup>

• Core elements and objectives of antibiotic stewardship Antibiotic stewardship assists health care providers with judicious and appropriate use of antibiotics for patient use.

"Appropriate clinical decision-making with regard to antibiotic use requires the clinician to evaluate the needs of the individual patient and provide the best treatment for that patient. At the same time, the clinician should consider what is the best for the long-term sustainability of antibiotics as an effective means of patient care. This dual responsibility is at the core of antibiotic stewardship"<sup>39</sup>.

<sup>39</sup>Antimicrobial stewardship has been defined by the Infectious Disease Society of America and the Society for Health Care Epidemiology of America as " an activity that included appropriate selection, dosing, route, and duration of antimicrobial therapy."<sup>40</sup> Although antibiotic stewardship concerns the development of resistant bacteria, the emerging evidence of the causal link between changes in the gut flora and the development of systemic disease makes the endeavour even more important and complex.<sup>41</sup>

The objectives of antibiotic stewardship are to improve prescribing habits with the intention to:

- Improve clinician prescribing and patient use so that antibiotics are only prescribed and used when needed.
- Minimize misdiagnosis leading to overuse of antibiotics.
- Ensure that the right drug, dose and duration is prescribed when an antibiotic is needed.<sup>38,39</sup>

#### 1. Pre-treatment principles and practices

#### • Correctly diagnose oral bacterial infection

Oral bacterial infections have a predictable presentation in the oral cavity usually characterized by redness, pain, swelling in the tissues around the tooth; advanced infections will often be associated with an exudate (pus). The dental surgeon should take a detailed history and thorough systemic, local and radiographic examination to diagnose the disease as infection. In addition, one should also do a hematologic, serologic and other laboratory examination wherever necessary to diagnose and to evaluate the origin or severity of oral and maxillofacial infections.<sup>42</sup>

# BA Optima Contra-Angle Handpieces



Dental handpieces from B.A. International to suit all needs, practices, and budgets.

Entry-level Optima and Ultimate contra-angle and straight handpieces allow you to budget without compromise; safety and reliability are key to this range.

#### **BA101**

## 1:1 blue band contra-angle with latch type bur release.

- Latch type
- Direct ratio 1:1
- Standard E fitting

#### Autoclavable

#### **BA102**

## 1:1 blue band contra-angle, screw-in prophy cups.

- Screw-in type
- Direct ratio 1:1
- Standard E fitting
- Autoclavable

#### **BA103**

#### 1:1 blue band contraangle, snap-on cups.

- Snap-on type
- Direct ratio 1:1
- Standard E fitting
- Autoclavable
- Was R2 350 NOW R1125

Was R2 061

**NOW R1165** 

#### **BA105**

# 1:1 blue band contra-angle, push button bur release.

- Push button type
- Direct ratio 1:1
- Standard E fitting
- Autoclavable



A HENRY SCHEIN® COMPANY www.dentalwarehouse.co.za



Was R3 815

#### Ultimate BA695FM

Was R2 226

**NOW R1125** 

New and improved Ultimate fixed base turbine with up to 30W power and smart coat technology for better handling. Midwest fitting.

- Amazing 30W power
- Quadruple spray
- Anti-retraction valve
- "Smart Coat" for better grip
- Midwest fitting

Was R4 124 NOW R3299



Ø



Johannesburg Durban Johannesburg Durban Building 2, No 106 16<sup>th</sup> Road, Midrand, 1686 51A Musgrave Park, Musgrave Road, Berea, Durban, 4001 Tel: 011 719 9111 • Fax: 011 719 9031 Tel: 031 312 6130

#### HARTSHORNE

#### • Consider therapeutic management interventions

Therapeutic interventions, with primary focus on eliminating the pathology that led to the infection, may be sufficient to control a localized bacterial infection.

Therapeutic interventions include periodontal debridement, endodontic treatment, tooth extraction, or incision drainage.

### • Consider antibiotics when regional and/or systemic manifestations are present

According to a recent systematic review, antibiotics should only be prescribed when regional and/or systemic body manifestations are present within the previous 24 hours e.g., presence of pronounced oedema (cellulitis), limited mouth opening (trismus), increased heart rate (tachycardia), rapid respiration, lymphadenopathy, difficulty swallowing (dysphagia), general malaise, and fever (pyrexia)<sup>26</sup>

### • Consider antibiotics when patients present with immune suppressed or immuno-compromised conditions

Antibiotics should be prescribed to fight infection when there is presence of a disease affecting the host defence system e.g. AIDS, cancer, autoimmune disease, patients on corticosteroid therapy, immune-compromised conditions, diabetes, chronic renal failure, patients who have undergone chemotherapy or radiation therapy or patients that have received organ transplants.<sup>42</sup>

Patients that are immune suppressed or immunecompromised are at higher risk of infection and are more likely to benefit from prophylactic antibiotics, because infections in this group are likely to be more frequent, associated with complications and may be more difficult to treat.<sup>43</sup>

#### Weigh possible benefits and risks

All drugs have risks. Weigh the possible benefits versus risks (i.e. toxicity, allergy, adverse effects, *C. difficile* infection) of antibiotics before prescribing. Be aware of the risks of the primary antibiotics used to treat dental infections: penicillin's, azithromycin and especially clindamycin. *C. difficile* infection (pseudomembranous colitis) is often associated with clindamycin and other broad spectrum antibiotic use. This is the most common serious side effect of antibiotic use. Penicillin allergy is also a serious risk. Closely monitor patients with extensive medical problems and those taking multiple medications.

In almost all situations where an oral infection shows signs of systemic spread, proper local management and initiating antibiotic use is of benefit and likely outweighs the risk.

#### • Prescribe antibiotics only for patients on record and only for bacterial infections you have been trained to treat

Clinicians must know and understand the patient's medical history and be familiar with their dental history for safe and effective patient care.

Familiarity and experience with managing bacterial dental, periodontal and oral mucosal infections are essential for the best perspective and decision-making.

Consultation and referral with a specialist is appropriate when an infection shows signs that it is outside the clinician's area of training and experience, e.g. altered eye movement, suggesting infection has entered into the cranial space, or difficulty swallowing, suggesting that the infection is spreading into deep neck tissues.

# • Do not prescribe antibiotics for viral and fungal infections, ulcerations related to trauma, or aphthae in the oral cavity

Viral infections manifest as blisters and constant pain at the site of the blister/ulcer.

Fungal infections usually present with redness and some white areas that can be rubbed off using gauze.

Ulcerations related to aphthous ulcers or autoimmune diseases such as lichen planus, pemphigoid and pemphigus, usually hurt when exposed to acid like orange or tomato juice and salty foods.

Traumatic ulcers incidents are generally recalled by the patient, are not an infection and do not commonly become infected unless the patient is immune-suppressed, or has a medical problem that compromise their ability to heal (i.e. diabetes).

### • Implement antibiotic prophylaxis recommendations for the medical concerns for which guidelines exist

The American Heart Association and the American Dental Association have developed guidelines for the prophylactic use of antibiotics to prevent infective endocarditis, in patients with specific cardiac conditions.<sup>44,45</sup>

In most cases, prophylactic antibiotics are NOT recommended for patients with prosthetic joints. If in doubt, consult with the patient's surgeon or physician.

Severely immunosuppressed patients, such as those undergoing chemotherapy, corticosteroid therapy or patients with immune compromised diseases such as AIDS, cyclic neutropenia and uncontrolled diabetes, are at an increased risk of systemic infection from an oral source.<sup>42,43</sup> Clinicians may elect to be more aggressive in initiating antibiotic use in such patients and may elect to use antibiotics prophylactically to prevent an infection if the intended dental or periodontal procedure may cause bacteremia.

# • Assess medical history and conditions, pregnancy status, drug allergies, and potential drug interactions and adverse events that may impact antibiotic selection.

All medications have risks; the antibiotics commonly used in dentistry – penicillin's, clindamycin and azithromycin – are no exception.

A proper medical history should reveal any medications that may risk drug interactions. Primary antibiotics used for dental infections (penicillin's, clindamycin and azithromycin) are not commonly associated with such adverse drug responses. Drugs that inhibit liver cytochrome P450 enzymes are most commonly associated with drug interactions. In dentistry these are metronidazole and erythromycin (both antibiotics) and ketoconazole (an antifungal). Avoid using these drugs in patients taking specific medications that are metabolized in the liver.

The clinician should consult an authorative reference (MIMS), the patient's physician or pharmacists, before prescribing an antibiotic when there is any concern of drug interaction.

#### 2. Prescribing principles and practices

#### • Ensure that an evidence-based antibiotic reference (i.e. MIMs – Monthly Index of Medical Specialities) is readily available during patient visits

While most clinicians are well versed in the antibiotic choices for oral bacterial infections, it is prudent for the clinician to have at least one of several recognized prescribing reference resources readily available.

# • Avoid prescribing based on non-evidence-based historical practices, patient demand, convenience, or pressure from colleagues

Avoid any non-evidenced based pressures that may influence the clinician's decision making in situations where antibiotic use is not indicated. This may lead to inappropriate antibiotic use and result in a poor clinical outcome for the patient.

#### • Thorough documentation in the patient's file

Clear and complete documentation of the diagnosis of an oral bacterial infection, the treatment steps, and the rationale for antibiotic use (if prescribed) should be made in the patient's record. • Prescribe only when clinical signs and symptoms of a bacterial infection suggest a systemic immune response, such as fever or malaise along with local oral swelling A local oral bacterial infection is best and effectively managed through mechanical intervention (e.g. extraction, endodontic therapy, and cleaning and irrigation of the infected site) to eliminate the irritant or foreign body causing the infection. Once effective cleaning and removal of the irritation is accomplished, the body's immune system should clear up remaining infection. A good policy to teach is never to let the sun set on puss.

Antibiotic therapy however, is appropriate if there are signs and symptoms of a systemic immune response.

#### • Use the most targeted (narrow-spectrum) antibiotic for the shortest duration possible. (2-3 days after the clinical signs and symptoms subside)

Most bacterial organisms associated with oral infections are sensitive to penicillin's, making it the first drug of choice as follows:

Penicillin VK, 500 mg given 4X daily or Amoxicillin, 500mg given 3X daily.

If there is no response in 48 to 72 hours, then amoxicillin protected from beta-lactamase with clavulanic acid (e.g. Augmentin) can be tried, 1000mg 2X daily.

If the patient has a true IgE mediated allergy to penicillin's, then the drug of choice is Clindamycin 300mg given 4X daily.

Patients that are unable to take clindamycin may be prescribed Azithromycin, 500mg given 1X per day.

The number of tablets/capsules prescribed should be enough for 10 days and the patient should be instructed to take the antibiotic as prescribed for two to three days after the clinical signs and symptoms are gone. Antibiotics should be used for the shortest time possible until the patients' clinical cure is achieved.<sup>26</sup>

Consider the most appropriate route of administration. Topical>Oral>IM>IV

Use microbiome protection therapies (i.e. probiotics) for all cases.

Clinicians should urge disposal of unused antibiotics immediately upon completion of treatment.

The duration of antibiotic therapy influences resistant development. A meta-analysis of antimicrobial use in primary care concluded that longer treatment duration was associated with an increased risk of emergence of antibiotic resistance.<sup>46</sup>

#### HARTSHORNE

### • Revise empiric antibiotic regimens on the basis of patient progress and, if needed culture results

All patients taking antibiotics for an oral bacterial infection should be followed closely to make sure the infection is resolving and that there are no adverse effects.

A patient taking an antibiotic as prescribed following a proper incision and drain or mechanical intervention should start to see a positive response within 48 to 72 hours. Patients not improving in that time frame or who are experiencing adverse responses to the antibiotic should be re-evaluated and their antibiotic changed to the next drug of choice.

For poorly responding patients, a consultation with a specialist may be appropriate as well as a culture and sensitivity test to ensure the correct antibiotic has been chosen.

### • Discuss antibiotic use and prescribing protocols with referring specialists

All clinicians managing a patient's care should utilize similar evidence-based protocols, including the first, second and third drug of choice, at the proper dosage for the proper duration.

The use of similar protocols improves the care of shared patients and decreases the risk of conflict for the clinicians and confusion for the patient.

#### 3. Patient education

# • Educate patients to take antibiotics exactly as prescribed, to take antibiotics prescribed only for them, and not to save antibiotics for future illnesses

Antibiotics are complex drugs with different absorption rates, half lives and elimination mechanisms, all of which influence the prescribed dosage.

Antibiotics must be taken as prescribed to be effective; many antibiotic failures can be traced back to the fact that the patient did not comply with the clinician's recommended dosage.

Clinicians should clearly and unequivocally inform patients of the need to take their medication as directed for two to three days after the clinical signs (fever, swelling, redness) and symptoms (pain) have resolved.

Clinicians should instruct patients to dispose of unused drugs immediately upon completion of treatment and provided guidance on drug disposal options.

Patients who refuse to take a prescribed antibiotic as directed, for any reason, must be instructed to immediately inform the prescribing clinician so an alternative treatment approach can be identified.

#### 4. Staff Education

All members of the dental team should be educated about oral bacterial infections, the office treatment protocols, the rationale for the steps in the infection protocol and the criteria used to initiate antibiotic therapy.

Staff training improves the probability of patient compliance with antibiotic prescriptions.

### Classification, characteristics and application of antibiotics commonly used in dental practice

Antibiotics are a subset of antimicrobials (Antimicrobials also include antivirals, antifungal, antiprotozoal). The most commonly used antibiotics in dental practice according to class of antibiotic are summarized in Table 1.

The prudent use of antibiotics requires an understanding of: (i) what is an antibiotic; (ii) why we should use an antibiotic; (iii) when we should use an antibiotic; and (iv) how we should use and antibiotic.<sup>42</sup>

### Pathogenic microbial flora and antibiotic sensitivity patterns in odontogenic infections

The most common odontogenic infections are dental caries (99,4%), gingivitis (56,4%), periodontitis (38,4%), peri-apical; (6,4%) and peri-coronitis (3,8%).<sup>47</sup> Maxillofacial spaces, especially the buccal spaces are frequently involved (54%). Most odontogenic infections are caused by bacteria normally found within the oral cavity. Approximately 50% of odontogenic infections are caused by anaerobic bacteria alone, 44% by a combination of aerobic and anaerobic and only 6% by aerobic alone.<sup>48</sup> A recent study by López-Gongález and co-workers reported that bacteria associated with odontogenic infections were mainly anaerobic (65,3%) and aerobic (35,7%) and exibit a high resistance to antibiotics<sup>49</sup>

The efficacy of antibiotics against isolated organisms varies considerably: clindamycin (88%), metronidazole (79%), cefotaxime (72%), erythromycin (72%), amoxiclav (71%), ciprofloxacin 967%), vancomycin (65%), cefadroxil (59%), ceftazidine (59%), azithromycin 58%).<sup>47</sup>

López-Gongález and co-workers reported in their study that the majority of microorganisms (82%) were sensitive to amoxicillin/clavulinic acid.  $^{\rm 49}$ 

The main principle of treatment of odontogenic infections is to establish drainage of the abscess either through endodontic therapy or the removal of the tooth. Prescribing antibiotics should be considered an adjunctive therapy to surgical intervention.<sup>50</sup>







# TruNatomy<sup>™</sup> Endodontic Files

The new **TruNatomy™** solution offers:

- Improved performance and efficacy<sup>1</sup>
- More space for debridement and debris removal<sup>1</sup>
- Respect of the natural tooth anatomy
- Preservation of structural dentin, to help maintain the strength of the tooth

<sup>1</sup> Compared to ProTaper Next®

#### TruNatomy™

TruNatomy is part of a long tradition of successful Maillefer and Dentsply Sirona endodontic treatment solutions. This tradition includes recognized brands such as ProTaper, WaveOne, X-Smart and Propex, all known and trusted around the world for their reliability and performance.

Dentsp

Dentsp

111111

### Please call 🤣 0860 444 330 to place your order.

THE DENTAL SOLUTIONS COMPANY™ Dentsply Sirona South Africa Building 11a, Lower Ground Floor, The Woodlands Woodlands Drive, Woodmead, Sandton, 2191 Tel: 0860 444 330 **www.dentsplysirona.com** 



# ENDODONTIC ACCESS

Successful root canal treatment starts with adequate access to the pulp chamber. The ideal procedure provides access to root canal orifices with minimal loss of dentin.

Dentin is the hard structure around the dental pulp which serves as the critical base for a quality restoration following root canal treatment. The more dentin preserved during an endodontic treatment, the more options there will be to perform a successful, durable restoration.

Thus, a Conservative Endodontic Cavity (CEC) is highly recommended, as the **TruNatomy™** system will work with various endodontic access cavities.









How small should the access cavity be?

Ou pro En

Our recommendation is for the orifice to be "as small as practical"<sup>1</sup> given the clinical case. Therefore, Conservative Endodontic Cavity (CEC) is recommended above other options.

<sup>1</sup> Schilder H. Cleaning and shaping the root canal. Dent Clin North Am 1974;18:269-96.

THE DENTAL SOLUTIONS COMPANY™ Dentsply Sirona South Africa Building 11a, Lower Ground Floor, The Woodlands Woodlands Drive, Woodmead, Sandton, 2191 Tel: 0860 444 330 **www.dentsplysirona.com** 



#### HARTSHORNE

Class	Drug names	Dosage	Interval (hr)	Activity	Side-effects
Penicillin	Penicillin VK (NS) Ampicillin (NS) Amoxicillin (NS) *Amoxicillin/ Clavulanic acid (BS)	500mg 500mg 500mg 875	6 (qid) 6 (qid) 8 (tds) 12 (bd	Bactericidal Inhibits cell wall synthesis * Broad spectrum Aerobes Gm-ves Gm+ves	Minimum toxicity Diarrrhea, vomiting, Hypersensitivity allergic reactions
Cephalosporins	1st Generation Cefazolin (NS) Cephalexin (NS) 2nd Generation* Cefaclor (BS) Cefuroxime (BS) 3rd Generation* Cefixime (BS) Ceftriaxone (BS) 4th Generation* Cefpirome (BS) Cefipin (BS)	500mg	6 (qid)	Bactericidal Inhibits cell wall synthesis *Broad spectrum Aerobes Gm +ves Gm-ves	Diarrhea, nausea, vomit- ing, 5-10% cross reaction with penicillin – allergy Haematologic toxicity
Macrolides	Erythromycin (BS) Azithromycin (BS) Clarithromycin (BS)	500mg 250mg 500mg	6 (qid) 12 (bd) 24	Bacteriostatic Blocks protein synthesis Broad spectrum Gm+ves Gm-ves	Liver toxicity Diarrhea Nausea , vomiting Coumadin interaction
Lincosamide	Clindamycin (NS)	300mg	6 (qid) (max 1,8gm / day	Bacteriostatic Inhibits protein synthesis Gm- aerobes Gm+ aerobes & anaerobes	Pseudomembranous colitis; <i>C.difficili</i> Hypersensitivity reaction
Tetracycline	Doxycycline Minocycline (BS)			Bacteriostatic Blocks protein synthesis Gm+ & Gm-aer- obes	Diarrhea, nausea, vom- iting Tooth discoloration
Fluoroquinolones	Ciprofloxacin Moxifloxacin (BS)	500mg 400mg	12 (bd) 24	Bactericidal Inhibits DNA synthesis Broad spectrum Gm+ves Gm-ves	Avoid in pregnancy Toxic effect on chondro- cytes, tendon fractures Inhibits fracture healing
Imidazoles	Metronidazole (NS)	500mg	6 (qid)	Bactericidal Narrow spectrum Inhibits RND syn- thesis Anaerobes Gm+ves Gm-ves C.difficile	Hepatotoxicity Body fluid discoloration Incompatible with alcohol

#### Table 1: Classification dosage, application and characteristics of commonly used antibiotics in dental practice

(NS = Narrow spectrum; BS – Broad spectrum)
### Adverse reactions and unintended consequences associated with prescribing antibiotics in dental practice

Antibiotics are considered the keystone of modern medicine, but their excessive use continues to generate unwanted adverse effects around the world ranging from diarrhoea, to life threatening allergic reactions.<sup>7</sup>

A recent study on antibiotic prescribing in England revealed that the most commonly prescribed antibiotics ranked from least to most likely to cause adverse drug reactions were as follows: amoxicillin<cephalosporins< erythromycin<tetracyclin<azithromycin< metronidazole< amoxicillin+clavulinic acid<clarithromycin<pre>clindamycin.<sup>51</sup> This study confirmed that amoxicillin, the most common prescribed antibiotics prescribed by dentists. Of all the antibiotics prescribed by dentists, clindamycin was least safe presenting with 15 x greater likelihood to cause an adverse drug reaction and a 30x greater likelihood to cause a fatal adverse drug reaction.<sup>51</sup>

Another study quantified the most prevalent adverse events from antibiotic prescribing amongst adults in Emergency departments in the USA during the period 2011-2015<sup>52</sup>, are summarized in Table 2.

#### Hypersensitivity reactions and cross-reactivity

The most common adverse event to antibiotics manifesting across all antibiotic classes, is sensitivity reactions.<sup>52</sup> (Table 3) They are usually mild and limited to rash or skin lesion in the head and neck region. Antibiotics, especially penicillin's, cause allergic reactions ranging from rash, skin reactions, Stevens-Johnson syndrome to breathing difficulty and anaphylaxis.<sup>53</sup> Life-threatening anaphylactic reactions

have occurred in some highly sensitized individuals, but remain rare.  $^{\rm 54}$ 

The use of cephalosporins in patients with penicillin allergy has been a concern. The latest literature shows that cross reactivity between penicillin's and 3rd and 4th generation cephalosporins is negligible and it is therefore considered safe to administer a cephalosporin with a side chain that is structurally dissimilar to that of penicillin or to administer a 3rd or 4th generation cephalosporin.<sup>55</sup>

## Dysbiosis of the gut microbiome and gastrointestinal conditions

Risks associated with the use of antibiotics include, nausea, vomiting, diarrhoea and stomach cramps because of disturbance of the gut microbiome.<sup>53</sup>

The gut microbiome contains around 100 trillion bacteria that support digestion and the immune system. Aggressive antibiotics can wipe out the good bacteria, whilst strengthening the bad bacteria. Key pathogens, such as *C. difficile* flourishing in the perturbed gut microbiome are immune to antibiotics, resulting in *C. difficile* diarrheal infections.<sup>32</sup> Patients who are more vulnerable to adverse effects include children, elderly, hospitalized, those with chronic inflammatory and/or immune compromised conditions. Recent studies indicate that antibiotic therapy can induce changes in the commensal flora is not always fully reversible and that may represent a risk for further colonization and dysbiosis- and infection with bacteria possessing antibiotic resistance.<sup>56</sup>

Other side effects include the development of fungal infections in the mouth or vagina resulting from an imbalance in the body's normal flora.

Antibiotic class	Mild allergy	Moderate to severe allergy	Gastro-intestinal disturbances	Other
Penicillin	57,5	23	15,9	
Cephalosporins	59,3	21,7	14,7	
Macrolides	59,4	17,4	18,1	
Lincosamide	48,3	22,9	27,0	
Tetracycline	44,9	19,8	28,3	
Fluoroquinolones	47,6	15,8	25,4	
Imidazoles	43,2	26,2	19.6	6,0

#### Table 2: The prevalence of adverse events following antibiotic prescribing amongst adults

(Adapted from: Geller, Lovegrove, Shehab et al, 2018)<sup>52</sup>

#### C. difficile infection (CDI)

*C. difficile* is spore forming, Gr-positive anaerobic bacillus found in the gut, that is the cause of 15-25% of all episodes of antibiotic associated diarrhoea.<sup>6</sup> CDI can result in pseudomembranous colitis, toxic megacolon, colon perforations, and sepsis. Clinical factors associated with increased risk of CDI include age older than 65yrs, and underlying systemic disease. Antibiotics associated with higher risk of CDI include clindamycin, cephalosporins and the fluoroquinolones.<sup>57</sup>

Studies have shown that more than 50% of antibiotics prescribed for children are for upper respiratory tract infection associated with common cold. Because the majority of common cold infections are viral, using antibiotics to treat such infections does nothing to stop the infection. Instead, it creates unwanted side effects. Studies have shown that children given antibiotics for routine upper respiratory tract infections are more susceptible to aggressive antibiotic resistant strains of bacteria commonly known as *Clostridiodes* (formerly *Clostridium*) difficile. *C. diffcile* associated diarrhea is responsible for 250000 infections in hospitalized patients and 14000 deaths every year among children and adults in the USA.<sup>32</sup>

#### **Peripheral neuropathies**

Isolated cases of peripheral neuropathies, leading to numbness or paraesthesia, have been reported with use of metronidazole. The medication should be discontinued instantly if such signs appear.<sup>58</sup>

#### Hepatotocicity

Some antibiotics are metabolized in the liver, e.g. erythromycin, clindamycin and metronidazole. In patients with liver failure use of such drugs should be restricted.<sup>59</sup>

#### **Drug interactions**

Almost all antibiotics can potentiate the effects of Warfarin by inhibiting intestinal flora that produce Vit. K, thus enhancing the anticoagulant effect and increasing the risk of bleeding. Antibiotics that inhibit Warfarin metabolism is ciprofloxacin, clarithromycin, erythromycin and metronidazole.<sup>60</sup>

Fluoroquinolone antibiotics are useful antibiotics in the management of infections. However, several agents, e.g. calcium, iron, magnesium and aluminium, can substantially reduce the absorption of fluoroquinolones thereby causing treatment failure. A good standard of practice is to obtain a full, current medication list from your patient before prescribing antibiotic regimens,<sup>60</sup> or use you MIMS reference guide. It

should also be noted that many antibiotics may cause oral contraceptives to fail, leading to unwanted pregnancies.

#### Conclusion

Rapidly emerging resistant bacteria due to inappropriate use of antibiotics, bacterial mutations and genetic adaptations, and the lack of development of new antibiotic drugs is threatening the extraordinary health benefits that have been achieved with antibiotics over decades. Currently it is being considered as one of the biggest threats to global health, food security, and development.

Evidence from the literature suggests that knowledge regarding antibiotic resistance amongst health care professionals, patients, and the public is still limited. Therefore, the need for educating health care professionals, patients and the public at large is essential to optimize the use of antibiotics, and to curb antimicrobial resistance. Implementing antibiotic stewardship efforts in dental practice is an opportunity to improve antibiotic prescribing practices and to reduce antibiotic resistance.

#### References

1. Lin J, Nishino K, Roberts MC, et al. Mechanisms of antibiotic resistance. Front Microbiol 2015; 6: 34. https:// doi:10.3389/fmicb.2015.00034

2. Ventola CL. The antibiotic crisis. Part 1: Causes and threats. Pharm Ther 2015; 40(4): 277-283.

3. Zaman SB, Hussain MA, Nye R, et al. A review on antibiotic resistance: alarm bells are ringing. Cureus 2017; 9(6): e1403. https://doi:107759/cureus.1403

4. Read AF, Woods RJ. Antibiotic resistance management. Evol Med Public Health 2014, 2014(1): 147. https:// doi:10.1093/emph/eou024

5. Centers for Disease Control, Office of Infectious Disease. Antibiotic Resistance threats in the United States, 2013. April 2013. https://www.cdc.gov/drugresistance/threatreport-2013.

6. CDC, Centers for Disease Control and Prevention. Antibiotic / Antimicrobial resistance. US Department of Health and Human Services, 2019.

7. Shallcross LJ, Davies SC. Antibiotic overuse, Br J Gen Prac 2014; 12: 604-605 https://doi:10.3399/ bjgp14X682561

8. Ramasamy A. A review of use of antibiotics in dentistry and recommendations for rational antibiotic usage by dentists. Int Arabic J Antimicrob Agents 2014; 4(2): 1 https:// doi:10.3823/748

9. World Health Organization. Antibiotic resistance. 5 February 2018. https://www.who.int/news-room/factsheets/detail/antibiotic-resistance

10. Spellberg B, Powers JH, Brass EL et al. Trends in

# PEFINED

### EXPERIENCE THE NEXT LEVEL A-DEC 500

@ a-dec.com/500EXPERIENCE





antimicrobial drug development: implications for the future. Clin Infect Dis 2004; 38(9):1279-1286.

11. Cheng G, Dai M. Ahmed S etal. Antimicrobial drugs fighting against antimicrobial resistance. Front Microbiol 2016; 7: Art 470/

https://doi.org/10.3389/fmicb.2016.00470

12. Nosanchul JD, Lin J, Hunter RP, Aminov RI. Lowdose antibiotics: current status and outlook for the future. Front Microbiol 2014; 5: 478. https://doi:10.3389/ fmicb.2014.00478

13. Fluent MT, Jacobsen PL, Hicks LA. Considerations for responsible antibiotic use in dentistry. JADA 2016; 147: 683-686.

14. Karibasappa GN, Dujatha A. Antibiotic resistance – A concern for dentists? J Dent Med Sci 2014; 13(2): 112-118.

15. Fleming-Dutra KE, Hersh AL, Shapiro DJ, et al. Prevalence of inappropriate antibiotics prescriptions among US ambulatory care visits, 2010-2011. JAMA 2016; 315(17): 1864-1873.

16. Oteri G, Panzarella V, Marcianò A, et al. Appropriateness in dentistry. A survey discovers improper procedures in Oral medicine and Surgery. Int J Dent 2018; Art ID: 3245324. https://doi.org/10.1155/2018/3245324

17. Bolfoni MR, Pappen FG, Preira-Cenci T, Jacinto RC. Antobiotic prescription for endodontic infections: a survey of Brazilian endodontists. Int Endod J 2018; 5(2): 148-156.

18. Stein K, Farmer J, Singhal S, et al. The use and misuse of antibiotics in dentistry: A scoping review. J Amer Dent Assoc 2018; 149(10): 869-884.

19. Teoh L. Marino RJ, Stewart K, McCullough MJ. A survey of prescribing practices by general dentists in Australia. BMC Oral Health 2019; 19: Article No: 193.

20. Ramachandran P, Rachuri NK, Martha S, et al. Implications of over prescription of antibiotics: A cross-sectional study. J Pharm Bioallied Sci 2019; 11(Suppl 2): S434-S437.

21 Vasaduvan S, Grunes B, McGeachie J, Sonis AL. Antibiotic prescribing patterns among dental professionals in Massachusetts. Pediatri Dent 2019; 41(1): 25-30.

22. Suda KJ, Calip GS, Zhou J, et al. Assessment of the appropriateness of antibiotic prescriptions for infection prophylaxis before dental procedures, 2011-2015. JAMA Netw Open 2019; 2(5): e193909. https://doi:10.1001/jamanet-workopen.2019.3909

23. Demirjan A, Sanchez GV, Finkelstein JA et al. CDC Grand Rounds: getting smart about antibiotics. MMWR Morb Mortal Wkly Rep 2015; 64(32): 871-873.

24. Marra F, George D, Chong M, et al. Antibiotic prescribing by dentists has increased JADA 2015; 147(5): 320-327.

25. Swift JQ, Gulden WS. Antibiotic therapy: managing odontogenic infections. Dent Clin North Amer 2002; 46: 623-633.

26. Martins JR, Chagas OL. Velasques BD, et al. The use of

antibiotics in odontogenic infections: What is the best choice? A systematic review. J Oral Maxillofac Surg 2017; 72(12): 2606e1-2608e11.

27. Pallasch TJ. Pharmacokinetic principles of antimicrobial therapy. Periodontol 2000 1996; 10: 511.

28. Oberoi SS, Dhingra C, Sharma G, Sardana D. Antibiotics in dental practice. Int Dent J 2015; 65: 4-10.

29. Tent PA, Juncar RI, Onisor F, et al. The pathogenic microbial flora and its antibiotic susceptibility pattern in odontogenic infections. Drug Metab Rev 2019; 51(3): 340-355.

30. Gould IM, Bal AM. New antibiotic agents in the pipeline and how they can overcome microbial resistance. Virulence 2013; 4(2): 185-191.

31. Sengupta S, Chattopadhyay MK, Grossart HP. The multifaceted roles of antibiotics and antibiotics in nature. Front Microbiol 2013; 4: 47.

32. CDC. Centres for Disease Control and Prevention, Nearly half a million Americans suffered from Clostridium difficile infections in a single year. US Department of Health and Human Sevices. February 25, 2015. https://www.cdc. gov/media/releases/p0225/clostridium-difficile

33. Lushniak BD. Antibiotic resistance: a public health crisis. Pub Health Rep 2014; 129(4): 314-316.

34. Gross M. Antibiotics in crisis. Curr Biol 2013; 23(24): R1063-R1065.

35. Piddock LJ. The crisis of no new antibiotics – what is the way forward? Lancet Infect Dis 2012; 12(3): 249-252.

36. Michael CA, Dominey-Howes D, Labbate M. The antibiotic resistance crisis: causes, consequences, and management. Front Public Health 2014; 2: 145.

37. Bartlett JG, Gilbert DN, Spellberg B. Seven ways to preserve the miracle of antibiotics. Clin Infect Dis 2013; 56(10): 1445-1450.

38. Centers for Disease Control and Prevention. Core elements of outpatient antibiotic stewardship, 2016 https://www. cdc.gov/antibiotic-use/community/pdfs/16\_268900-A\_ CoreElementsOutpatient\_508.pdf

39. Jacobsen PL. The core elements of antibiotic stewardship in Dentistry. CDA J 2018; 46(12): 757-765.

40. Dellit TH, Owens RC, McGowen JE, et al. Infectious Disease Society for Health Care Eipdemiology of America; Society for Healthcare Epidemiology of America. Infectious Disease Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. Clin Infect Dis 2007; 44(2): 159-177.

41. Glick M. Antibiotics The good, the bad, and the ugly. JADA 2016; 147(10): 771-773.

42. Shivanand S, Doddawad VG, Vidya CS, et al. The current concepts in the use of antibiotics in dental Practice. Int J App Eng Res 2018; 13(5): 2959-2964.



# THE RIGHT CEMENT FOR EVERY CLINICAL SITUATION

**IPS Empress\* CAD/ Esthetic** 

The duo for all your cementation needs

Multilink Speed

The **easy** way of cementing **highly esthetic** restorations.

k<sup>®</sup> Esthetic

Veneers Inlays / Onlays / Partial Crowns Crowns IPS e.max<sup>®</sup> CAD/Press Veneers / Occlusal Veneers Inlays / Onlays / Partial Crowns Crowns / Bridges Tetric<sup>®</sup> CAD Veneers Inlays / Onlays Crowns IPS e.max® ZirCAD Crowns / Bridges **Endodontic Posts** ivoclar Fibre Posts Metal Posts Metal / metal-based Inlays / Onlays / Partial Crowns Crowns / Bridges

(22)

The **efficient** way of cementing **zirconia** restorations.





0860 456 123 orders@ivodent.co.za www.ivodentonline.co.za 1 www.ivohealth.co.za 1 www.facebook.com/IvodentSA

#### HARTSHORNE

43. Lodi G, Figini L, Sardella, et al. Antibiotics to prevent complications following tooth extractions. Cochrane database Syt Rev 2012; 11: CD003811. https:// doi:10.1002/14651858.CD003811.pub2

44. Wilson W, Taubert KA, Gewitz M. Prevention of infective endocarditis: Guidelines from the American Heart Association – A guideline from the American Heart Association Rheumatic Fever, Endocarditis and Kawasaki Disease Committee, Council on cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and anaesthesia. Circulation 2007; 116(15): 1736-1754.

45. Wilson W, Taubert KA, Gewitz M et al. Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anaesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. J Amer Dent Assoc 2008; 13 Suppl: 3S-24S.

46. Costelloe C, Metcalfe C, Lovering A et al. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: a systematic review and metaanalysis. BMJ 2010; 340: c2096.

47. Vishnoi N, Bishnoi RS, Gupta MK. Clinical appearances, microbiological findings and antimicrobials susceptibility patterns to orofacial infections of odontogenic origin in relation to cytokine analysis. J Drug Delivery Ther 2019; 9(3-s): 589-574.

48. Brook I, Frazier EH, Gher ME. Aerobic and anaerobic microbiology of the periapical abscess. Oral Microbiol Immunol 1991; 6(2): 123-125.

49. López-Gongález E, Vitales-Noyola M, González-Amaro AM et al. Aerobic and anaerobic organisms and antibiotic sensitivity to odontogenic maxillofacial infection. Odontol 2019; 107(3): 409-417.

50. Hajek G, Goldberg MH, Ferneini EM. In: Ferneini EM, Goldberg MH (eds) Odontogenic infections. Evidence-Based Oral Surgery, Springer, Cham 2019.

51. Thornhill MH, Dayer MJ, Durkin MJ, et al. Risk of adverse reactions to oral antibiotics prescribed by dentists. J Dent Res 2019; 1-7 Article in Press.

52. Geller AI, Lovegrove MC, Shehab N, et al. National estimates of emergency department visits for antibiotic adverse events among adults – United States 2011-2015. J Gen Int Med 2018; 33(7): 1060-1068.

53. American Association of Endodontists. AEE guidance on the use of systemic antibiotics in endodontics. AAE Position Statement. 2017

54. Cunha-Cruz J, Hujoel PP, Maupome G, saver B. Systemic antibiotics and tooth loss in periodontal disease. J Dent Res 2008; 87(9): 871-876.

55. Campagna JD, Bond MC, Schabelman E, Hayes BD. The use of cephalosporins in penicillin-allergic patients. A Literature review. J Emerg Med 2012; 42: 612-620.

56. Stewardson AJ, Huttner B, Harbarth S, At least it won't hurt: the personal risks of antibiotic exposure. Curr Opin Pharmacol 2011; 11(5): 446-452.

57. Rupnic M, Wilcox MH, Gerding DN. Clostridium difficile infection: new developments in epidemiology and pathogenesis. Nat Rev Microbiol 2009; 7(7): 526-536.

58. Bendesky A, Menedez D, Ostrosky-Wegman P. Is metronidazole carcinogenic. Mutat Res 2002; 511(2): 133-144.

59. Roda RP, Bagán JV, Bielsa JMS, Pastor EC. Antibiotic use in dental practice. A review. Med Oral Patol Circ Bucal 2007; 12: E186-192.

60. Ament PW, Bertolino JG, Liszewski JL. Clinically significant drug interactions. Am Fam Physician 2000, 61(6): 1745-1754.



# Premium Technology. Better Performance. Great Price.



Incredible Strength 5x the cyclic fatigue as WaveOne® Gold.



Unmatched Flexibility Heat-treated FireWire™ NiTi gives amazing flexibility, capable of 90° curves.



No Bounce Back FireWire™ NiTi doesn't bounce back to preserve apical anatomy

**EdgeOne Fire**<sup>™</sup> features our Heat-Treated Fire-Wire<sup>™</sup> NiTi and is designed to shape canals in a reverse-reciprocating motion similar to WaveOne<sup>®</sup> Gold and can be used with the same motor and hand piece settings. EdgeOne Fire tests at five times the cyclic fatigue as WaveOne<sup>®</sup> Gold.

EdgeOne Fire™ is available in sizes Small, Primary, Medium and Large. Files have a parallelogram shaped cross section with a variable taper. There are three files in each pack with the option of an assortment pack or single sized pack. Available in lengths 21mm, 25mm and 31mm.





A HENRY SCHEIN\* COMPANY www.dentalwarehouse.co.za



on Us



Small (tip size 20)Primary (tip size 25)Medium (tip size 35)Large (tip size 45)

#### Price: R364.55



Johannesburg Durban Johannesburg Durban

Kelv

Building 2, No 106 16<sup>th</sup> Road, Midrand, 1686 51A Musgrave Park, Musgrave Road, Berea, Durban, 4001 Tel: 011 719 9111 • Fax: 011 719 9031 Tel: 031 312 6130

Taking care of everything dental 👒 0800 111 796 🖾 admin@dentalwarehouse.co.za



One Bulk Fill Restorative

### Why waste time with incremental layering?

Instead, you can place 3M<sup>™</sup> Filtek<sup>™</sup> One Bulk Fill Restorative in one layer up to 5 mm deep. You're about to learn why.





3M<sup>™</sup> Filtek<sup>™</sup> One Bulk Fill Restorative puts less or equivalent stress on the tooth than common incrementally placed universal composites.

Source: 3M internal data

## Shrinkage, stress ... and bulk fill restoratives

A2

**Shrinkage** is easy to measure and easy to understand. Polymerization shrinkage is the change in volume of your composite that occurs as you cure it. The composite shrinks as all the freely moving resin molecules go through the free-radical methacrylate polymerization reaction.

M Filtek"

IBAN IN

**Stress** is a little harder to visualize and a little harder to measure. Stress is the amount of force exerted on the tooth because of polymerization shrinkage. Stress is what can break the adhesive bond, crack enamel and allow leakage at the margins.



#### The amount of stress is based on a number of factors

It's not just the amount of shrinkage. Both the shrinkage of the material and the stiffness of the material come into play (Li 2007).

- A sealant, for example, can have very high shrinkage (over 5%!) and place very low stress on the tooth (Kleverlaan 2005)
- A universal restorative might have 2% shrinkage, but because it is much stiffer, it will place much higher stress on the tooth (Kleverlaan 2005)

# So what enables a dental composite to be placed in bulk?

There are recent advances in chemistry that allow us to control polymerization stress.

3M<sup>™</sup> Filtek<sup>™</sup> One Bulk Fill Restorative uses two resin components to reduce polymerization stress.

To learn how it works, read on ...



## Here's how it works.



The innovative component of the first resin is an additionfragmentation monomer (AFM). The unique feature of this resin is that, during polymerization, the central group **can fragment to relieve stress**. The fragments can then re-polymerize in a lower stress state.





The other new resin component is aromatic urethane dimethacrylate (AUDMA). Because it's a larger monomer than found in traditional dimethacrylates, it limits the number of shrinkage zones. That helps **reduce the amount of shrinkage and stress** that occurs during polymerization.



## You choose it for speed. Now it's more aesthetic, too.

3M leveraged its nanotechnology expertise to increase opacity without reducing depth of cure. In its cured state, Filtek One Bulk Fill Restorative has a higher opacity than other leading bulk fill restoratives\*, resulting in improved esthetics.

\*Source: 3M internal data



\*The contrast ratio is the average of all shades.

www.3M.com/FiltekOne



3M South Africa (Pty) Ltd. 146a Kelvin Drive Woodmead, 2128 Web 3M.co.za/OralCare 3M and Filtek are trademarks of 3M or 3M Deutschland GmbH. Used under license in Canada. © 3M 2016. All rights reserved.

## The cortical window

Naheed Mohamed<sup>1</sup>, Yosi Nahmias<sup>2</sup> and Ken Serota<sup>3</sup>

#### Introduction

Techniques, materials and innovations in the micro-armamentarium of endodontic microsurgery are seminal to enhanced predictable outcomes by comparison with historical microsurgical procedures.

The superior magnification and illumination of surgical operating microscopes improves the identification of root peripheries, ensures a lesser degree of root reduction and diminishes the size of osteotomies; thus retaining greater residual bone.

Smaller resection angles (perpendicular to the long axis of the root) reduce the number of tubuli exposed. Lateral canals, canal deltas, isthmus connections and micro-cracks can be identified prior to root resection, retropreparation and retro-sealing (Weller et al, 1995)

Studies of positive treatment outcomes for conventional encloclontic surgical therapy show a diverse range of success dependent upon an array of predictors (Garcia-Guerrero et al, 2017; De Chevigny C et al, 2008).

A study by Wang et al reported an overall healed rate of 74% of assessed teeth; root filling length and size of preoperative lesions proved to be important predictors of treatment outcomes (Wang et al, 2004).

Positive treatment outcomes (94%) were demonstrated by microsurgical techniques (Tsesis et al, 2013)

Retreatment of failing encloclontic procedures demonstrate statistically less positive treatment outcomes than those clone by microsurgical techniques (86%); fewer failures ensue (Setzer et al, 2012). These conditions are more readily addressed with microsurgical techniques (Floratos and Kim, 2017)

<sup>1</sup> Dr Naheed Mohamed DMD, MSD, PERIO, FRCD(C) Private practice, Mississauga and Oakville, Canada. Contact: naheedm@gmail.com.

<sup>2</sup> Dr Yosi Nahmias DDS, MSC Private Practice, Oakville, Canada. Contact: yosi@allianceds.com.

<sup>3</sup> Dr Ken Serota DDS, MMSC Clinical instructor in the University of Toronto, Canada postdoctoral endodontics department.



Figure 1: A variety of piezotomes are commercially available; saw-toothed tips of 8mm to 10mm are essential. Piezotomes ensure precise and safe cutting of mineralized tissues and preserve soft tissues (blood vessels, nerves, and mucosa)



Figure 2: The porcelain-fused-to-metal (PFM) crown appeared to fit appropriately. The root filing demonstrated incomplete sealing and there was no evidence of the expected MB2 canal



Figure 3: The post-operative radiograph showed four treated canals



Figure 4: Eighteen-months post-endodontic retreatment therapy. Apical pathology appeared to be present

#### The computer-guided cortical window approach

A cortical window (bone lid) access to the apical region is less invasive, minimises bone loss and is less traumatic in comparison to alternative techniques.

The perimeter of the window is determined from racliographs of the area. Radiographs are essential to all aspects of encloclontics; however, flat films are twodimensional images of three-dimensional structures and so data interpretation is subjective. Cone beam computed technology (CBCT) enables the clinician to visualise structures in sagittal, axial and coronal planes. Three-dimensional imaging provides more substantial data for diagnosis, pre-treatment planning, post-treatment assessment and reassessment evaluations (Ahlowalia et al, 2013; Venskutonis et al, 2014).

A printed stereolithographic surgical template can guide the osteotomies during the surgery; minimising deviation from the digital surgical plan. Surgical templates printed

#### MOHAMED ET AL



Figure 5: The cone beam computed tomography (CBCT) scan results showed rarefying osteitis and sinus cortical floor elevation along the mesiobuccal and distobuccal roots

from three-dimensional imaging optimise site preparation, the perimeter of the osteotomy, depth of cortical bone, extent of pathology and volume of bone graft required (Kuhl et al, 2015; D'haese et al, 2012; Pinsky et al, 2007; Strbac et al, 2017).

#### **Piezotome osteotomy**

Traditional osteotomies use large, round burs which remove significant cortical bone. Delayed healing, increased postoperative pain and other complications may ensue.

With microscopes, piezotomes and ultrasonic tips, a smaller osteotomy is created, thus minimising the aforementioned sequelae.

Piezo surgery enables micrometric saw cuts which preserve cortical bone loss and facilitates preservation of root length by lower resection angles and enhanced visiblity.

In deep spaces, ultrasonic vibrations break clown irrigants into small particles readily washed from the crypt.

Less vascular presence in the crypt minimises use of hemostatic agents (Viscostat) and interference with retro-seal setting time. The use of a piezo surgical devices (Figure 1) enables accurate shaping of the cortical window and diminished osseous removal, in contrast to traditional crypt creations which are freehand guided (Abella et al, 2014).

#### **Case report**

The patient presented to our surgery with a history of 'sporadic discomfort in the gum' overlying tooth LR2.

A two-dimensional intraoral racliograph revealed a prior history of root canal therapy and a porcelain-fused-to-metal (PFM) crown (both completed approximately 10 years ago) (Figure 2)

Swelling began the evening prior to the appointment; the patient reported that the throbbing necessitated analgesics for relief of the pain. No sensitivity to pressure nor reaction to temperature were noted; the patient could not localise the tooth causing the distress. Treatment options were discussed with the patient; retreatment through the PFM crown was chosen.

Anaesthesia was administered (posterior superior alveolar nerve block - 2% xylocaine with epinephrine 1: 100,00 and infltration facially and palatally 2% xylocaine with epinephrine 1:50,000). A conservative access preparation was made; decay was identified proximal to the palatal







# DENTURE CARE EAT, SPEAK AND SMILE WITH CONFIDENCE



 \* Value Retail Sales data for GSK-branded denture care products, 12 months ending February 2019. GlaxoSmithKline Consumer Healthcare South Africa (Pty) LTD. 57 Sloane Street, Bryanston, 2021 Refer to carton for instructions of use. Trademarks are owned or licensed to the GSK group of companies. For any product safety issues contact GSK Consumer on +27 11 745 6001. CHZAF/CHPOLD/0004/19

#### MOHAMED ET AL





Figure 6: The digital rendering of the surgical stent used to guide the cortical bone window osteotomies

Figure 7: The 3D-printed model and surgical stent used to guide our cortical bone window access

Figure 8: The surgical stent was put in place against the bone to guide the piezosurgical saw osteotomies



Figure 10: The clinical view of the surgical site once the cortical window had been removed and the roots resected



Figure 11: The microsurgical view of the root apical retro-preparation and apical seal



Figure 12: The defect was grafted with allograft cortical bone chips (Straumann Allograft)



Figure 13: The cortical bone window was replaced and fixated in place with gentle pressure



Figure 14: The flap was replaced and sutured with prolene monofilament sutures



Figure 15: The immediate post-operative radiograph







## **COMPREHENSIVE** 2-YEAR ORTHO COURSE From a Leading USA Continuing Education Center

Since 1984, we have taught thousands of dentists real life knowledge to perform orthodontics successfully on every case. We are proud to bring a modern, comprehensive orthodontic system to South Africa. Since the first Johannesburg class started 8 years ago, the program has grown to larger success. This year, we are offering not only our popular IAT Comprehensive Orthodontics Program, but also two Intro to Orthodontics classes. Don't miss this offering. We will not be starting another local series until 2021.

Our Internet Assisted Training (IAT) program will allow you to get the highest levels of education through a mix of online study (with thousands of cases, videos, exercises and principles), continual communication with your instructor, and 12 days of hands-on training. This format allows even the busiest dentists to learn at the highest levels, with fexible study anytime, anywhere.





#### Free SmileStream Orthodontic Software included with full course

Come see what the hype's about at:

#### 20-22 MARCH, 2020

Emperors Palace, Johannesburg **18 CPDs** 

**CLEAR ALIGNER+** 

Mini Series coming to Johannesburg in 2020 24 CPDs

limited seats available

CALL US AT 011 814 3196 to reserve your seat today or receive a free case trial!



posafrica@posortho.net 011 814 3196 www.posortho.com

ADA C·E·R·P<sup>®</sup> Continuing Educat Recognition Progr

· Fully accredited with 35 years of experience and over 8000 graduates worldwide

 Teaches you how to perform the highest level of orthodontics in your practice

WORLD CLASS ORTHO TRAINING IN SOUTH AFRICA

 Progressive Orthodontics and the McGann Postgraduate School of Dentistry are leading **US Dental Continuing Education Centers** 

- · Includes hundreds of case studies and a system of orthodontic principles
- · You will be able to do a variety of cases
- · Earn while you learn with an affordable 17 month payment plan
- · The best support in the industry:
  - Lifetime Free Retake Policy
  - Clinical support with experienced instructors on your personal cases

#### HIGH TECH TEACHING

At Progressive, we use technology to give us every advantage in the classroom and the clinic.

- SmileStream diagnostic software (included free with series): get the best diagnosis every time
- Online Case Consulting: get instructor help anytime
- · Clinical Videos: help you visualize our concepts

#### MOHAMED ET AL



Figure 16: The nine-month post-operative radiograph showed excellent bone regeneration

canal and no fractures or cracks were noted.

Cavil was present beneath the composite core and the untreated MB2 canal (Stropko, 1999) was discovered.

A reservoir was made in the gutta percha (Proultra ultrasonic tip). Endosolv E was used to soften the gutta percha (Hwang et al, 2015)

After debridement and shaping, Ca(OH)2 (Ultracal XS) was placed in the root canal space to further enhance disinfection.

Prior to obturation, drainage was noted coming from the MB2 canal; drainage was arrested and the canals root was filled with vertical condensation of warm gutta percha (VCWG) and AH-Plus sealer (Figure 3).

The patient returned in six months for reassessment. Tooth LR2 was within normal limits to percussion, bite, palpation, mobility and probing.

Eighteen months later, the patient returned for a second reassessment appointment (Figure 4). Tooth LR2 was slightly sensitive to percussion and the overlying gingival tissues were inflamed.

The patient was referred for a CBCT; the scan (Figure 5) revealed a common area of rarefying osteitis surrounding the mesial buccal and distal buccal roots which had caused elevation of the sinus floor. As the endodontic pathology had not resolved, treatment options were proposed. The patient chose to have microsurgical therapy performed.

A 3D-printed stereolithographic template was created

by combining the CBCT scan data with an intraoral scan's (3Shape Trios intraoral scanner) digital data. The data was then imported into Codiagnostix software in order to plan our approach and design our cortical window dimensions for optimal access to the roots (Figure 6).

The guided microsurgical approach would facilitate an osteotomy design to minimise the potential for sinus membrane perforation. The JD-printed guide for the cortical window would guide the length and angle of the osteotomies using the piezosurgical saw (Figure 7).

Cervical recession and decay were in evidence about teeth LU and LRI in addition to exposure of the crown margin of tooth LR2.

The cervical area of tooth LR3 was severely abraded. An intra-sulcular full-thickness muco-periosteal fap was raised; a vertical releasing incision was positioned mesial to tooth LR1.

The surgical stent was placed over the maxillary teeth (Figure 8) and a piezotome-guided surgical window was developed using the margins of the stent (Figure 9).

A chisel was used to elevate the cortical plate and root resection performed with Lindemann burs (Figure 10).

The cortical window was placed in sterile saline while the endodontic microsurgery was completed. After resection using Lindemann burs, the root periphery was stained with methylene blue and examined for anomalies and the root canal space was retro-prepared with ultrasonic tips to a depth of three millimetres, creating a reservoir for the retrosealing materials.

The retro-preparation was rinsed with ethylenediaminetetraacetic acid (EDTA) and dried with paper points.

Bosworth Super-EBA was placed (Figure 11) and the root end burnished with a multi-fluted carbide bur. Radiographs were taken at the retro-preparation stage and the retrosealing stage to ensure accuracy of direction and material placement. The defect thoroughly debrided and was grafted with allograft (Straumann Allograft) (Figure 12). The cortical bone window was replaced and ensured to have no mobility (Figure 13)

The flap was closed with Ethicon 5-0 Prolene monofilament sutures (Figure 14) and a post-operative radiograph was taken (Figure 15).

The patient was directed to use 800 mg of ibuprofen and 1000 mg of acetaminophen for pain and to rinse with chlorhexidine.

Sutures were removed in seven days and the patient reappointed for reassessment. The re-evaluation radiograph taken at nine months showed substantial osseous IMPROVED COMPLIANCE through a pleasant-tasting solution that ensures unaltered taste sensation and minimal CHX staining.

CURAPROX

OOTHPASTE

Gum care

CITROX®/ P-Complex for intense protection

Contains xylitol

ORAL RINSE

FORTE CX-P+

Biofilm control

P-Complex for intense protection

Reduced staining

Enhanced antiseptic effects pat. CITROX®/

2

۵

ERIOPLI

×

**CITROX**®

# CURAPROX PERIOPLUS<sup>+</sup>

Curaprox Perio Plus + Forte (0.2% Chlorhexidine) is boosted by Citrox and offers the strongest anti-bacterial effect. Ideal for short-term use before and after invasive dental treatment. Recommend to use in combination with Perio Plus+ support toothpaste (SLS FREE) for optimal



CUI

200

EXTRA

www.primedental.co.za

🛨 SWISS PREMIUM ORAL CARE

patient compliance and convenience.

#### MOHAMED ET AL



Figure 17: The one-year post-operative cone beam computed tomography (CBCT) scan showed complete regeneration of the defect and buccal plate

regeneration (Figure 16) and a post-operative CBCT scan was taken after one year, showing complete bone regeneration and continuity of the buccal plate. (Figure 17).

#### Conclusions

Along with surgical operating microscopes and piezotomes, integration of optical scanners and CBCT Dicom files to JD-printed stereolithographic surgical guides is yet another iteration in the advancement of endodontic microsurgery

This novel, digitally-guided approach used in this case report, along with the intraoperative use of a JD-printed osteotomy guide, allows for greater effciency and accuracy for creation of the access window to the roots.

The technique gives the advantage of bone preservation by allowing the cortical plate to be replaced, yet still provides adequate access for the apical root preparation.

The JD-printed guide provides a control for the osteotomies without risking damage to vital structures. This digitallyguided microsurgical approach provides accuracy, access, control and bone preservation to the endodontic apical surgery procedure.

As we come upon the dawn of a new age of digital dentistry, we can see the future applications to be endless.

#### References

Weller RN, Niemczyk SP, Kim S (1995) Incidence and position of the canal isthmus. Part 1. Mesiobuccal root of the maxillary first molar) Endod 21 (7):380-383

Garcia-Guerrero C, Guauque SQ, Molano N, Pineda GA, Nino-Barrera JL, Marin-Zuluaga DJ (2017) Predictors of clinical outcomes in endodontic microsurgery: a systematic review and meta-analysis. Giornale Italiano di Endondonzia 31(1):2-13

De Chevigny C, Dao TT, Basrani BR, Marquis V, Farzaneh M, Abitbol S, Friedman S (2008). Treatment outcome in endodontics: the Toronto study - phase 4: initial treatment. J Endod 34(3);258-263

Wang N, Knight K, Dao T, Friedman S (2004). Treatment outcome in endodontics: the Toronto Study. Phases I and II: apical surgery.) Endod 30(11):751-761

Tsesis I, Rosen E, Taschieri 5, Telishevsky Strauss Y, Ceresoli V, Del Fabbro M (2013). Outcomes of surgical endodontic treatment performed by a modern technique: an updated meta-analysis of the literature. J Endod 39(3):332-339

Setzer FC, Kohli MR, Shah SB, Karabucak B, Kim S (2012). Outcome of endodontic surgery: a meta-analysis

of the literature - Part 2: Comparison of endodontic rnicrosurgical techniques with and without the use of higher magnification. J Endod 38(1): 1-10

Floratos S, Syngcuk K (2017). Modern Endodontic Microsurgery Concepts: A Clinical Update. Dent Cf in N Arn 61(1):81-91

Ahlowalia MS, Patel S, Anwar HM, Carna G, Austin RS, Wilson R, Mannocci F (2013). Accuracy of CBCT for volumetric measurement of simulated periapical lesions. Int Endod J 46(6):538-546

Venskutonis T, Plotino G, Juodzbalys G, Mickevii'iene L (2014). The importance of cone-beam computed tomography in the management of endodontic problems: a review of the literature. J Endod 40(12):1895-1901

Kuhl S, Payer M, Zitzmann NU, Lambrecht JT, Filippi A (2015). Technical accuracy of printed surgical templates for guided implant surgery with the coDiagnostiX software Clin Implant Dent Re/at Res 17(Suppl 1):e 1 77-82

D'Haese J, Van De Velde T, Komiyama A, Hultin M, De Bruyn H (2012). Accuracy and complications using computerdesigned stereolithographic surgical guides for oral rehabilitation by means of dental implants: a review of the literature. Clin Implant Dent Re/at Res 14(3):321-335

Pinsky HM, Champleboux G, Sarment DP (2007). Peria pica I surgery using CAD/CAM guidance: preclinical results. J Endod 33(2):148-151

Strbac GD, Schnappauf A, Giannis K, Moritz A, Ulm C (2017) Guided Modern Endodontic Surgery: A Novel Approach for Guided Osteotomy and Root Resection. J Endod 43(3):496-501

Abella F, de Ribot J, Doria G, Duran-Sindreu F, Roig M (2014). Applications of piezoelectric surgery in endodontic surgery: a literature review J Endod 40(3):325-532

Stropko JJ (1999), Canal morphology of maxillary molars: clinical observations of canal configurations. J Endod 25(6):446-450

Hwang JI, Chuang AH, Sidow SJ, McNally K, Goodin JL, McPherson JC 3rd (2015). The effectiveness of endodontic solvents to remove endodontic sealers. Mil Med 180 (3 Suppl) 92-95

Reprinted with permission from ENDODONTIC PRACTICE February 2019

# **SMILE CLUB**

#### HOW ACTIVE ALIGNERS CAN BENEFIT YOUR PRACTICE

#### WHAT ARE CLEAR ALIGNERS?

Clear aligners have been around for more than 20 years and work on basic orthodontic principles. They are used for the correction of crooked teeth, gaps or rotation, while achieving the desired results in an organized and planned fashion. These customized trays are virtually invisible and move the tooth in the desired direction. This is achieved through wearing a series of Active Aligners, each for 22 hours a day, 1 to 2 weeks at a time (one stage), which move the teeth per stage until their optimal alignment has been reached.



#### ---- GIVE YOURSELF THE ACTIVE ALIGNER ADVANTAGE ----



- 70% of patients are candidates for clear aligners
- · Growing interests in Active Aligners
- Less than 1% of adults are undergoing orthodontic treatments

#### 7/8mm Essix ACE® Plastic

DENTSPLY - Essix® Brand Plastics give you the quality you demand and the versatility you need.

#### Precise Engineering -----

Research backed approach through the entire manufacturing process

#### Attractive and Accessible

International quality priced affordably to allow access and affordability to your practice for your patients

#### 2mm Optimised Trimline -

\*Research backs our 2mm trim line 2x to 4x Stronger Retention

**ACTIVE ALIGNERS** 

\*\*The effect of gingival-margin design on the retention of thermoformed aligners\* by Daniel P. Cowley, James Mah, and Brendan O'Toole in the Journal of Clinical Orthodontics: JCO 11/2012; 46(11):697-702.

Tel: 087 807 8724 - info@smileclub.co.za www.smileclub.co.za

#### @smileclubsa SMILE CLUB (PTY) LTD

Block 17, Woodmead Business Park 145 Western Services Rd, Woodmead, 2191

# **SMILE CLUB**

#### HOW CAN CLEAR ALIGNERS BENEFIT DENTAL PRACTICES?

Until recently, teeth alignment treatment has been an Orthodontist's domain. With the introduction of clear aligners, dental practices can now venture into this patient-driven solution, which provides good ROI, minimal chair time, and happy patients.

#### GOOD ROI



With more patients becoming interested in clear aligners every day, achieving a good ROI is easy. Growing your practice by offering aligner therapy provides a new revenue stream with a product that is highly sought after, easy to prescribe, and perfect for cross-selling to a majority of your patients.

#### HAPPY PATIENTS

Clear aligners provide an aesthetic alternative to traditional braces. As long as a patient follows important wear and care instructions, their treatment will typically be quick and unnoticeable by acquaintances. Providing alignment treatment will result in satisfied, smiling patients who have gone through a relatively painless and easy process. Happy patients lead to more patients as they refer their friends and family to your practice to get started with clear aligner treatment.



# **ACTIVE ALIGNERS**

Active Aligners provide a virtually invisible and comfortable solution for misaligned dentition. Every aligner is carefully designed to have exceptional precision and durability. We understand the importance of a qualified clinician overseeing the treatment process, which is why our aligners are only available through dental professionals. Provide your patients with an aesthetic alternative that still provides the results and professional involvement of your traditional alignment offerings.

Affordable for your patients - Growth for your practice Online Course and accreditation

#### ADD ACTIVE ALIGNERS TO YOUR PRACTICE TODAY www.activealigners.com to learn more and get started.



@smileclubsa SMILE CLUB (PTY) LTD Block 17, Woodmead Business Park 145 Western Services Rd, Woodmead, 2191

#### CLINICAL

## Immediate loading of post-extraction implant in a high-esthetic value area: digital workflow advantages

Vincenzo Santomauro<sup>1</sup>

The use of the latest digital workflows in both surgery and prosthetics is introducing significant innovations, especially concerning ways of making the clinical procedures easier and faster.

Nowadays, using the Straumann<sup>®</sup> Virtuo Vivo<sup>™</sup> intraoral scanner and the coDiagnostiX<sup>®</sup> Dental Wings software, it is possible to create a digital workflow which, starting with the cone beam x-ray examination, followed by surgical-prosthetic digital planning, allows us to facilitate immediate loading of a temporary prosthesis.

This is also possible thanks to the CAD Straumann CARES® Visual software, which works in harmony with coDiagnostiX®.

#### Initial situation

A systematically healthy 50-year-old man presented at our practice requesting the restoration of a missing crown in a central incisor. His main priority was the esthetic appearance, and his expectations were high.

The extraoral and intraoral examination revealed a medium/high smile line, medium-thickness gingival biotype, good general oral hygiene and multiple gingival recessions. Furthermore, he presented a horizontal fracture below the cemento-enamel junction on tooth #11 with the exposure of the root canal and plaque accumulation in the area (Fig. 1).





<sup>1</sup> Vincenzo Santomauro, Italy

Figure 1.

Figure 2.

Reset Back	Generate PDF				0	
Assessment of Su	argical Cases: S	ingle-tooth gap		Modifiers	111	
Defining Characteristic	s: One missing tooth	to be replaced by one	implant.	Exposure of obsellar		
Placement protocol	Immediate implant placement			Gingtunt Bloctype     Medium-scalapped, medium-sitela     Mapper (Sords Couvers     Mectangular     Metangular     Monoto va insplane Stim     Nore		
Stork op úntegrity	att integrity Damage to one or more bone walls					
Touth site Societ marphology	Maxillary Incisor	or canine		Bone Level at Adjacent Teeth \$ 5 mm to contact paint		
Anatomic Risk	Esthetic Risk	Complexity	Risk of Complications	Virgin	of reacts	
Low	High	Moderate	High	Wilth of Edentulous Spin 1 tooth (2 7 mm)		
Additional processures	+ Similarpool	ore approximition		Defective		
that may be required	<ul> <li>Adjunctive soft</li> </ul>	times Rida		Loading Protocol Immediate	6	
Addmonativelop	+ 800					
				Additional complexity/risk b	used an modifiers	
Normative SAC Classification	Complex		Janea, Moderate	Nat		
Classification		Comple	x	Janes, Moderate	-	
	n the test				rsedt	



Figure 3.

Figure 4.



Figure 5.



Figure 6.



Figure 7.



Figure 8.

The periapical x-ray and CBCT examination showed images compatible with interproximal bone loss and partial root canal treatment (Fig. 2).

post-extraction dental implant was planned.





Figure 9.

#### **Treatment planning**

The SAC assessment tool was used to assess the complexity and potential risk associated with this case. Since the protocol used included immediate loading and other modifiers, this case was defined as advanced and complex (Fig. 3).

The treatment plan included the insertion of one Straumann® BLX Roxolid® SLActive® post-extraction implant



using computer-guided flapless surgery and a screwed, immediately-loaded temporary crown in order to minimize the patient's esthetic discomfort and enable immediate softtissue conditioning.

An intraoral impression of the initial clinical situation was taken using the Straumann<sup>®</sup> Virtuo Vivo<sup>™</sup> intraoral scanner (Fig. 4).



Figure 11.



Figure 12.



Figure 13.







# Emax®

# zircad

Redefining all-ceramics – featuring Gradient Technology: High-end esthetics and 1200 MPa for all indications\*

> All ceramic, all you need.

#### zircadprime.ipsemax.com

\* ranging from single tooth crowns to 14-unit bridges



Tel: 0860 456 123 info@ivodent.co.za www.ivodentonline.co.za







Figure 15.

Figure 16.



Figure 17.

Figure 18.

The CBCT DICOM files were imported into the coDiagnostiX<sup>®</sup> Dental Wings planning software and were created through segmentation to eliminate CBCT data artefacts and obtain a 3D conversion of the bone tissues (Fig. 5).

The PLY file obtained by the initial scan with Straumann<sup>®</sup> Virtuo Vivo<sup>™</sup> imported the information concerning soft tissues and dental surfaces. Moreover, another STL file was created during the prosthetic planning.

Afterwards, both files are matched by the alignment or superimposition of the two 3D objects (between a segmentation and one STL file, or between two STL files) having in common some regions of interest (ROI). When the areas to be matched on both files are selected, the software automatically determines the matching (Fig. 6). As a result, we obtain images of bones, teeth, mucous membranes and wax that can be perfectly superimposed on one another (Fig. 7).

The ideal implant position can be planned digitally in line with the prosthetic solution that is most suitable for the surgical plan, including predicting the related selection of the most appropriate abutments (Fig. 8).

Following a prosthetic-driven planning strategy, and taking into consideration the bone volume, we planned to insert a Straumann<sup>®</sup> BLX Roxolid<sup>®</sup> SLActive<sup>®</sup> implant 3.75 mm in diameter and 12 mm long (Fig. 9).

Once the planning was completed, the surgical guide





Figure 19.

Figure 20.

was designed and the corresponding information was sent to the Magma Center lab (Castellammare di Stabia, Italy), where the guide was 3D-printed with a Straumann® CARES® P40 printer (Fig. 10).

These guides are created according to the LPD print technology and, when placed, they seem to fit in a very satisfying way, especially in the case of tooth-supported surgical templates.<sup>1</sup>

#### Surgical procedure

The template was placed and proved to be very reliable, precise and stable (Fig. 11).

Following the application of local anesthesia, tooth #21 was extracted atraumatically (Fig. 12).

According to the specific BLX surgical protocol, the presence of soft bone allows us to use the  $\emptyset$  2.2 mm Velodrill<sup>TM</sup> pilot drill and the  $\emptyset$  2.8 mm Velodrill<sup>TM</sup> for the







Figure 22.



Figure 23.



Figure 24.

implant bed preparation with abundant irrigation with saline solution (Figs. 13,14).

The surgery was carried out by flapless procedures, following the standard phases of computer-guided surgery. The implant was placed using a specific mounter through the sleeve in an accurately chosen position (Figs. 15, 16).

We obtained optimal primary stability and ISQ, and were

thus able to proceed with the immediate loading (Fig. 17).

The follow-up radiography showed the excellent precision obtained in implant positioning, which faithfully reproduced in the patient's mouth what has been accurately planned on the computer (Fig. 18).

Finally, an epithelium-connective graft was taken from the palate in order to use an envelope technique to optimize the



# PLEASE SAVE DATE

A HENRY SCHEIN® COMPANY

Johannesburg Tel: 011 719 9111 • Fax: 011 719 9031 • Building 2, No 106 16<sup>th</sup> Road, Midrand, 1686 Durban Tel: 031 312 6130 • 51A Musgrave Park, Musgrave Road, Berea, Durban, 4001

# THE ULTIMATE DIGITAL EXPERIENCE

22 February 2020 | Maslow Hotel Sandton | Johannesburg

Top International Speakers focusing on Digital Dentistry

#### Prof. Dr. Dr. Angelo Troedhan

Specialist for General Dentistry, Oral Surgery and Implantology President of the International Academy for Ultrasonic Surgery and Implantology Director of the Centre for Facial Aesthetics – Vienna Founding Member of the TKW-Research-Group (Dr. Troedhan, Dr. Kurrek/GER, Dr. Wainwright GER/USA).

#### **Carsten Fischer**

Dental technician with focus is on CAD/CAM, ceramic double crowns, custom abutments, and all-ceramic materials.

Agenda and registration form to follow

🚹 in the dental warehouse 🔟 dwhrelyonus



Figure 25.



Figure 26.

soft tissue profile and act as a vestibular closure and support the bone-implant gap that was filled with cerabone<sup>®</sup> bone substitute (Fig. 19,20).

#### **Prosthetic procedure**

The Virtuo Vivo<sup>™</sup> scanner allowed us to take a digital impression of the implant position in order to create a temporary crown using a Variobase<sup>®</sup> abutment (Fig. 21).

The resulting PLY scan file was sent to the laboratory through CARES® Connect to create the temporary prosthetic crown (Fig. 22).

CAD Straumann CARES<sup>®</sup> Visual software was used to adjust the temporary crown, making sure that no contacts occurred in centric and protrusive movements (Fig. 23,24).

The CAD was drilled in a PMMA Straumann<sup>®</sup> Temp Multilayer and glued onto a Variobase<sup>®</sup> abutment with 3M<sup>™</sup> RelyX<sup>™</sup> Unicem II cement (Fig. 25).

The temporary crown was screwed to 15 N (Fig. 26). The temporary restoration was immediately adapted from an esthetic and functional point of view and did not require any changes thanks to the accurate digital planning (Fig. 27).

The scheduled one-month follow-up showed good soft tissue healing (Fig. 28).

#### **Treatment outcomes**

The fully digital workflow reduces chair-time and speeds up patient turnover, guaranteeing immediate provisionalization, reduced patient discomfort and immediate soft tissue conditioning. The accurate analysis of the case and treatment planning using all the digital tools at our disposal allowed us to reduce the possibility of mistakes and have a very predictable clinical outcome. Straumann® BLX implant is the perfect solution for the positioning and immediate loading of the implant itself, thanks to its anatomic design, TorcFit<sup>™</sup> connection, surface and material.

We would like to thank Laboratorio Magma Center of Castellamare di Stabia for helping with the digital planning and the prosthetic restoration.

#### Reference

1. Technical Accuracy of Printed Surgical Templates for



Figure 27.



Figure 28.

Guided Implant Surgery with the coDiagnostiX<sup>®</sup> Software. Sebastian Kühl, DMD;\* Michael Payer, DMD, MD, PhD;† Nicola Ursula Zitzmann, DMD, PhD;‡ Jörg Thomas Lambrecht, DMD, MD, PhD;§ Andreas Filippi, DMD, PhD.

Clinical Implant Dentistry and Related Research, Volume 17, Supplement 1, 2015

Reprinted with permission by Starget

## <u>The ITI – Leading the way</u> <u>in implant dentistry</u>



The International Team for Implantology (ITI) is an academic association that unites professionals around the world from every field of implant dentistry. It actively promotes networking and exchange among its membership of currently more than 16,000. ITI Fellows and Members regularly share their knowledge and expertise from research and clinical practice at meetings, courses and congresses with the objective of continuously improving treatment methods and outcomes to the benefit of their patients.

The ITI is active in two principal areas: education and research funding. The organization supports the premise of well-documented treatment guidelines as well as risk assessment and quality assurance to ensure reliable outcomes. It funds research and scholarships, organizes congresses and continuing education events, and runs more than 630 Study Clubs around the globe. The organization also publishes reference books and operates the ITI Online Academy, a peer-reviewed, evidence-based e-learning platform.

#### Why be part of the global ITI community?

The ITI is a leading academic organization with a focus on implant dentistry that offers highest quality educational support and a wealth of benefits to enhance professional activities.

#### **ITI Study Clubs**

ITI Study Clubs Study Clubs provide an efficient platform from which to disseminate and exchange knowledge on the latest treatment approaches in implant dentistry as well as discussion of clinical questions and an exchange of expertise. The ITI Study Clubs are a great place to tap the collective knowledge and opinion of the members within a trusted environment and informal atmosphere.

Each ITI Study Club offers three to four meetings per year and the groups remain small. ITI Members participate free of charge while non-ITI Members can attend up to two meetings as guests.

#### Join the ITI and get:

- A print copy of every upcoming volume of the ITI Treatment Guide series\* upon publication (classic membership only)
- A print subscription to the ITI journal Forum Implantologicum\* (classic membership only)
- 100 Academy Credits per full membership year to unlock content on the ITI Online Academy (digital membership only)
- Online access to all available volumes of the ITI Treatment Guide series and every issue of Forum Implantologicum
- Regular literature updates
- Access to the online portal ITInet, a unique global platform for worldwide networking and exchange
- Significantly reduced entry fees to international and national ITI congresses and educational events
- Free participation in ITI Study Club meetings
- Full access to a broad range of national ITI Section activities
- Direct access to the largest and most prestigious international academic network in implant dentistry



Olivin Glen Spiron Periodontist, Windhoek, Namibia



**ITI Southern Africa welcomes new Fellows:** 

Sandile Mpungose Prosthodontist, UWC, Cape Town



**Trevor Bath** Dental Technician, Cape Town

To join the ITI Southern African Section, contact: Phone: +27 (0)21 850 0823 Email: southernafrica@itisection.org





International Team for Implantology

# Will my dentist understand what I really need?

Patients have many questions. Get the right answers at the ITI World Symposium 2020 in Singapore!

ITI World Symposium Singapore May 14–16 2020 Evidence and Trends for Patient-Centered Solutions: The Challenge of Choice Register now! www.iti.org Antibiotic stewardship in dentistry – review of evidencebased clinical recommendations on appropriate antibiotic prescribing in dental practice

# Part 2: Clinical guidelines and recommendations for antibiotic prescribing in dental practice

Johan Hartshorne<sup>1</sup>

#### Acknowledgements:

I thank the following individuals for their expertise and assistance in reviewing and revising the manuscript scientifically and technically: Dr Cameron Meyer, Group Clinical Officer, Intercare Group, Pretoria; Dr Carl de Villiers, Clinical Advisory Committee and General Dentist, Intercare Medical and Dental Centre, Glen Marais; Dr Linton Brown, Clinical Advisory Committee and General Dentist Intercare Parow Medical and Dental Centre, Parow; Dr Harry Vermeulen, Clinical Advisory Committee and General Dentist, Intercare Wilgeheuwel Medical and Dental Centre Wilgeheuwel.

#### **Executive summary**

#### Rational

• Antibiotic stewardship efforts in dental practice are an opportunity to improve antibiotic prescribing practices and to curb antibiotic resistance.

#### Key Points

- Antibiotic prophylaxis is used routinely in high-risk groups of patients to reduce bacteraemia and the risk of developing infective endocarditis.
- Endocarditis prophylaxis is required in all dental procedures that involve manipulation of gingival tissue, the periapical region of teeth, or perforation of the oral mucosa
- In general, for patients with prosthetic joint implants, prophylactic antibiotics are NOT recommended prior to dental procedures to prevent prosthetic joint infection. In cases where antibiotics are deemed necessary, it is appropriate that the orthopaedic surgeon recommend the antibiotic regimen and when reasonable write the prescription.
- A single dose 2gm of amoxicillin given orally 1 hour preoperatively is effective and efficacious and significantly reduce failures of dental implants placed in ordinary conditions.
- There is no conclusive evidence to suggest the routine use of antibiotic as prophylaxis for third molar extraction surgery in healthy young adults.
- The primary care for odontogenic infections is by local intervention through drainage and or removal of the cause of infection by means of endodontic or surgical therapy.
- In patients with clearly established oral and dental infections, antibiotic therapy should be reserved for those patients who have regional or systemic body manifestations.
- Patients with infection spreading to the eye (orbital cellulitis) or throat (Ludwig's angina) or presenting with life threatening symptoms should be referred to an Oral Maxillo-

<sup>1</sup> Dr Johan Hartshorne B.Sc, B.Ch.D., M.Ch.D., M.P.A., PhD. (Stell), FFPH. RCP. (UK) Intercare Dental Clinical Advisory Committee and General Dentist Intercare Tyger Valley Medical and Dental Centre, 43 Old Oak Rd., Tyger Valley, Bellville Email: johan.laptop@intercare.co.za Mobile No: 082 5512 993 Facial Surgeon for immediate intravenous antibiotics and appropriate surgical intervention.

- Prescribe narrow-spectrum antibiotics for the shortest duration possible until the clinical cure of the patient is obtained. This will also minimize disturbance of the normal gut flora.
- Amoxicillin is the preferred first line antibiotic because it is more effective against various Gram-negative anaerobes and has a lower incidence of gastro-intestinal adverse effects.
- A review point two to three days after drainage of an acute dental infection is a key element of the guidance. Those patients whose infections have resolved, and body temperature returned to normal, should be instructed to stop taking the antibiotics.
- Antibiotics may be used in conjunction with, but not as an alternative to other appropriate interventions, such as endodontic therapy, periodontal debridement, or surgical extraction of a tooth.
- Dentists should curb the use of Clindamycin due to high frequency of side effects, and specifically because it increases the risk of *Clostridiosis* (formerly *Clostridum*) *difficile* pseudomembranous colitis 4 x
- Any antibiotic prescribing recommendations should be integrated with the practitioner's professional judgement in consultation with the patients' physician, and the patient's needs and preferences.
- The benefits of giving an antibiotic should always outweigh the risks of antibiotic-related allergy, toxicity, super infection and the development of drug-resistant strains.

#### Practical implications

- Local intervention (endodontic therapy, periodontal debridement, extraction and surgical drainage) are always first line primary care, with antibiotics serving as adjunctive therapy in indicated cases.
- First line antibiotics used in dentistry are penicillin's, amoxicillin, clindamycin and azithromycin. The use of Clindamycin should be reviewed and used with caution.
- Topical or local administration of 10% Doxycycline as an adjunctive to deep scaling and root planning (SRP) for treatment of periodontitis, can reduce or avoid the need for systemic therapy and subsequent gut microbiome exposure.
- Amoxicillin is the most commonly recommended antibiotic for children, with metronidazole or azithromycin being the alternative antibiotic in penicillin-sensitive patients.
- Safety and product cost should always be taken in consideration when selecting an appropriate antibiotic.

#### Introduction

Avoiding unnecessarily and inappropriate prescribing of antibiotics is the key to reducing the number of adverse drug reactions and curbing antibiotic resistance.

Various international (World Health Organization), Governmental Organizations (Centers for Disease Control and Health Prevention, USA, Department of Health and Human Services, USA, National Health Service, UK, British National Formulary, UK), Health Related Associations (American Heart Association, American Dental Association, Faculty of General Dental Practitioners, UK), Research Organizations (Cochrane Database) and Independent research collaborative efforts, publish and regularly update evidence-based clinical guidelines, recommendations and systematic reviews and meta-analysis for prescribing antibiotics. These clinical recommendations and guidelines are a key element of antibiotic stewardship and therefore fundamental for appropriate antibiotics prescribing in the dental setting.

### Infective endocarditis prophylaxis recommendations<sup>1</sup> Indications

Antibiotic prophylaxis is used routinely in high-risk groups of patients to reduce bacteraemia, and the risk of developing infective endocarditis.<sup>2</sup> Patients at increased risk of developing infective carditis (IE) are:

- Prosthetic cardiac valves, including trans catheterimplanted prostheses and homographs
- Prosthetic material used for cardiac valve repair, such as annuloplasty rings and cords
- Previous IE
- Unrepaired cyanotic congenital heart disease or repaired congenital heart disease, with residual shunts or valvular regurgitation at the site of or adjacent to the site of a prosthetic patch or prosthetic device.
- Cardiac transplant with valve regurgitation due to structurally abnormal valve.

Endocarditis prophylaxis is required in all dental procedures that involve manipulation of gingival tissue, the periapical region of teeth, or perforation of the oral mucosa, including prophylactic cleaning, dental extractions, periodontal procedures, endodontic instrumentation, placement of orthodontic bands, placement of implants or any oral surgical procedure.

#### • Antibiotic regimen

The AHA guidelines state that an antibiotic for prophylaxis should be administered in a single dose 1 hour before the procedure  $^{3,4}$  (Table 3)

#### Table 3: Prophylactic regimen to prevent infective endocarditis 1

	Regimen: Single dose 30-60 minutes before procedure			
Situation	Antibiotic	Adults	Children	
Oral	Amoxicillin	2g	50mg/kg	
Unable to take oral medication	Ampicillin OR Cefazolin or Cefttriaxone	2g IM or IV	50mg/kg IM or IV 50mg IM or IV	
Allergic to penicillin or ampicillin – oral	Cephalexin OR Clindamycin OR Azithromycin or clarithromycin	2g 600mg 500mg	50mg/kg 20mg/kg 15mg/kg	
Allergic to penicillin or ampicillin and unable to take oral medication	Cefazolin or Ceftriaxone OR Clindamycin	1 g IM or IV 600mg IM or IV	50mg/kg IM or IV 20mg/kg IM or IV	

However, in the event that the dosage of antibiotic is inadvertently not administered before the procedure, it may be administered up to two hours after the procedure.

For patients already receiving an antibiotic that is also recommended for IE prophylaxis, then a drug should be selected from a different class; for example, a patient already taking oral penicillin for other purposes may likely have in their oral cavity *Streptococcus viridans* that are relatively resistant to beta-lactams. In these situations, clindamycin, azithromycin or clarithromycin would be recommended for antibiotic prophylaxis.<sup>3,4</sup> Alternatively if possible, treatment should be delayed until at least 10 days after completion of the antibiotic to allow reestablishment of usual oral flora.

A recent systematic review 2 made the following recommendations based of the available evidence-based-literature:

Antibiotic prophylaxis should be limited to patients at high risk of developing infective endocarditis, according to the recommendations and protocol of the American Heart Association as summarized above.

- Oral amoxicillin is still the antibiotic of choice to reduce bacteraemia.
- IV amoxicillin-clavulanic acid could be used for patients at high risk of developing IE who require invasive dental procedures and are treated under general anaesthesia.
- In patients with penicillin allergies, oral azithromycin showed higher efficacy for the reduction of bacteraemia.
- The use of clindamycin should be reviewed.

## • Prophylactic antibiotics prior to dental procedures in patients with prosthetic joints

Based on the updated systematic review and the 2015 ADA clinical practice guidelines state: "In general for patients with prosthetic joint implants, prophylactic antibiotics are NOT recommended prior to dental procedures to prevent prosthetic joint infection" <sup>5</sup>

However, a commentary published in February 2017 issue of JADA written by American Dental Association appointed experts, calls for appropriate decision-making criteria and to encourage dentists to continue using the 2015 guidelines.<sup>6</sup> It is recommended that dentists, patients and orthopedic surgeons should discuss and weigh the potential risks and benefits before making a decision. It is also recommended that the dentists consult the appropriate use criteria as needed and respect the patients' specific needs and preferences when considering antibiotic prophylaxis before dental treatment.<sup>5</sup>

In cases where antibiotics are deemed necessary, it is most appropriate that the orthopaedic surgeon recommend the appropriate antibiotic regimen and when reasonable write the prescription.<sup>7</sup>

#### Prophylaxis for preventing implant failures

The use of antibiotics in implant dentistry is controversial. The evidence-based data suggests that a single dose 2gm of amoxicillin given orally 1 hour preoperatively is effective and efficacious and significantly reduce failures of dental


## **GUM Access Floss**

### Specially designed to floss under and around crowns, bridges, braces and wide interdental spaces

- + Built-in threader allows for easy insert into narrow spaces and hard-to-reach areas
- + Floss adapts to different sizes of patients' interdental spaces for more tooth surface contact
- + Easy and effective plaque and debris removal without irritating the gums

@ivodentSA(f)@(in)

### PERIO • ORTHO

### Specialist oral care solutions for every step

**HEALTHY GUMS. HEALTHY LIFE.®** 

0860 456 123

implants placed in ordinary conditions.<sup>8,9,10</sup> It is still unknown whether postoperative antibiotics are beneficial, and which is the most effective antibiotic.

## • Prophylaxis for preventing infection in third molar extractions

There is evidence that prophylactic antibiotics reduce the risk of infection, dry socket and pain following third molar extractions and result in mild and transient adverse effects. It is unclear whether the evidence is generalizable to individuals with concomitant illnesses or immunedeficiencies, or those undergoing the extraction of teeth due to severe caries or periodontitis.<sup>11</sup>) In a recent systematic review and meta-analysis it was concluded that there is little conclusive evidence to suggest the routine use of antibiotic as prophylaxis for third molar extraction surgery in healthy young adults.<sup>12</sup>

### • Oral and Dento-Facial infections

As a general guideline antibiotic therapy should be reserved for those patients with clearly established infections who have regional or systemic body manifestations e.g., presence of pronounced oedema (cellulitis), limited mouth opening (trismus), increased heart rate (tachycardia), difficulty swallowing (dysphagia), general malaise, fever and should be used as an aid to fight infection.<sup>13</sup> Such patients should be treated surgically as early as possible. Adjunctive treatment should include endodontic therapy, or extraction of the causative tooth and surgical drainage of any areas of pus accumulation.

#### • Life threatening sepsis:

Patients with infection spreading to the eye (orbital cellulitis), or throat (Ludwig's angina), or presenting with symptoms indicating a life threatening sepsis such as an altered mental state, decreasing respiration rate, oxygen saturation below 92%, and increased heart rate >130bpm, systolic BP <90mmHg, should be referred to an Oral Maxillo-Facial Surgeon for immediate treatment with intravenous antibiotics and appropriate surgical intervention.<sup>14</sup>

• Abscess: acute dentoalveolar cellulitis and abscess usually require antibiotic therapy. Chronic dental abscesses need no antibiotic therapy.

### • Pericoronitis:

The bacteria responsible for pericoronitis are all Gramnegative anaerobic bacteria. Debridement by irrigation and possible extraction of the offending tooth usually are sufficient without requirement for antibiotic therapy.<sup>15</sup> However if the patient presents with temperature elevation and trismus preventing adequate surgical therapy, then the use of antibiotics may be necessary for several days before surgery can be performed. Penicillin is the drug of choice.<sup>15</sup>

### • Osteomyelitis:

Osteomyelitis usually requires surgical and antibiotic therapy for successful treatment. Special care must be taken to identify the causative organisms using anaerobic and aerobic culture of tissue removed at surgery for appropriate antibiotic therapy. Osteomyelitis must be treated with antibiotics for much longer period than soft tissue infections.<sup>15</sup>

### • Management of maxillo-facial fractures:

Administration of antibiotics should begin as early as possible after diagnosis to diminish the chance of clinical infection.

Dento-facial infections can be treated with less extensive and aggressive surgical and antibiotic therapy, reduced hospitalization costs and fewer complications if approached earlier when diagnosed during premature clinical manifestations.<sup>16</sup>

### Odontogenic infections

Current clinical guidelines for the rational use of antibiotics in the United Kingdom on treating acute dental infections is provided by the Faculty of General Dental Practice (FGDP)17, British National Formulary<sup>18</sup>, and Scottish Dental Clinical Effectiveness Programme.<sup>19</sup>

The primary care for odontogenic infections is by local intervention through drainage and or removal of the cause of infection by means of endodontic or surgical therapy. It is suggested that the correct diagnosis and local intervention should be given the greatest attention by the dentist, whilst the choice of antibiotic playing a secondary role, provided that the antibiotic used fits in with the spectrum that has been proved effective in the treatment of odontogenic infections.<sup>13</sup> The safety and cost of antibiotic should be taken into account.

Management of odontogenic infections includes diagnosis of causative organisms, clinical management including appropriate antibiotic selection, and referral to a specialist where indicated.<sup>20,21,22</sup>

• Endodontic (pulpal-and periapical-related) infections Studies have shown that adjunctive antibiotics are not effective in preventing or ameliorating signs and symptoms in cases of irreversible pulpitis, symptomatic apical periodontitis, or localized acute apical abscess, when adequate local debridement, medication and incision for drainage, if indicated, have been achieved.<sup>23-28</sup>

A clinical practice guideline just released by an expert panel of the American Dental Association made the following recommendations on antibiotic use for the urgent management of pulpal- and periapical-related conditions in immunocompetent adult patients.<sup>29</sup>

- Antibiotics should not be prescribed for immunocompetent adult patients with pulpal-or periapical-related conditions where definitive conservative dental treatment is available, including pulpotomy, pulpectomy, or incision drainage of an abscess.
- Prescribing antibiotics in immunocompetent adults are not recommended owing to potentially negligible benefits and likely large harms associated with their use.
- Antibiotics should be prescribed for immunocompetent adult patients with pulp necrosis and localized acute apical abscess, in settings where no definitive conservative dental treatment is available.
- It is suggested good practice to prescribe oral amoxicillin (500mg, 3 times per d, 3-7d) or oral penicillin V potassium (500mg, 4 times per d, 3-7d) for immunocompetent adults with pulp necrosis and acute apical abscess with systemic

involvement.

Antibiotics should only be used as adjuvant therapies in cases with evidence of systemic involvement.<sup>29</sup> In addition patients who are immune-compromised or having predisposing conditions such as previous endocarditis should receive prophylactic antibiotics. When using adjunctive antibiotics in addition to adequate debridement and surgical drainage, such as in cases with spreading infections, the practitioner should use the shortest effective course of antibiotics, minimize the use of broad spectrum antibiotics and monitor the patient closely.<sup>30</sup> Penicillin VK and amoxicillin are the first line of antibiotics used for urgent management of pulpal- and periapical- related pain and intra-oral swelling.<sup>30</sup> However, amoxicillin is the preferred antibiotic because it is more effective against various Gram-negative anaerobes and has a lower incidence of gastrointestinal adverse effects.<sup>29</sup>

As an alternative for patients with a history of penicillin allergy, but without a history of anaphylaxis, angioedema, or hives with penicillin, ampicillin or amoxicillin, oral cephalexin (500mg, 4 times per d, 3-7 d) is recommended.

As an alternative for patients with a history of penicillin allergy, and a history of anaphylaxis, angioedema, or hives with penicillin, ampicillin or amoxicillin, oral azithromycin (loading dose of 500mg on day 1, followed by 250mg for

Infection	Recommended antibiotic regimen	Infection	Recommended antibiotic regimen for penicillin-allergic patient
Cellulitis, Necrotizing ulcerative gingivitis or pericoronitis	Amoxicillin (2-3 days, max 5 days) Children >3 mths and <40kg: 20-40mgs/kg/ day in divided doses 8 hourly Children >40 kg 250- 500mg 8 hourly 0r 500- 875mg 12 hourly	Cellulitis Necrotizing ulcerative gingivitis pericorinitis	Metronidazole (3 days): Children: 30mg/kg/day in divided doses 6 hourly (max 4gm/24 hr) Adolescents: 7.5mg/kg/ 6 hourly (max 4g/24hrs OR Azithromycin (3 days): Children < 6mths – 16 yrs: 5-12mg/kg/daily for 3 days (max 500mg/day OR Clarithromycin (7 days) 7.5mg/kg 12 hourly 13-18yrs: 250mg 12 hourly
Aggressive periodontitis	Amoxicillin 50mg/kg/ day AND Metronidazole 30mg/kg/day 8 hourly for 7 days	Aggressive periodontitis	Azithromycin (3 days) 10mg/kg daily OR Metronidazole 30mg/kg/day 8 hourly for 7 days

### Table 4: Recommended antibiotic regimens for orofacial infections in children 34,35

(Adapted from: Geller, Lovegrove, Shehab et al, 2018)<sup>49</sup>

### HARTSHORNE

an additional 4 days, or oral clindamycin (300mg 4 times per d , 3-7 d). Bacterial resistance rates for azithromycin are higher than for other antibiotics and clindamycin substantially increases the risk of developing Clostridiosis difficile infection after a single dose.<sup>29, 30</sup>

The recommended dose regimen for amoxicillin is 500mg tds, with or without a loading dose of 1000mg.

#### • Periodontal infections

Antibiotics are not needed for most cases of periodontal infections. Non-surgical mechanical debridement by deep scaling and root planning (SRP) resolves a considerable amount of infection on its own. Antibiotics adjunctive to SRP should be assessed on an individual risk basis against the necessity for further therapy.<sup>32</sup> Specific indications for prescribing antibiotics as an adjunct to mechanical debridement are multiple deep pockets, especially in the molar area, severe periodontitis with a rapid rate of progression and ANUG.<sup>32</sup> So far, no antibiotic or combination of antibiotics, has shown clinical or microbiological superiority to amoxicillin 500mg tds and metronidazole 400mg tds in any appropriately conducted randomized clinical trial.<sup>32</sup> Poor quality mechanical

debridement and poor oral hygiene is a contraindication for prescribing antibiotics.<sup>32</sup> Administration of antibiotics has been identified as a risk for the development of periodontal abscesses if subgingival debridement in the apical portion of a lesion is incomplete.<sup>33</sup> It is also suggested that the use of topical or local administration of antibiotics (e.g., 10% Doxycycline) can reduce or avoid the need for systemic therapy and subsequent gut microbiome exposure.<sup>34</sup>

### • Pediatrics - Treatment of acute dental infections

A systematic review of the literature revealed that the main indication for use of antibiotics in children were for cellulitis, aggressive periodontitis, ulcerative gingivitis and pericoronitis. Amoxicillin was found to be the most commonly recommended antibiotic for short durations of 3-5 days, with metronidazole or azithromycin being the alternative antibiotic in penicillin-sensitive patients.<sup>35</sup>

Children should be followed up for a few days to evaluate response to treatment, and the development of unwanted side effects.<sup>35</sup>

The recommended antibiotic prescribing clinical guidelines by the Faculty of General Dental Practitioners  $(UK)^{17}$  for acute dental infections in children are as follows:

Amoxicillin dosing		
1mth-1yr	125mg every 8 hrs, increased if necessary up to 30mg/kg every 8 hrs	
1-5 yrs	250 mg every 8 hrs, increased if necessary up to 30mg/kg every 8 hrs	
5-12 yrs	500 mg every 8 hrs (max 1gm every 8 hrs)	
12-18 yrs	500 mg every 8 hrs, in sever infections 1 gm every 8 hrs	
Metronidazole dosing		
1 - 3 yrs	100mg tds for up to 5 days- review after 2-3 days and discontinue if resolved	
3-7 yrs	200mg bd for up to 5 days- review after 2-3 days and discontinue if resolved	
7-10 yrs	200mg tds for up to 5 days - review after 2-3 days and discontinue if resolved	

Table 5: Alternative recommended antibiotic prescribing clinical guidelines for children<sup>17</sup>

A review point two to three days after drainage of an acute dental infection is a key element of the guidance. Those patients whose infections have resolved, and body temperature returned to normal, should be instructed to stop taking the antibiotics.<sup>37</sup>

stewardship, embrace the following principles<sup>17,38</sup>:

- Avoid prescribing antibiotics for conditions where antibiotics are not indicated.
- Reduce macrolides.
- Increase first-line guideline concordant.
- Review after 2-3 days and discontinue if infection has resolved.

Fundamental clinical guidelines for pediatric antibiotic



Email: sales@kzndental.co.za | www.kzndental.co.za | Tel: 031 312 8234 / 309 8234 | T&C's APPLY. E&OE EXEMP

### Ethical considerations and medical risk

Patients have the right to expect that clinicians will examine them thoroughly, diagnose their needs correctly, provide a clear treatment plan and treat them accordingly. Dentists must be prepared to decline requests for a particular treatment if they judge it would not benefit the patient's health, such as when a patient requests antibiotics without any real indication for a prescription.<sup>39</sup> The dentist has an obligation to explain the consequences and/or risks of not continuing the treatment and ensure the patient knows that they are responsible for any future problems which arise as a result of not following or completing the treatment.

The practitioner should in consultation with the patient consider if there are possible clinical circumstances that may suggest the presence of a significant medical risk in providing dental care without antibiotic prescribing. Any antibiotic prescribing recommendations should be integrated with the practitioner's professional judgement in consultation with the patients' physician, and the patient's needs and preferences. All communications between the dentist and the patient in this regard must be recorded in the patients' notes.

Due to the increasing prevalence of bacteria, which are resistant to treatment by currently available antibiotics, clinicians should consider carefully treating all patients' with antibiotics. This is likely to do more harm than good.<sup>11</sup> Ultimately dentists must weigh the benefits and risks of antibiotics and make and informed decision with their patients on the appropriateness of using antibiotics. The benefits of giving antibiotics should always outweigh the risks of antibiotic-related allergy, toxicity, super infection and the development of drug-resistant strains.<sup>15</sup>

It is the duty of every dentist to arrive at a correct diagnosis in order to avoid inappropriate use of antibiotics. When selecting an antibiotic that fits in with the action spectrum that has been proved effective for treatment, safety of antibiotic use and product cost should always be taken in consideration.<sup>13</sup>

### Conclusion

Primary indications for using antibiotics to prevent and fight bacterial infections in the dental setting are: prophylaxis to prevent infective endocarditis, when there is systemic body response to infection, and in patients that are immunesupressed or immune-compromised. Antibiotic prescribing in the dental setting should always be based on the narrowest spectrum antibiotic for the shortest duration possible. In addition, effective plaque control must also be prioritised. As a society we need to recognize that antibiotics are fundamental to how we practice modern dentistry, and therefore use and value antibiotics prudently and cautiously. It is essential to understand that antibiotic therapy will fail if the source of infection is not removed. Primary dental care, including periodontal debridement, endodontic therapy, extractions, drainage and/or surgical intervention should always be the first line of care, with antibiotics serving as adjunctive therapy in indicated cases. Antibiotics are not a replacement for surgical drainage or debridement.

Any antibiotic prescribing should be based on the practitioner's professional judgement, in consultation with the patients' physician, and the patient's needs and preferences. The benefits of giving antibiotics should always outweigh the risks of antibiotic-related allergy, toxicity, super infection and the development of drug-resistant strains.

#### References

1. Nishimura RA, Otto CM, Bonow CO, et al. American Heart Association and The American College of Cardiology Focussed Update of the 2014 AHA/ACC Guideline for the management of patients with valvular heart disease: A Report of the American College of Cardiology / American Heart Association Task Force on Clinical Practice Guidelines. Circulation 2017; 135: e1159-e1195.

2. Lafaurie GI, Noriega L, Torres CC, et al. Systematic Review: Impact of antibiotic prophylaxis on the incidence, nature, magnitude, and duration of bacteremia associated with dental procedures. JADA. 10 September 2019. Article in Press.

3. Wilson W, Taubert KA, Gewitz M. Prevention of infective endocarditis: Guidelines from the American Heart Association – A guideline from the American Heart Association Rheumatic Fever, Endocarditis and Kawasaki Disease Committee, Council on cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and anaesthesia. Circulation 2007; 116(15): 1736-1754.

4. Wilson W, Taubert KA, Gewitz M et al. Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anaesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. J Amer Dent Assoc 2008; 13 Suppl: 3S-24S.

5. Sollecito TB, Abt E, Lockhart PB, et al. The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints: Evidence –based clinical guidelines for dental practitioners – A report of the American Dental Association Council on Scientific Affairs. J Amer Dent Assoc 2015; 146(1): 11-16.

6. American Dental Association. ADA appointed members of the Expert Writing and Voting Panels contributing to the development of the American Academy of Orthopaedic Surgeon appropriate to use criteria. American Dental Association guidance for utilizing appropriate use criteria in the management and care of patients with orthopaedic implants undergoing dental procedures. J Amer Dent Assoc 2017;

#### 148(20): 57-59.

7. Quinn RH, Murray JN, Pezold R, Sevarino KS. The American Academy of Orthopaedic Surgeons appropriate use criteria for the management of patients with orthopaedic implants undergoing dental procedures. J Bone Joint Surg 2017; 99(2): 161-163.

8. Esposito M, Worthington HV, Loli V et al. Interventions for replacing missing teeth: antibiotics at dental implant placement to prevent complications. Cochrane Database Syst Rev 2010; 7: CD004152. https://doi.10.1002/14651858.CD004152.pub3

9. Esposito M, Grusovin MG, Worthington HV. Interventions for replacing missing teeth: antibiotics at dental implant placement to prevent complications. Cochrane Database Syst Rev 2013; 7: CD004152. https://doi:10.1002/14651858.CD004152.pub34

 Sánchez FR, Andrés CR, Arteagoita I. Which antibiotic regimen prevents implant failures or infection after dental implant surgery: A systematic review and meta-analysis. J Cranio Maxillofac Surg 2018; 46(4): 722-738.

11. Lodi G, Figini L, Sardella, et al. Antibiotics to prevent complications following tooth extractions. Cochrane database Syt Rev 2012; 11: CD003811. https://doi:10.1002/14651858. CD003811.pub2

12. Gill AM, Morrissey H, Rahman A. A systematic review and meta-analysis evaluating antibiotic prophylaxis in dental implants and extraction procedures. Medicina 2018; 54(6): pii:E95. https://doi:10.3390/medicina54060095

13. Martins JR, Chagas OL. Velasques BD, et al. The use of antibiotics in odontogenic infections: What is the best choice? A systematic review. J Oral Maxillofac Surg 2017; 72(12): 2606e1-2608e11.

14. Bowe CM, O'Neill MA, O'Connel JE, Kearns GJ. The surgical management of severe dentofacial infections (DFI\_- A prospective study. Irish J Med Sci 2019; 188(1): 327-331.

15. Shivanand S, Doddawad VG, Vidya CS, et al. The current concepts in the use of antibiotics in dental Practice. Int J App Eng Res 2018; 13(5): 2959-2964.

16. Tormes AKK, De Bortoli MM, Júnior RM, Andrades ESS. Management of a severe cervicofacial odontogenic infection. J Contemp Dent Practice 2018; 19(3): 352-355.

17. Faculty of General Dental Practitioners (UK). Antimicrobial prescribing for general dental practitioners, 2nd ed. June 2016. Faculty of General Dental Practice, London. Available at: www.fgdp. org.uk/osi/open-standards-initiative.ashx

18. Joint Formulary Committee, British National Formulary. BMJ Group and Pharmaceutical Press, London 2015. Available at: www. medicinescomplete.com

 Scottish Dental Clinical Effectiveness programme. Management of acute dental problems – Guidance for Healthcare professionals.
 Available at:

www.sdcep.org.uk/published-guidance/management-o-acutedental-problems-madp

20. Gregoire C. How are odontogenic infections best managed? J Can Dent Assoc 2010; 76(2): 114-117.

21. Flynn TR, Halpern LR. Antibiotic selection in head and neck infection. Oral Maxillofac Surg Clin North Am 2003; 15(1): 21.

22. Flynn TR. What are the antibiotics of choice for odontogenic

infections, and how long should the treatment course last? Oral Maxillofac Surg Clin North Am 2011; 23(4): 519-536.

23. Cope A, Francis N, Wood F et al. Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults. Cochrane Database Syst Rev 2014; 6: CD010136.

24. Fouad AF, Rivera EM, Walton RE. penicillin as a supplement in resolving the localized acute apical abscess. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1996; 81: 590-595.

25. Henry M, Reader A, Beck M. Effect of penicillin on postoperative endodontic pain and swelling in symptomatic teeth. J Endod 2001; 27: 117-123.

26. Matthews DC, Sutherland S, Basrani B. Emergency management of acute apical abscess in the permanent dentition: a systematic review of the literature. J Can Dent Assoc 2003; 69: 660.

27. Nagel D, Reader A, Beck M, Weaver J. Effect of systemic penicillin on pain in untreated irreversible pulpitis. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2000; 90: 636-640.

28. Pickenpaugh L, Reader A, Beck M et al. Effect of prophylactic amoxicillin on endodontic flare-up in asymptomatic, necrotic teeth J Endod 2001; 27: 53-56.

29. Lockhart PB, Tampi MP, Abt E, et al. Evidence-based clinical guideline on antibiotic use for the urgent management of pulpal-and periapical-related dental pain and intra-oral swelling. A report from the American Dental Association. JADA 2019; 150(11): 906-921.e12

30. American Association of Endodontists. AEE guidance on the use of systemic antibiotics in endodontics. AAE Position Statement. 2017

31. Leffler DA, Lamont JT. Clostridium difficile infection. N Eng J Med 2015; 372: 1539-1548.

32. Mombelli A. Should antibiotics be rationed in periodontics – if Yes, how?

Curr Oral Health Rep 2019. https://doi:10.1007/s40496-019-00225-6

33. Topoll HH, Lange DE, Müller RF. Multiple periodontal abscesses after systemic antibiotic therapy. J Clin Periodontol 1990; 17: 268-272.

34. Shahi F, Redeker K, Chong J. Rethinking antimicrobial stewardship paradigms in the context of the gut microbiome. JAC Antimicrob Resist 2019; https://doi:10.1093/jacamt/dlz015

35. Dar-Odeh N, Fadel HT, Abu-Hammad S, et al. Antibiotic prescribing for orofacial infections in the paediatric outpatient: A Review. Antibiotics 2018; 7: 38. https://doi:3390/antibiotics7020038

36. Peedikayil FC. Antibiotics in odontogenic infections – An update. J Antimicrobial Agents 2016; 2(2): 117. https://doi:10.4172/2472-1212.1000117

37. Thompson W, Rios LE, Fedorowicz Z, et al. I've got toothache, I need antibiotics: A UK perspective on rational antibiotic prescribing by dentists. Braz Dent J 2018; 29(4): 395-399.

38. Poole NM, Shapiro DJ, Fleming-Dutra KE, et al. Antibiotic prescribing for children in United states Emergency Departments: 2009-2014. Pediatrics 2019; 143(2): https://doi:10.1542/peds.2018-1056.

39. General Medical Council. Consent: patients and doctors making decisions together. 2008. General Medical Council. Available at: https://www.gmc-uk.org/guidance/ethical\_guidance/consent\_ guidance\_index.asp.

### CPD QUESTIONNAIRE 9.6.1

### Article: Class II Division 2 deep bite treatment using a combination of fixed orthodontic appliances and an acrylic splint. Julyan, Coetsee, page 6

- 1. Some of the common characteristics associated with Class II Division 2 malocclusion include:
- a Class II molar relationship and an increased overbite
- Retroclined mandibular incisors h
- Retroclination of two or more of the maxillary incisors С
- All of the above Ч
- None of the above е
- 2. Class II Division 2 malocclusion treatment in an adolescent patient can often lead to an excellent result if growth, compliance and treatment mechanics are favourable
- а True b False
- 3. The treatment objectives in the case included
- Improving the deep bite α
- Well aligned maxillary and mandibular arches b
- Achieve a Class I molar and canine relationship С
- All of the above d
- None of the above е
- A high lower lip line, with its associated resting pressure on the 4 maxillary incisors, results in a proclination of the maxillary incisors True b False a
- According to the authors, the minimum amount of years 5. recommended to follow up treated Class II Division 2 cases is?
- 2 years a
- b 3 years
- 4 years С
- d 5 years
- 6 years e

#### Article: Antibiotic stewardship in dentistry - review of evidencebased clinical recommendations on appropriateantibiotic prescribing in dental practice. Part 1. Hartshorne, page 24

- 6. The antibiotic resistance crisis is due to the following reasons
- Increasing development of new antibiotics α
- Inappropriate prescribing of antibiotics h
- Bacterial genetic mutation and adaptation С
- All of the above e None of the above d
- 7. Which of the following pre-treatment principles and practices for optimal antibiotic prescribing is TRUE
- a Oral bacterial infections should be diagnosed correctly
- Prescribing antibiotics should be considered first to eliminate infection h before considering therapeutic management interventions
- Antibiotics should only be prescribed when systemic manifestations are present
- d a and c e All of the above
- Which of the following prescribing principles and practices for optimal 8. antibiotic prescribing is TRUE?
- a Longer antibiotic treatment duration increases risk of emergence of antibiotic resistance.
- Antibiotics should be used for the shortest duration possible b
- Local oral bacterial infection is best managed through prescribing С antibiotics
- Ч All of the above e None of the above
- Amoxicillin is more likely to cause an adverse drug reaction than amoxicillin + clavulinic acid combination (True or FALSE?)
- a True b False
- 10. Which of the following classes of antibiotics presents with the greatest likelihood to cause a fatal adverse drug reaction?
- Penicillin a Cephalosporins

С

b Lincosamides d Imidazoles



Call: 012 342 8551





- Infection Control Specialist
- Dental Assistant Training
- Specialised Consulting
- Marketing and Practice Management

Melanie Savvides has worked in the Dental Industry for the last 32 years and was the MD of one of the largest Dental supply companies in South Africa. She has travelled around the world through dentistry, attending numerous courses, workshops and events.

Melanie is passionate about Dentistry in South Africa and would like to share her experience with you.



### Article: The cortical window. Mohamed, Nahmias and Serota, page 42

- 11. Which statement is correct. The superior magnification and illumination of surgical operating microscopes:
- a Ensures a lesser degree of root reduction
- b Diminishes the size of osteotomies
- c Improves the identification of root peripheries
- d All of the above
- e None of the above
- 12. Which study reported that smaller resection angles (perpendicular to the long axis of the root) reduce the number of tubuli exposed. Lateral canals, canal deltas, isthmus connections and micro-cracks can be identified prior to root resection, retropreparation and retro-sealing
- a Garcia-Guerrero et al, 2017; De Chevigny C et al, 2008
- b Tsesis et al, 2013
- c Wang et al, 2004
- d Weller et al, 1995)
- 13. Complications following traditional osteotomies using large, round burs to remove significant cortical bone include:
- a Increased post-operative pain
- b Delayed healing.
- c Neither of the above
- d Both of the above
- 14. In the case described, the patient presented to our surgery with a history of 'sporadic discomfort in the gum' overlying which tooth:
- a LR1
- b LR2
- c LR3

15. After the initial treeatment, the patient was reassessed at:

THE ART OF Dentistry

- a After 9 and 12 months
- b After 9 and 12 weeks
- c After 6 and 18 weeks
- d. After 6 and 18 months

#### Article: Antibiotic stewardship in dentistry – review of evidencebased clinical recommendations on appropriate antibiotic prescribing in dental practice - Part 2. Hartshorne, page 66

- 16. Which of the following statements are TRUE (More than one answer may be correct, select one):
- a Treating all oral infections with antibiotics is likely to do more harm than good.
- b The benefits of giving antibiotics should always outweigh the risks of adverse reactions and development of bacterial resistance.
- c It is the duty of every dentist to arrive at a correct diagnosis in order to avoid inappropriate use of antibiotics
- d It is unethical to decline a patients' request for a particular antibiotic treatment without any real indication.
- 17. If there are possible clinical circumstances that may suggest a significant medical risk in providing dental care without antibiotic prescribing the following considerations should be taken into account
- a The practitioner's professional judgement
- b Consultation with the patients' physician
- c The patients' needs and preferences d Product safety and cost e All of the above
- 18. Antibiotic prophylaxis is recommended routinely in high-risk groups of patients to reduce bacteraemia, and the risk of developing infecting endocarditis when conducting the following procedures (More than one answer may be correct, select one):
  a Extractions b Prophylactic cleaning
- c Restoration of a tooth
- d Placement of implants
- e Placement of orthodontic brackets
- Antibiotics should not be prescribed for immune-competent adult patients with pulpal- or peri-apical-related conditions where definitive conservative dental treatment is available.
   a True b False
- 20. Which of the following statements are TRUE regarding use of antibiotics in children? (More than one answer may be correct, select one):
- a Children presenting with aggressive periodontitis or ulcerative gingivitis should receive antibiotics.
- b Amoxicillin is the most commonly recommended antibiotic.
- c Tetracycline is the most commonly prescribed alternative antibiotic for penicillin-sensitive patients.
- d Antibiotics should be prescribed for short durations (3-5 days).

Stunning Venue Exclusive International Specials Speakers



### DENTAL CONGRESS

Programmes for: Dentists, Oral Hygienists, Dental Technicians

### SAVE THE DATE 30 MAY 2020

The Forum Company, The Campus, Wanderers Building, 57 Sloane Street, Bryanston, Johannesburg

## **Tips & Tricks to Apply In Your Practice Monday Morning**





# Shanghai China

NATIONAL EXHIBITION AND CONVENTION CENTER

1-4 September 2020

ABSTRACT SUBMISSION DEADLINE

25 March 2020

EARLY-BIRD REGISTRATION DEADLINE

31 May 2020

www.world-dental-congress.org

**f** FDIWorldDentalCongress





## IDEM Singapore features conference programme on the cutting edge of dentistry

- Emerging and under-represented topics such as AI in Dentistry and Special Needs Dentistry to take spotlight alongside staple topics
- Over 9,000 visitors and 500 exhibitors expected to attend

Reputedly Asia Pacific's leading dental exhibition and conference, IDEM, the International Dental Exhibition and Meeting, will take place at Suntec Singapore Convention and Exhibition Centre from 24-26 April 2020. IDEM is co-organised by Koelnmesse and the Singapore Dental Association.

"With each edition, IDEM has strengthened to become what it is today, the most established exhibition and scientific conference for dentistry in the Asia Pacific region. For this next edition, we have given great consideration as to what is important in dentistry today, so that the 2020 edition will build new experiences for dental professionals from all aspects of dentistry, to add value in their day-to-day practice," said Mathias Kuepper, Managing Director at Koelnmesse Pte Ltd. IDEM 2020 includes activities new to the exhibition hall such as workshops, a dedicated area featuring free live talks, along with a revitalised space to serve food and beverages.

### **IDEM 2020 Conference**

The theme for the IDEM 2020 Conference is "Striving for Clinical Excellence". In this spirit, conference delegates will gain practical knowledge and learn new techniques that can improve the oral health and well-being of their patients.

Influential speakers include:

- Dr. Shimon Friedman, Professor at the Faculty of Dentistry, University of Toronto, Canada
- Prof. Mark Wolff, Morton Amsterdam Dean and Professor at the Division of Restorative Dentistry, School of Dental Medicine, University of Pennsylvania, USA
- Dr. Fadi Yassmin, Founder and Cosmetic Dentist at DFY Dental, Australia
- Dr. Roberto Turrini, Dentist and Educator, Dr. Mauro Fradeani's Specialised Dentistry Clinic, Italy

"IDEM 2020 will have something meaningful for each person in the dental profession ecosystem, as we understand that the entire dental team is instrumental when it comes to offering sound dental care to patients," said Dr Lim Lii, President of the Singapore Dental Association. "The conference programme is comprehensive, as it is attendees about new practice areas in dentistry. The Singapore Dental Association is excited that IDEM, the region's top event for dentistry, continues to be anchored in Singapore."

For the first time in Asia, a full conference day will be dedicated to discussing the treatment of patients with special needs in a Special Care Dentistry Symposium. Additionally, together with the Association of Oral Heath Therapists Singapore (AOHT), IDEM will also host the third edition of the Dental Hygienist and Therapist Forum. The forum teaches such therapists to manage matters such as dealing with dental fear and anxiety, the periodontal probe, and patient management, through behavioural and pharmacological techniques.

### **Global business opportunities**

Some 9,000 visitors and in excess of 500 exhibitors will participate at IDEM 2020 which, along with the conference, comprises an exhibition across 20,000 sqm. Presently 80% of exhibition space has been pre-sold to global pavilions, manufacturers and distributors. 15 international pavilions will be featured, including first-time participants Spain and Russia. Along with the exhibition, there are opportunities to network, participate in a buyer programme, or to use an expanded online business matching platform that systematically manages meeting schedules to build connections and unlock business opportunities between visitors, manufacturers and distributors attending IDEM 2020.

Sponsors confirmed for IDEM 2020 include Colgate, Dental Monitoring, Dentsply Sirona, EMS - Electro Medical Systems SA, GC Asia Dental, GlaxoSmithKline (GSK), Ivoclar Vivadent, and J Morita Corporation.

### EXCLUSIVE DISCOUNT FOR READERS OF INTERNATIONAL DENTISTRY - AFRICAN EDITION.

### REGISTER USING THE FOLLOWING CODE: MDM@IDEMBS6PP. TO REGISTER, VISIT: https://www.event-reg.biz/ registration/LandingIDEM

With the discount code, readers will be able to purchase IDEM2020 delegate passes at 5% off any categories (except membership categories, eg. SDA members/AOHT members). Please note that the discount code will be capped for the first 200 users and will be available for use till the end of early bird promotion period (31st January 2020)

### www.idem-singapore.com



# 24 - 26 April 2020 Suntec Singapore THE LEADING DENTAL EXHIBITION AND CONFERENCE IN ASIA PACIFIC

### **INTRODUCING THE IDEM 2020 MAIN CONFERENCE SPEAKERS**

















Mohamed Hassanien



Mitsuhiro Tsukiboshi



Roberto Turrini





### **Dental Hygienist** and Therapist Forum

.

The 2020 dental hygienist and therapist forum will focus on issues such as dealing with fear of dental visits, the periodontal probe and more.



### **Trade Exhibition**

Discover the latest products and services in the dental industry and meet over 500 exhibitors at IDEM.



### **Special Care Dentistry Symposium**

Highlighting the treatment needs of patients with special needs, this full day forum is one of the first in Asia to focus on this niche topic in dentistry.



### Hands-On Workshops

Hone your skills and learn new techniques at the limited attendance, hands-on workshops.

## **SECURE YOUR PASSES ONLINE FOR IDEM 2020**

#### Registration

Koelnmesse Pte Ltd Ms. Isabel Shankar T: +65 6500 6700 E: idem-reg@koelnmesse.com.sg +65 9622 9782

Connect with us F IDEM Singapore

in IDEM Singapore idem.sg @IDEMSingapore



Endorsed by

Supported by



Held in



Organised by

koelnmesse ur business | since 1924

### PRODUCTS AND NEWS





Tried and tested in tough, everyday practical applications. With indication-based touchscreen and one-of-a-kind range of applications.



### DENTAL REFURBISHERS

### SPECIALISTS IN PRE-OWNED EQUIPMENT JHB AGENT FOR FIRST MEDICAL & DENTAL

Dental Refurbishers specialize in preowned and refurbished dental equipment.



### Services include:

- High quality re-upholstery of dental chairs and stools
- Repairs and servicing of all dental equipment
- Manufacture and repairs of dental cabinetry and reception counters
- Tiling, painting and partitioning
- Plumbing and electrics
- Dental installation and surgery design
- We also have a wide range of preowned, refurbished equipment for sale

Tel/Fax: 011 615 1128 • Cell: 083 267 2604 dentfurb@worldonline.co.za

### Hamdan bin Rashid Al Maktoum

Deputy Ruler of Dubai, Minister of Finance and President of the Dubai Health Authority

### 24<sup>th</sup> UAE International Dental Conference & Arab Dental Exhibition



## 4-6 February

## "LEADING THE DENTAL WORLD TO NEW HORIZONS"

aeedc.com

Supported by

Car

مجلس الصحة



Strategic Partner



INDEX Holding Headquarters | Road # D-62, Opposite Nad Al Hamar | P.O. Box: 13636, Dubai, UAE Tel: +971 4 520 8888 | Fax: +971 4 338 4193 | E-mail: info@aeedc.com | Website: index.ae

### **Positions Available**

### AUSTRALIA CALLING

Dentists required to work in various states in Australia, sponsorship available with initial contracts from 12 months to 3 years.

ROC Human Resources will support you through your initial application, obtaining the visa and getting dental board registration.

Interviews will be conducted by telephone and are only available through ROC. Please forward your CV to:

lynn@rochumanresources.com Tel +971 5591 73809 or +971 4 421 5293

### DENTIST REQUIRED - MIDDELBURG

Dentist as Locum and potential associate required in Middelburg, Mpumalanga. Send CV to smileawhile880@gmail.com Contact 013 282 4651 / 084 4678 678

### **ASSOCIATE DENTIST - SANDTON**

A private well-established Dental Practice in Sandton has a permanent position available for an experienced Dentist with a view to a long-term associateship. **Please email a current CV clearly detailing all experience to carol.chapman28@yahoo.com** Kindly provide a contact number and we will call you to set up an interview.

### LOCUM AVAILABLE - JOHANNESBURG

Locum for medium to long term in the Johannesburg area (mostly North and West) from end of December onwards. Clinically experienced in Implantology, Dento-facial orthopaedics as well as sleep medicine and general dentistry. (have own Endo and implant motors)

Please call: +27 83 453 3083 or email: alexkeizan@gmail.com

**DENTIST REQUIRED - SOUTHERN SUBURBS, CAPE TOWN** 

A full time dentist required for dental practice in Bergvliet. Send CV's to: louise.vdw@braindynamics.co.za and james@bergvlietdms.com or Contact Lynn: 021 715 1148

### FULL TIME POSITION - DENTIST REQUIRED FOR BUSY DENTAL PRACTICE IN BALLITO, KZN

We are looking for an experienced Dentist to join our busy team at the coast. Crown and bridge experience essential. Orthodontic experience a bonus.

Generous commissions paid. Send CV, copy of HPCSA registration and copy of ID to: drsaltrock@gmail.com Dr Lino Cericola Dental Team at Tiffany's



Our well-established Family Dental Practice in Bergvliet Cape Town is making available a position for an experienced dentist in view of a long term position.

Please email us a current CV with detailed experience in dental work as well as listing of interests and training that you have been exposed to in keeping with CPD requirements.

### CV's can be mailed to james@bergvlietdms.com

Please provide us with a contact number that will allow us to set up an interview.

We are looking forward to hearing from you.

### **Dental Equipment for Sale**

BLUE CAM ACQUISITION UNIT FOR SALE Price: R85 000.00 negotiable Contact: Chris Pullen: 083 488 2184 or 017 811 4671

EQUIPMENT FOR SALE - HYDE PARK JOHANNESBURG Second-hand Planmeca Planscan digital 3D impression intraoral scanner. Used for digital dentistry. Scan and send digital impressions to your lab. R150 000 Email: drzeyn@smilesahead.co.za

### **Dental Practice for Sale**

DENTAL PRACTICES(2) FOR SALE - DURBAN SOUTH Two dental practices are for sale in the Durban South Area. Please contact: 084 603 4909 / 031 468 6301

### DENTAL PRACTICE FOR SALE - SECUNDA

Extremely lucrative practice for sale in Secunda at a BARGAIN price. Excellent location with Dental Lab in medical building. Owner relocating. Majority of patients on Sasolmed which has unlimited basic dentistry benefits as well as benefits for specialized dentistry and implants. **Please call: 072 524 5729** 

### DENTAL PRACTICE FOR SALE - ILLOVO

Dental practice for sale in Illovo, Johannesburg. Dentist is retiring. **Tel: 082 452 6007** 

Disclaimer: Modern Dentistry Media has not verified all the services and products advertised herein and cannot be held liable in any way for any acts and/or omissions and/or misleading claims made by any advertiser. It is the responsibility of the reader to check the credentials of any advertiser.

# High performance dental equipment from The Dental Warehouse



Cont

## **DCI Edge Series 5 Chair**

The DCI Edge operatory chair provides comfort, style and efficiency. The DCI Edge Series 5 is an ergonomic chair that combines a thin, narrow back with a low chair height. This allows you to be in the proper working position regardless of patient size. The delivery system and light easily convert from left to right handed operation. The compact swing radius optimizes space making it perfect for operatories of any size. The Series 5 dental chairs, operatory lights, and delivery systems offer industry leading comfort and ease of use.





## X-Mind Trium

The 3D technology that facilitates implant planning with instant volume measurement and bone density assessment.

ACTEON®'s CBCT integrates high performance, state-ofthe-art tools to increase diagnostic reliability and improve patient care. With X-Mind® trium and ACTEON® Imaging Suite software, treatment becomes more efficient and safer, less traumatic and therefore less stressful. Bone density around the implant is assessed with a single click, allowing easier clinical decision-making. Its simplified implant planning program generates complete reports in less than a minute.

X-Mind® trium provides 4 different type of field of view going from 40x40mm to 110x80mm. The smallest field of view (Ø40x40) allows ultra-high-resolution images (75µm), making it the new reference in endodontics.







Johannesburg Durban Johannesburg Durban Building 2, No 106 16<sup>th</sup> Road, Midrand, 1686 51A Musgrave Park, Musgrave Road, Berea, Durban, 4001 Tel: 011 719 9111 • Fax: 011 719 9031 Tel: 031 312 6130



Taking care of everything dental 🔌 0800 111 796 🖾 admin@dentalwarehouse.co.za

THE DENTAL SOLUTIONS COMPANY™

SmartLite® Pro



## CLINICAL PERFORMANCE NEVER LOOKED SO GOOD.



SmartLite<sup>®</sup> Pro Modular LED Curing Light

We weren't satisfied with creating one of the most advanced curing lights ever. It had to be one of the best-designed as well. The SmartLite® Pro light is a unique modular curing device in a remarkable, all-metal housing. But it delivers far more than good looks. State of the art optics provide leading quality of cure for reliable outcomes. And the modular concept with exchangeable tips makes this possibly one of the most versatile dental instruments you'll ever own. SmartLite® Pro. Designed to perform.

**Dentsply Sirona South Africa** Building 11a, Lower Ground Floor, The Woodlands Woodlands Drive, Woodmead, Sandton, 2191 Tel: 0860 444 330 www.dentsplysirona.com