By DTI

MELBOURNE, Australia: Evaluating the effectiveness of oral health promotion strategies for preventing dental caries and periodontal disease among children, researchers from the Cochrane Public Health Group have found that oral health education alone, such as classroom lessons, videos, comics and brochures, was ineffective.

From analysis of the results of 38 international studies, the Cochrane researchers found that oral health education as a stand-alone measure, had no significant impact on caries in permanent or primary teeth and surfaces. Nonetheless, some of the studies reported improvements in gingival health, oral hygiene behaviours and oral cleanliness, the review showed.

“There is a general perception that oral health education will change oral health risk behaviours and promote good oral health practices,” commented Dr Shalika Hegde, a research fellow at Dental Health Services Victoria in Melbourne and part of the Cochrane Public Health Group, on the findings in an article on DrBicuspid.com. “However, this thinking is fundamentally flawed, as knowledge gained alone will not lead to sustained changes in oral health,” Hegde emphasised.

When coupled with other measures, such as supervised toothbrushing with fluoridated toothpaste, oral health education can be effective, Hegde said. She pointed out that the Cochrane review showed effectiveness of combining education with supplementary measures, including home toothbrushing and visits to the dentist.

In 2016, researchers from the Cochrane Public Health Group have aimed to determine which promotion strategies are most effective and equitable in preventing poor oral health. (Photograph: Anna Hoychuk/Shutterstock)
Another most promising intervention approach for reducing caries in children—although additional research is needed—appears to be improving access to fluoride in its various forms and reducing sugar consumption. Hegde told Dental Tribune Online. Generally, the findings of this review will have global implications in the area of models of oral health care delivery and oral health promotion, research, policy and practice, Riggle concluded. The review, which was the first of its kind at an international level, included data on 10,969 children in 21 countries from studies conducted between January 1996 and April 2014. All of the studies reviewed focused on community-based oral health promotion interventions for preventing caries and periodontal disease among children from birth to 18 years of age.

The review, titled “Community-based population-level interventions for promoting child oral health,” was published online on 13 September in the Cochrane Database of Systematic Reviews.

Saliva may indicate susceptibility to depression in boys

By DTI
CAMBRIDGE, UK: For the first time, researchers at the University of Cambridge have identified a biomarker for major or clinical depression in human saliva. An examination of saliva samples of hundreds of teenagers revealed that boys especially may be at the greatest risk of depression.

Following a group of boys and girls over 12 to 36 months by measuring levels of cortisol in their saliva, as well as collecting self-reported information on symptoms of depression, the researchers found that boys with depressive symptoms and elevated morning cortisol were 14 times more likely to develop clinical depression compared with boys with neither.

However, the connection was not as distinctive in female participants. Girls with high cortisol and depressive symptoms were four times more likely to develop depression, suggesting differences between the sexes in how depression develops. Clinical depression is a severe and common illness, affecting one in six people at some point in their lives, according to the researchers. To date, however, scientists have lacked validated biomarkers for the condition in the youth population at large to aid the detection of at-risk groups for depression in general and in boys and young men in particular, partly owing to its various causes and symptoms. “Through our research, we now have a very real way of identifying those teenage boys most likely to develop clinical depression,” said Prof Ian Goodyer from the university’s Department of Psychiatry. “This will help us strategically target prevention and interventions at these individuals and hopefully help reduce their risk of serious episodes of depression and their consequences in adult life.”

The study, titled “Elevated morning cortisol is a stratified population-level biomarker for major depression in boys only with high depressive symptoms,” was published on 18 February in the Proceedings of the National Academy of Sciences of the United States of America journal.
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Solving the problem of postoperative complications of Class I restorations

By Dr. Valentina Kondratieva, Russia

Introduction
In the recent years there has been a rapid improvement in the physical properties of the composite materials and adhesive systems that certainly helped dentists to improve the quality of their work. Shankage of composite materials today is lower than before, their strength and wear resistance have increased, and aesthetic rates are comparable to the aesthetics of natural teeth. But, unfortunately, the problem of the polymerization stress has remained to the present time. Shankage of the composite material during polymerization causes stress in the composite, the adhesive layer and the tooth tissues. The intensity of the stress depends on such factors as cavity configuration (C-factor), the physical properties and composition of the composite material. The result of the polymerization stress is a number of complications - micro leakage, postoperative sensitivity, cracks in the tooth, subsequent secondary caries and others. To prevent such problems during performing restorations with classic composite materials it is recommended to use flowable composites as an adaptive layer (creating the "elastic cavity wall"), as well as perform placement of the composite in small portions during filling the cavity "incremental technique". [1] Such approach is familiar to the dentists but require a lot of time for restoration of each tooth as during the work the clinician has to insert into the cavity and adapt multiple number of layers of the composite material. That is why bulk fill materials are increasingly popular. They help solve the problem of polymerization stress and reduce the amount of time spent on the restoration of the tooth. One of such materials, Filtek™ Bulk Fill Posterior Restorative, is used in dentistry in many countries as well. It helps clinicians to make a direct working field and retraction of the soft tissues surrounding the tooth. But in this case the application of a clamp for fixing the rubber dam material has certain difficulties – a tooth 4.7 has a low clinical crown and there is no possibility to rigidly fix the clamp on it. There is a simple solution to this problem: 36% phosphoric acid is applied on the area near the gingiva on the buccal wall of the tooth in two places and after 5 seconds washed out the rest of water, then a piece of the composite material is placed on the surface (composite sandwich), which after the polymerization will perform the function of holding the clamp on the tooth. After the placement of the rubber dam all possible leaks are sealed with gingival protector (Fig. 2).

Clinical case
The patient came to the dental office with complaints about increased sensitivity of the posterior teeth of the lower jaw on the right while eating sweets. During the examination the poor-quality restorations of teeth 4.6, 4.7 were found (Fig. 1). To minimize polymerization stress, save time during the treatment without compromising the strength and the wear resistance of the restoration it was decided to make a direct restoration of the teeth with Filtek™ Bulk Fill Posterior composite material.

Preparation step
Old restorations were removed with the diamond burs (diamond particle size 1-340 microns), the universal carbide bur (Sof-Lex™ Spiral Wheels) was used for preparation of carious dentin, enamel walls of the cavities were treated with fine-grain diamond burs (diamond particle size 25 microns) and polished with Phillips polishing cup for a better adhesion of the restoration. [2] The result of the preparation is two Class I cavities, teeth 4.6 and 4.7 (Fig. 3).

Isolation of the working field
When working with composite materials the use of the isolation will help to make the adhesive procedure more predictable and will provide a dry working field and retraction of the soft tissues surrounding the tooth. But in this case the application of a clamp for fixing the rubber dam material has certain difficulties – a tooth 4.7 has a low clinical crown and there is no possibility to rigidly fix the clamp on it. There is a simple solution to this problem: 36% phosphoric acid is applied on the area near the gingiva on the buccal wall of the tooth in two places and after 5 seconds washed out the rest of water, then a piece of the composite material is placed on the surface (composite sandwich), which after the polymerization will perform the function of holding the clamp on the tooth. After the placement of the rubber dam all possible leaks are sealed with gingival protector (Fig. 2).

Flowable composite use
Many authors describe the use of flowable composite underneath posterior restorations. Improved adaptation and contribution to lower postoperative sensitivity have been given as reasons for this. Although Filtek™ Bulk Fill Posterior is very flowable upon extruding, the author also prefers to apply a layer of flowable composite prior to placing the composite posterior [3]. In this clinical case, for this purpose Filtek™ Bulk Fill flowable composite was placed on the dentin in an amount of about 0.5-0.7 mm and polymerized afterwards (Fig. 7).

Composite restoration
The further restoration was performed with Filtek™ Bulk Fill Posterior Restorative material (Shade A2). The product has high strength and wear resistance, good polishing, self-adhesion, it allows placing an increment up to 5 mm and has low modulus of elasticity. Full list of references is available from the manufacturer [3].

Finishing of the restoration
On the Fig. 16 and 17 the restorations before finishing and polishing are shown. After the finishing and polishing removal, the composite shoulder was removed from the buccal wall of the tooth using an ultrasonic tip for removing dental plaque, and the remaining of the composite was polished with the Sof-Lex™ Spiral Wheels (beige and white). The final result of the finishing and polishing was shown on the Fig. 19. Long-term clinical results after the restoration is shown on the Fig. 20.

Conclusions
With this technique using bulk fill nanocomposite materials such as Filtek™ Bulk Fill Posterior the author has less postoperative sensitivity issues than with multi-layer composite placement [3]. In addition, using the material in one layer up to 5 mm allows dentists to significantly reduce the amount of working time without sacrificing the quality of work.

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Fig. 1. Initial clinical situation. Teeth 4.6, 4.7 with unsatisfactory restorations with microleakages, color changes along the restoration–tooth border.
Fig. 2. Isolation of the working field with the latex curtain.
Fig. 3. Old restorations are removed from the tooth. Preparation of the tooth performed, cavities are prepared for further restorations.
Fig. 4. Selective etching of the enamel with 36% phosphoric acid for 10 seconds.
Fig. 5. Application of Single Bond Universal adhesive.
Fig. 6. 10-second polymerization of Single Bond Universal adhesive.
Fig. 7. Application of Filtek™ Bulk Fill Flowable composite as an adhesive layer on the bottoms of the cavities.
Fig. 8. Application of Filtek™ Bulk Fill Posterior (shade A2) for the polymerization of the adhesive layer.
Fig. 9. Adaptation of the top layer of the Filtek™ Bulk Fill Posterior with a ball bur.
Fig. 10. Shaping the distal buccal cusp of the tooth 4.6 with LM-Applica tool.
Fig. 11. Shaping the mesial lingual cusp of the tooth 4.6 with LM-Applica tool.
Fig. 12. Shaping the fissures of the tooth 4.6 with LM-Applica tool.
Fig. 13. Position of the LM-Fissura tool during the process of creating the tooth shape
Fig. 14. Removal of the excess material from the tooth–restoration border with synthetic fiber brush.
Fig. 15. Curing of the composite for 20 seconds with Elipar™ S10 Curing Light.
Fig. 16. Restorations of the teeth 4.6, 4.7 before finishing.
Fig. 17. Restorations of the teeth 4.6, 4.7 before finishing.
Fig. 18. X-Ray of the final restorations. The X-Ray showed that the material has an excellent radiopacity and adhesion to the cavity walls (white).
Fig. 19. Final restorations after the occlusal adaptation, finishing and polishing.
Fig. 20. Restorations after 10 months.

Full list of references is available from the publisher.
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CROWN RESTORATION MADE BY CEREC ZIRCONIA

1. After a cusp fracture in a tooth restored with amalgam, I proposed a CEREC crown made of full contour zirconia.
2. I drew the preparation margins on the virtual model with the help of the automatic margin finder.
3. The CEREC software reconstructs the crown automatically with the Biojaw algorithm.
4. In the preview, I checked the position of the crown in the ceramic block. Adjustments could be made at this point if needed.
5. Finally, I placed the finished polished crown made from pre-colored zirconium oxide in the patient’s mouth.

FABRICATION OF ZIRCONIUM OXIDE RESTORATIONS IN JUST UNDER TWO HOURS

Digital impressions: The scan with Omnicam is done in the same way as with conventional CEREC restorations (2 min)

Designing on CEREC AC: Excellent initial proposals are generated with the Biojaw algorithm (8 min)

Mixing: Zirconium oxide is milled in enlarged form. This allows for more detailed finishing of the structures (10 min)

Sintering: The assistant places the restoration in the CEREC SpeedFire furnace and starts the sintering process with a touchpad (16 min)

Fitting and finishing: The restoration is cemented in the usual way. The remaining cement residue is then removed and the margins smoothed (8 min)

Images and additional information: The CEREC SpeedFire sintering furnace

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My experiences with CEREC Zirconia have been very positive. Fabricating dental prostheses from full contour zirconia using CAD/CAM technology is easy; we familiarized ourselves with the process very quickly. This is not surprising since the process is hardly any different from producing other milled restorations. By means of full anatomical zirconium oxide chairside fabrication with CEREC becomes even more versatile and economical. A great benefit for my practice.

First publication: VISION, Customer magazine of Dentsply Sirona; Issue 1/2016, p. 32-34.

Dr. Michael Skramstad is a dentist in Chaska, Minnesota, USA. He specializes in restorative and cosmetic dentistry as well as implantology. He is a certified trainer for Patterson Dental and lectures internationally on digital dentistry.
**Pink & White Aesthetics with BEAUTIFIL II**

By SHOFU

BEAUTIFIL II ENAMEL and GINGIVA from Shofu are developed as a complementary line extension of BEAUTIFIL II to easily create life-like direct aesthetic restorations. A special one-push syringe ensures controlled dispensing of the smooth and creamy material that is easy to sculpt into fine details and recreate the surface textures seen in natural teeth & gums.

Integration of nanoparticles and newly developed organic-inorganic filler complex into a unique silanol modified resin network imparts BEAUTIFIL II ENAMEL and GINGIVA with exceptional handling characteristics, longer working time, high abrasion/wear resistance, stable shade, effortless and superior polish with sustained polish retention for lasting aesthetics. Shofu’s proprietary S-PRG fillers offer additional fluoride benefits and anti-plaque effect on the restoration surface.

BEAUTIFIL II ENAMEL is available in 4 naturally translucent and opalescent, Value based shades that facilitate life-like shade reproduction and value adjustment in the final restoration to meet individual clinical needs.

BEAUTIFIL II GINGIVA is available in 5 natural shade variations of pink to match all ethnicities and easily mimic patient’s individual gum while restoring areas with receded or missing gums/papilla, cervical defects, root caries/erosion, exposed PFM margins and abutments to achieve red and white aesthetic harmony.

**Dentsply Sirona appoints new group Vice President of CAD/CAM Systems**

By DTI

BENSHEIM, Germany/SALZBURG, Austria: Dentsply Sirona has announced that Dr Frank Thiel will be succeeding Dr Joachim Pfeiffer as head of the company’s strategic CAD/CAM business unit. Owing to the Dentsply–Sirona merger at the beginning of 2016, Pfeiffer's tasks as chief technology officer will keep expanding and Thiel, who was previously involved in the development of the CEREC Omnicam 3-D intra-oral scanner, will take over his responsibilities in the development, production and acquisition sections of the CAD/CAM division.

Thiel will be sharing the management position of the division with Roddy MacLeod, who will be in charge of product management, marketing and control.

Thiel has been working in the company’s CAD/CAM division for more than 15 years. From 2009 to 2016, he held the position of head of development for optical 3-D measurement technologies, and he oversaw basic development from 2006 to 2009.

Thiel began as a development engineer at the then Sirona Dental Systems and took over management of the development projects soon afterwards. Prior to his career at the company, Thiel was involved in basic research in the fields of atomic, molecular and electronic physics, as well as photonics.

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Dental Tribune Middle East & Africa Edition | 6/2016
Congress on Guided Biofilm Therapy (GBT)

By E.M.S.

DIVONNE LES-BAINS, France: More than 30 years ago, E.M.S. developed AIR-FLOW® and PIEZON® NO PAIN and since then continuously improved these technologies. In July 2016, it is time to launch the next game changer: E.M.S. presented the Guided Biofilm Therapy (GBT). The GBT revolutionizes what Axelsson and Lindhe started more than 40 years ago and will set a new standard in dental maintenance and oral hygiene. International guest speakers from universities, dental offices and the Swiss Dental Academy were invited to a two-day conference in Divonne Les Bains. The summit provided a stage where dental professionals could discuss biofilm management, the main causes of biofilm and the clinically effective ways to remove it.

The Game Changer

“I believe that education and awareness is key to making game changers out of our colleagues.” (Jolene Pinder, Dental Hygienist)

E.M.S. organised the GBT conference under the heading: "How to manage biofilm and its effective removal?"

The presented ‘Game Changer’ was developed in close cooperation with universities, dentists, dental hygienists and E.M.S. specialists. Therefore, it is no surprise that Nina Von Dr. Fen, prophylaxis professional and trainer at the Swiss Dental Academy, is ‘proud to be a game changer’. Indeed, dental maintenance and oral hygiene has never been as important as it is today. The participants feel like pioneers who experience a high standard homogeneous solution for every patient. And it seems that a new gold standard has been created in the field of prophylaxis, coming straight out of Switzerland.

The GBT, which is a detailed clinical protocol, ensures a high standard in dental maintenance and facilitates complete removal of biofilm sub- and supra-gingivally. The GBT aims to bring a fast and comfortable treatment to any patient profile with the use of the high technology powder PLUS based on Erythritol, the AIR-FLOW® and the PIEZON® NO PAIN technologies. Be it children, sensitive patients, recall or pre-surgery prophylaxis, the GBT offers a complete solution. The GBT, this new, simple and predictable approach to professional dental maintenance, begins with the use of a disclosing agent. It guides the dental professional to see the biofilm normally not visible to the naked eye and to demonstrate biofilm presence to the patient. This procedure is followed by removal of biofilm and stains from the hard and soft tissues sub- and supra-gingivally by using AIR-FLOW® with the very fine Erythritol powder PLUS. After this procedure, calculus and concrements are easy to detect and can be removed using PIEZON® NO PAIN and the PS instrument. Scaling is only needed if there are hard deposits. Therefore, GBT provides a minimally invasive therapy. Afterwards, the GBT is completed with a quality control and the recall management.

Nevertheless, the presentation of the detailed GBT protocol was only one of the highlights of the conference. The guest speakers like Prof. Magda Merisi, Dr. Klaus-Dieter Bastendorf, Eva Müller, Karen Davis and Brigitta Schöneich, board member of the European Dental Hygienist Federation, offered a course on pathogenic biofilm, the history of biofilm removal and the challenges of clinical cases. With a total of 18 speakers a variety of topics was treated, including hand piece technique and literature analysis. The attendants were professors, dentists, dental hygienists and dental assistants, actively involved in dental prophylaxis either at the clinic or in dental universities. The aim of the congress on Guided Biofilm Therapy was essentially to build a common understanding of the need to introduce the approach towards prophylaxis – based on knowledge, experience and supported by clinical evidence. Every presenter shared his personal opinion on best practices which were differentiated and country specific.

GBT – no conflict of ethics and profitability

“I provide services similar to those of my colleagues. I am happy to work for patients who are happy with the results of the treatment.” (Dr. Dong Xiao Xiao, Periodontist)

The GBT is safer, more comfortable and more efficient than conventional methods. Thus, it is definitely time to change the game!
The GBT congress emphasized the importance of high-quality dental maintenance. The effective removal of biofilm is paramount to long-term oral health. Thus, it’s definitely time to provide the neglected fields of dentistry – dental maintenance and prevention – the reputation they deserve. Indeed, the awareness of dental care and oral hygiene has never been as high as it is today. And that is why the GBT protocol is so vital. Conventional dental prophylaxis with hand instruments, rubber cups and abrasive pastes – the so-called gold standard – is not up to today anymore but is still used by over 80% of dental professionals. These methods induce recession when used in a sulcus, create scratches on exposed dentine or cementum, remove natural enamel structure and obviously, this treatment is not comfortable for the patient at all. Jasmina Karisik, dentist, has only one answer to this: “Guided Biofilm Therapy – finally to replace the traditional way of thinking that endodontics is the savior.”

Perio for a better life
“GBT and its focus on general health aspects reducing massively the overall oral bacterial load – thus reducing health risks” (Klethis Manolakis, Prosthodontist)

Compared to conventional methods, the GBT is more comfortable, safer and makes professional dental maintenance feel more like a wellness treatment instead of an unpleasant medical examination. The AIR-FLOW® Powder PLUS has a grain size of only 14µm, therefore it feels very soft, even if applied sub-gingivally! The presentations convinced the attending dental professionals: “GBT meeting encouraged me to use PLUS powder for all my periodontal and implant maintenance patients”, states Jolene Finder, Dental Hygienist. And with PIEZON® NO PAIN – composed of PIEZON® NO PAIN Module, Original PIEZON® handpiece and Original SWISS INSTRUMENTS PS – the removal of calculus and concretions is comfortable and safe. And the long-term benefits are remarkable as well: By avoiding over instrumentation you preserve the natural tooth structure, the implant surface and prevent root sensitivity. For the clinician, the approach of GBT reduces treatment time and hand fatigue with minimal use of ultrasonic. The safe and comfortable treatment is easy to adapt and decreases recolonization by biofilm due to antibacterial properties of Erythritol. Given the resulting advantages, it is not surprising that the prevailing mood at this congress was dominated by an atmosphere of striving, positive spirit and overall optimism, confidence and trust in the future. It’s time to shape the future of dental prophylaxis – it’s time to change the game adopting the GBT protocol in dental maintenance.

SDA – Swiss Dental Academy
“SDA in China encourages the trainees to share the "real" knowledge to help the clinicians and patients through evidence based dentistry” (Dr. Dong Xiao Xiao, Periodontist)

“With Guided Biofilm Therapy, no more patients complain, only smiles”
Inconspicuous anterior implant-supported restorations: Combining clinical and laboratory expertise

By Dr. Larry R. Holt, USA

The ultimate goal of tooth replacement in the esthetic zone is an inconspicuous transition from the restoration to the patient’s natural, biologic tissues. This transition is evaluated at many levels. Color and contour of gingiva at the interface must mimic the natural contours and color of adjacent and contralateral teeth.

The dental restoration must match contour and blend seamlessly into the existing dentition. Color matching of final crown must be consistent with existing dentition. Hue, chroma and value. This case study explores the management and correction of a previously treated implant-retained mandibular central incisor.

The patient presented as a healthy, 48-year-old female with no contributory health history to prohibit dental treatment. Recent dental history revealed an Ankylos implant that did not retain a provisional abutment and cementable all-ceramic crown. The implant had been uncovered and a temporary abutment was placed.

A ridge lap provisional restoration was fabricated to fit the marginal portion of the abutment. The resultant provisional was not only esthetic but also was the source of considerable tissue inflammation and patient discomfort (Figs. 1-3). Patient reported dissatisfaction with the provisional treatment and was seeking a more desirable solution.

Clinical evaluation revealed a well-placed implant with acceptable position both facio-lingually and mesiodistally. Additionally, there was good volume of soft tissue and ridge form was ideal. Surgeon reported that the implant was well-integrated in bone. There was a poorly adapted provisional restoration over an inadequately contoured provisional abutment. Radiograph revealed excess acrylic that extended well into the dental sulcus all the way to the implant platform (Fig. 4). This acrylic did not provide any emergence profile support of transmucosal tissue.

The provisional restoration was poorly adapted to both the abutment and to the ridge crest soft tissue. Intaglio surface was rough and made in such a manner as to create a ridge lap profile. The facial and proximal surfaces of the provisional were fitted over soft tissue crest. There had been no attempt to modify gingival tissue emergence profile or to create the environment for inconspicuous tissue transition from restoration to biologic tissues.

Techniques for managing emergence profile are well-documented in the literature. Interproximal tissues will point and form papillae when appropriate lateral pressure is applied with a temporary abutment when natural teeth are on either side of the implant. The adjacent bone height will dictate the level of the papilla assuming the restoration and its associated abutment properly support them. Facial contour can be manipulated to create approximate gingival zenith height by increasing or decreasing facial emergence profile. Increasing the profile will move the gingival zenith apically and reduction of contour will move the crest incisally.

Treatment plan consisted of removal of temporary abutment/provisional crown, fabrication of a temporary partial denture (Figs. 5, 6) and placement of an appropriate temporary abutment that did not retain a provisional crown (Ankylos sulcus former) (Fig. 7).

This sulcus former, as its name implies, would provide soft-tissue emergence profile support. The partial denture was to be placed to avoid interference with the sulcus former when fully seated (Fig. 8). Patient was to be recalled in one-week intervals to evaluate the response to this treatment. Once healed, a final, customized abutment and cementable all-ceramic crown would be delivered.

The plan was followed per previous description. Postoperative visits were uneventful. Patient comfort was immediate. Tissue health and emergence profile were deemed appropriate at the second week recall visit (Figs. 9, 10).

At a subsequent appointment, the sulcus-forming abutment was removed, a closed tray impression coping was placed, and an impression (Identium, Kettenbach) was taken for fabrication of final restoration (Figs. 11, 12). Appropriate opposing model, bite registrations and facebow accomplishment of the case to the laboratory. A careful shade map and clinical photography were included.

Clinically, it was determined that this would be a difficult shade because of surface characteristics and maverick colors of the adjacent central incisor. Arrangements were made to have a laboratory technician available at the delivery appointment. Sulcus former and temporary partial were reinserted and patient was dismissed and scheduled for delivery appointment.

All model work was accomplished. The laboratory was given the option of fabricating a custom abutment or customizing a stock abutment. This decision was to be based on the trajectory of the abutment relative to the position of the implant. The placement of the implant was ideal and the use of a lab-modified, stock abutment was selected (0 degree Cercon Balance Abutment, Dentistry Implant).

The contour correlation between the sulcus former and the emergence profile of the stock abutment complement one another. The margins were placed 1 mm subgingivally on facial, mesial and distal. The lingual margin was placed at 3 mm.

Once the abutment was perfected, an all-ceramic crown was fabricated (Emax, Ivoclar). This crown was waxed to full contour, and then the facial was cut back to provide a field into which a customized facial surface could be developed from added porcelain. The wax pattern was invested and pressed. The resultant crown was then modified with addition application of porcelain and was left pre glazed in anticipation of chairside staining (Figs. 13, 14).
The delivery appointment was un-
eventful. The lab provided a seating
jig that simplified the positioning of the
customized abutment (Fig. 10). The
abutment was torqued to man-
ufacturer’s specifications (Figs. 16, 17).

The crown was tried in and adjust-
ments were made to proximal contacts
to ensure a well-fitting crown. The
abutment was selected to be used for remov-
ing the crown-seating jig was provided by
the laboratory to be used for removal
of excess cement prior to seating of
the crown.

Patient was rescheduled at a two-
week interval for a final evaluation
to complete the restorative proce-
dures. All practitioners whose
tissue management was critical.

There is no stark contrast between tissue-man-
agement protocols. There is no place
in contemporary implant dentistry for rudi-
gress crowns assuming appro-
priate pretreatment parameters are met.

The esthetic zone must be evalu-
at ed prior to implant placement and any
modification of the ridge form
should be taken into consideration
well in advance of implant place-
ment surgery.1 Surgery should be
directed by prosthetic requirements.
Once surgery is accomplished, it
is imperative that restorative cli-
nicians understand how to manipulate
the peri-implant soft tissues.

All of this tissue management is
 critically important. However, then
comes fabrication of the final resto-
ation. The abutment must be
designed in such a way as to conceal
the crown/abutment interface. Fur-
thermore, it must allow for adequate
crown thickness to have appropriate
strength to withstand mastication
forces and still remain retentive.
The final contours of the crown
must be managed in such a way as to blend
into the existing dentition.

This case was a success based upon
all previously described parameters.
The gingival contour was essentially
identical to the adjacent
central incisor. Papillae were
intact.25 The laboratory was skilful
at modification of the abutment so
that the margins were concealed within
the sulcus. The axial and clin-
ical contours of the abutment pro-
vided adequate clearance so that a
proper thickness crown could be
developed.

This is critical for both esthetics and
for long term strength and stabil-
ity of the definitive restoration. The
technician selected the appropriate
porcelain and substrate for the subse-
cquent cementation.

This is part of the training pro-
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Fig. 11. Anterior impression coping placed.

Fig. 12. Final impression.

Fig. 13. Abutment with soft tissue mucosal.

Fig. 14. eMax crown on abutment.

Fig. 15. Seating jig.

Fig. 16. Placing abutment with seating jig.

Fig. 17. Abutment torqued and ready for crown seat.

Fig. 18. Seating crown.

Fig. 19. Final restoration at two weeks.

Fig. 20. Patient postoperative smile.
Introduction

Lasers provide an exciting new technology that allows the dentist the ability to give patients optimal care without many of the "true factors" found in conventional dental techniques. Used with proper understanding of laser physics, lasers are extremely safe and effective.

Using lasers for caries removal, perio treatment, endodontic treatment, bone management, cutting and shaping, and soft tissue procedures can reduce postoperative discomfort, infection and provide safe, simple in-office treatment. As a result, we can improve our efficiency, expand what we can do, achieve better results and increase production.

Lasers represent a real quantum leap forward in the treatment of our patients, including the pediatric patient. The US Food and Drug Administration (FDA) gave approval for the use of the Er:YAG laser in 1997 for both hard- and soft-tissue procedures. The erbium doped (erbium particles placed within the YAG crystal) yttrium-aluminum-garnet (Er:YAG) development and success has made the treatment of children safer and quicker.

Plainly stated, a laser is a piece of equipment that creates a concentrated monochromatic beam of visible or infrared light that can be absorbed by a specific target. Since then, laser-assisted dental care has changed forever the way dentists can perform previously tedious and invasive treatments. Medical lasers are used in the treatment of numerous ailments using a minimally invasive approach. They provide an alternative to conventional dental techniques, such as removing diseased tissue, bone or teeth and cavities, the need to take radiographs because of the chemical makeup of the alloy. Whether these should remain is a matter of debate, depending on your individual beliefs. There are many concerns by many, although not as loudly, about the effect of various soft-tissue infections, advanced periodontal treatments and the latest in advanced endodontic treatment via photoinduced electroacoustic streaming.

Photoacoustic endodontics using PIPS

The goal of endodontic treatment is to obtain effective cleaning and the containment of the smear layer, bacteria and their byproducts in the root canal system. Clinically, traditional endodontic techniques use mechanical instruments, as well as ultrasonic and chemical irrigation, in an attempt to shape, clean and completely decontaminate the endodontic system but still fall short of successfully removing all of the infective microorganisms and debris. This is because the complex root canal anatomy and the instability for common organisms to penetrate into the lateral canals and the apical ramifications. It seems, therefore, appropriate to search for new materials, techniques and technologies that can improve the cleaning and the decontamination of these anatomical areas.

Among the new technologies, the laser has been studied in endodontics since the early 1970s-73 and has become more widely used since the '90s. Different wavelengths have been shown to be effective in significantly reducing the bacteria in the infected canals, and important studies have confirmed these results in vitro. Studies reported that near infrared
laser are highly effective in disinfecting the root canal surfaces and the dentinal walls (up to 790 microns thickness) and can be performed in less than 2 seconds (Nd:YAG 1.064 nm). On the other hand, these waveforms did not show effective results in debridging and cleansing the root canal surfaces and in the organic morphological alterations of the dental wall. The smear layer was only partially removed and the dentinal tubules primarily closed as a result of the inorganic dentinal structure.

Other studies reported the ability of the medium infrared laser in debridging and cleaning root canal walls.13,14 The bacterial load reduction after erbium laser irradiation, demonstrated high on the dentin surfaces, but low in depth of penetration because of the high absorption of laser energy on the dentin surface.15 Also the laser activation of commonly used irrigants (LA) resulted in statistically more effective removal of debris and dentin smear layer in root canals compared with traditional techniques (CI) and ultrasonic activation (US).16,17 A new approach of the laser activation method resulted in a strong modulation in reaction rate and a superior dissipation rate by reducing production and consumption of available energy compared to ultrasound activation.18

A recent study has reported how the use of an Er:YAG laser equipped with a newly designed radial and striped tip, produces a 1.2 °C of thermal rise after 20 seconds and the absence of smear layer and the presence of bacterial contaminants.19 The benefits and drawbacks of this laser technique and to sent briefly the experimental background and methodology. The placement of the tip in the intracanal portion only of the treated tooth allows for a more minimally invasive solution and the preparation of the root canal system as a newly designed radial and stripped tip. The full list of references is available from the publisher.

Scientific background

The macrophotographic recording of the LAI studies suggested that the effectiveness of this technique in irrigant-filled root canals generates a streaming of fluids at high speed through a cavitation effect.20 This mode of energy emission allows for improved lateral diffusion with low energy and enhanced photoacoustic coupling.21

Discussion

For improved lateral diffusion with low energy and enhanced photoacoustic coupling, erbium lasers used in irrigant-filled root canals are highly efficient in disinfecting the root canal surfaces and create a typical morphological damage. Moreover, they are not able to thoroughly remove the smear layer.22

On the contrary, erbium lasers are used for their effective smear layer removal and for the ablation of the bacteria and the function of the conventional methods employed by the vast majority of dentists. Laser endodontic treatment cannot be used in many instances instead of conventional methods. The full list of references is available from the publisher.

References


Conclusion

Laser use is: 

• a regionally specific treatment: only the area that is directly exposed to the laser beam changes its physical structure, 

• a minimally invasive and biomimetic technique: little thermal injury to the root canal system, 

• a highly selective treatment for improved lateral diffusion with low energy and enhanced photoacoustic coupling, 

• a direct treatment with the tip or fibers introduced into the root canal system. 

A new approach of the laser technique and to sent briefly the experimental background and methodology. The placement of the tip in the intracanal portion only of the treated tooth allows for a more minimally invasive solution and the preparation of the root canal system as a newly designed radial and stripped tip.

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Cosmetic dentistry is commonly at the forefront of everything interesting and exciting in dentistry. Historically, all dentistry can and should be carried out in an aesthetic way, and as a result the term “cosmetic” could apply to nearly any type of treatment, even an extraction if executed with aesthetics in mind.

The way treatment planning is carried out for smile makeovers has fundamentally been the same for some time. Recently Digital Smile Design has taken another step and has made the very best and most intelligent use of software, imaging and video to creating a very powerful and emotional communication tool. This can allow a patient to see a smile makeover mockup not just on a screen as a static image but watching themselves on video and actually to trial it within their mouths also and deliver an emotional response to that preview.

Ideal smiles and fantastic results can be achieved this way and this is appropriate for patients who want perfection... or is it?

The concept of progressive smile design is a little different.

The idea of PSD to allow the patient to see improvements in staged approaches to really decide if they want a perfect smile at the end of treatment. Now of course Progressive smile design and Digital smile design are not mutually exclusive, they can be combined but commonly PSD will result in less treatment for the patient.

The Concept of Progressive Smile Design

The Concept of Progressive Smile Design often uses mixture of tooth alignment, whitening, direct bonding and contouring. Indirect treatments can certainly be considered but are only ever after the patient is able to see changes alignment, bleaching or shaping can achieve.

The logic to this approach is that we are trying to see if a patient is satisfied with small staged improvements rather than going straight to a perfect result in an irreversible way. It may well be that they do end up with a perfect smile but at least the consenting process is real, because the patient is able to see the very best in their own smile before moving forward to the irreversible stages.

Looking at this in a more extreme way, it might be the difference between a patient choosing 2 to veneers accepting some tooth preparation to do so, and alternatively absolutely no tooth removal whatever with less financial and biological risk.

The case described shows a patient’s journey and how her perception of her own smile changed with progressive smile design.

The Case

This young 26-year-old lady presented wanting a smile makeover. Her main complaints was her diastema, the color and length of her teeth. She requested porcelain veneers to address this problem.

On examination, a 3.5 mm diastema existed and the patient had a class I base with a mild lower crowding and slightly rotated upper laterals. There had reducing canine guidance from previous evidence of para-functional wear. She had no TMJ complaints or symptoms. It was explained to the patient that orthodontics could improve the anterior position of the teeth to make any further treatment, which might include veneers, easier at a later time.

The patient was not keen on orthodontics particularly fixed braces, but all options were thoroughly explained, including the Inman Aligner diastema closer appliance. The patient was interested in this option because of the short treatment time and the fact that it was removable. Once she understood that the diastema could be closed in less than 10 weeks she suddenly became keen on using the appliance.

Before any treatment was decided upon, x-rays, photos and study models were taken and a full orthodontic diagnosis and assessment was carried out.

A landmark/reference point was also decided on with the patient. This is a critical point that is aesthetically and functionally correct in a misalignment or space creation to achieve alignment. It will give the amount of space left over after alignment (1). The patient described the position of the two centrals as ideal from the curve and the curve then is used to calculate the amount of potential crowding and potential space creation that might be required.

The patient described the position of the two centrals as ideal from the curve and the curve then is used to calculate the amount of potential crowding and potential space creation that might be required.

1) It will give the amount of space creation required or the amount of space left over after alignment
2) It dictates the occlusal setup to technicians who will set the case up digitally
3) It is also important in the consenting process and evidence of planning

The Spacewize trace revealed that the case would required 0.2mm of space creation to achieve alignment with a diastema present, this might seem a surprise but the laterals closing inwards and being rotated were already accounted for much of that space.

Impressions were taken and sent to the Inman Aligner laboratory with the spacewize trace.

Two days later a digital STL was sent of the proposed Archwize setup.

This was checked and the lab was instructed to create the 3d print of the proposed setup.

The patient was keen to see this before committing to understand the real potential outcome. The advantage of a 3d print over 3d images is that a patient can hold the models and really appreciate the potential outcome with a clearer picture of scale, position and shape. On viewing the models the patient was highly satisfied with the proposed outcome and could also see that the teeth still looked short and further treatment would be needed to lengthen them.

This was discussed and planned. The models were returned to the lab for the modified Inman Aligner to be constructed.

One week later it was fitted. Instructions were given and no space creation needed. The patient was to wear the appliance for 18-20 hours a day. The patient turned the retention screw once every 3 days. After 2 weeks a significant improve was seen.

At 4 weeks home bleaching was started using Daywhite 6% H2O2, (Philips) using super-sealed trays (trays with sealing grooves cut into the stone models before sucking down). She whitened for 45 minutes a day while the Inman Aligner was out of the mouth for 2 weeks.

At this appointment a little flattening of the contacting areas was carried out to reduce the risk of a black triangle and lengthen the connector. This was done using a softer disc using the digital models for guidance. Bucal anchors were also placed to help the laterals rotate in.

At 6 weeks the diastema was closed and the teeth were noticeably whiter.

The Concept of Progressive Smile Design and its potential impact on Cosmetic Dentistry
and the patient was shown the new potential outline. Immediately the patient was thrilled and happy to just have no preparation composite bonding as the final part of the treatment rather than veneers.

The part of the process is vital as allowing a patient to see their teeth align and whiten often helps them to comprehend the best potential in their own natural smile before taking an irreversible route.

Two weeks later, an indirect wire retainer was bonded in place after roughening the teeth and using etch and optioned with Venus Diamond Flow.

On the same day, direct composite edge bonding was carried out. Venus Diamond (Heraeus Kulzer) OL shade dentine was placed initially to block out the visual join and B1 and B8 shade were used on the facial surfaces and blended into the surface of the teeth. The patient returned for her polishing appointment and the material was fully blended into the tooth. At this point the black triangle was closed also.

Lateral and anterior guidance was rechecked and adjusted and a new impression was taken for a night-time essix/ back up retainer.

**Discussion**

This case was completed in less than 10 weeks. By allowing this patient to see small changes a little at a time, she was able to see the very best potential in her own smile and to make the decision to move to composite edges instead of just jumping straight into porcelain veneers. The long term biological and cost and economic cost also means that the risks are lower. There is certainly nothing wrong with placing porcelain veneers on a case like this, but one can see that following the logic of progressive smile design, you never really know what the patient wants unless they are able to see the very best in their own smile and they might be happy with a small amount of bleaching, alignment or bonding. Added to the fact that the long term risks of cases like this are lower, and this kind of treatment is more accessible to many more patients, and one can see the potential for many patients around the world.

**Disclosure**

Inman Aligner training run courses and mentoring through Intelligent Alignment Systems Orthodontic Academy. Visit: www.iasortho.com

Dr. Tj Qureshi, UK, Past President of the British Academy of Cosmetic Dentistry. Director of Intelligent Alignment Systems.

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Full-Arch Implant-Retained-Restoration. Fixed or Removable?

By Prof. Gregor-Georg Zafiropoulos, UAE & Dr. Shah Maanas, UAE

Dental implants as abutments for full-arch restorations are a widely accepted treatment modality. How- ever, when scheduling the use of a fixed or removable implant-supported full-arch restoration, many factors should be considered. Due to the possible need for additional surgical steps to enhance the esthet- ics surrounding fixed restorations, removable implant-supported den- tures, often a preferable alterna- tive.

The current report presents a com- prehensive treatment approach, wherein the patient undergoes dif- ferent treatment modalities for res- toration of the upper and lower full arches at different timelines along with discussing the advantages and disadvantages of each approach.

Although implants have become a widely accepted treatment modality, dentists and patients frequently are conflicted when deciding between a fixed or removable full-arch res- toration. Many patients requiring a full-arch rehabilitation, wish an esthetically sophisticated and fixed implant-retained denture (FIRD). In such cases, the esthetic outcomes are often severely restricted by bone loss as a cause of advanced periododontitis and/or tooth extractions.

Modern restorative materials and technologies make removable im- plant-retained dentures (RIRD) to an esthetically and functionally accept- able alternative to FIRDs.¹

A 55-year-old woman was referred for a complex periodontal-implant treatment (Fig. 1, Fig. 2). Due to severe periodontal tissue loss, six implants were imme- diately extracted and the socket #4 was augmented using a non-resorb- able membrane (Cytoplast, Regentex AG, Kienzlebad, Germany) was augmented using a non-resorb- able alternative to FIRDs.

The patient was informed about the advanced bone destruction due to periodontitis and the following treatment plan were recommended: 1) extraction of the teeth # 13, 12, 22, 24, 14, 26, 36, and 32-42 due to ad- vanced chronic periodontitis as well as cavities, and surgical treatment of the rest dentition by access flap surgery; 2) strategic placement of implants to increase the number of abutments; 3) full-arch restoration of the maxilla with a RIRD using telescop- ic crowns as attachments; 4) implant or teeth retained bridges for restoration of the mandible.

The patient did not accept this pro- posed and sought treatment from another dentist.

One year later, the patient presented again for consultation. Eleven im- plants have been placed (Fig. 2-13, 24, 25, 36, 34, 45, and 46) and the max- illa and mandible have been restored with FPDs at the patient’s request (Fig. 3 – Fig. 5). However, the patient was dissatisfied with the esthetic re- sults due to the unnatural length of the artificial teeth. Furthermore, the design of the existing FPDs impeded oral hygiene.

Due to a home accident, the frac- tured teeth # 13, 25, 45, and 44 were extracted and an implant was immediately placed in region #44. Open tray impression were taken using a polyether impression mate- rial (Impregum Penta Soft, 3M ESPE) and mounted on a semi-adjustable articulator (SAM 2P, SAM Prazision- technik GmbH, Goslar, Germany). For an improved esthetic result, pres- sional abutments were used and temporary covered dentures were fabricated and retained on the provi- sional abutments (Fig. 6 – Fig. 8).

Two months later, full mouth reha- bituation of the maxilla (supported by six implants) and mandible (sup- ported by six implants) was com- pleted by fabrication of RIRDs using telescopic crowns as attachments, as previously described.² Custom- ized abutments served as primary telescopes and electroformed pure gold copings (0.25 mm thickness, AGC Galvanogold, Au>99.9%, Wie- land Dental Systems Inc., Pforzheim, Germany) served as secondary teles- scopes (Fig. 9, Fig. 10). The metal frameworks was milled from titan- ium (Zirconit Ti, Wieland Dental Systems Inc., Pforzheim, Germany) and veneered using a photo- cured indirect ceramic polymer (Ger- amug, Shofu, Ratingen, Germany; Fig. 12–15).

Discussion

This report presents a case in which the patient was treated with fixed restorations supported by im- plants and natural teeth and sub- sequently treated with an implant- retained removable denture.

The patient initially insisted on fixed restorations. Unfortunately, the den- tist fulfilled this wish, despite the existing clinical conditions of loss of hard and soft tissue. Aggres- sive procedures were performed pri- or to implant placement, resulting in complications and treatment failure. While the fixed restoration resulted in a Functionally satisfactory treat- ment outcome, the patient was dis- pleased with the esthetic results. The main concern was the unnatural long tooth shape necessary to com- pensate for the insufficient alveolar ridge height. The esthetic outcome was unsatisfactory and the patient could not control the fractures related to the bar placed in these situations, which is detrimental, particularly from a periodontal per- spective.

Various other alternatives to restore edentulous arches include fixed as well as removable prostheses.²³ With regards to the fixed option, clinicians routinely encoun- ter resorption of the alveolar ridges leading to atrophy along with loss of vertical dimension of the tissues, which in turn, pertain to placement of dental implants in unfavorable positions. This can severely affect the prostheses by need for longer un- esthetic ridges as was the case in the presented report. Also, unfavorable positioning of the implants may lead to difficult access to the screw holes complicating the fabrication of pros- theses as well affecting the retriev- ability of the prostheses at the time of maintenance visits.

Other evident alternatives for RIRDs included the possibility of replacing the fixed restoration by removable partial dentures. There are various reports suggesting soft tissue overgrowth in relation to the bar placed in these situations, hindering the long term oral hygiene regimen associated with these dentures. The complication of fractures related to frameworks’ veneering or one of the abutments in fixed as well as bar- and-clip RIRDs is also reported. It not only affects usability of the denture but also, adds an additional exorbi- tant expense and time consumption for replacement, serves as a definite disadvantage while electing this al- ternative.

In contrast to above mentioned shortcomings, ease of retrievability of telescopic crown supported RIRDs proves highly beneficial over other alternatives while overcoming the commonly encountered implant or natural teeth complications. Sev- eral complications related to dental implants range from implant-ab- set screw loosening, peri-implant mucositis or peri-implantitis, or fracture of one of the used implants.

By Prof. Gregor-Georg Zafiropoulos, UAE & Dr. Shah Maanas, UAE

References


Fig. 1. Initial examination. Orthopantomograph.

Fig. 2. Initial examination. Clinical view.

Fig. 3. 2nd consultation. Orthopantomograph. After implant placement and prosthetic treatment.

Fig. 4. 2nd consultation. Clinical view (front).

Fig. 5. 2nd consultation. Clinical view (right).

Fig. 6. Orthopantomograph. After placement of implant #44.

Fig. 7. Provisional implant abutments and extraction.

Fig. 8. Temporary restorations retained on the provi- sional implant abutments.

Fig. 9. Customized gold implant abutments.

Fig. 10. Fitting of the electroformed copings.

Fig. 11. Milled titanium framework.

Fig. 12. Final RIRD using telescopic crowns as attach- ment (front).
New organic toothpaste may inhibit harmful bacteria

By DTI

SEOUL, South Korea: A Seoul dentist has developed an all-natural toothpaste that aims to reduce the health risks posed by Streptococcus gordonii, an oral bacterium that initiates dental plaque formation. Once in the bloodstream, which it may enter through bleeding gingivae, for example, the bacterium also causes blood clots, which can lead to life-threatening conditions such as infective endocarditis, heart attack or stroke.

South Korean dentist Dr Hyung-Ik Moon, head of the Moon Dental Hospital in Seoul, recently obtained the patent for his bacteria-inhibiting organic formula from the Korean Intellectual Property Office. Conventional toothpastes mainly focus on combating two major oral bacteria, Streptococcus mutans and Porphyromonas gingivalis, which are both associated with tooth decay and periodontal disease. However, inspired by a joint study by the Royal College of Surgeons in Ireland and the University of Bristol, which found that S. gordonii can trigger an infection of the inner lining of the heart when entering the bloodstream, Moon started developing a toothpaste that especially inhibits the growth of these bacteria.

"Endocarditis is a serious disease treated only by surgery or strong antibiotics, which is becoming more difficult due to growing antibiotic resistance. Considering this, using my toothpaste will reduce the risks potentially caused by the bacterium," Moon told the Korea Times.

The toothpaste’s anti-inflammatory ingredients include nenn and cumin oil, herbal extracts made from psyllium seed, Japanese star anise, and Japanese cornelian cherry. "Unlike most other toothpastes that use artificial chemical preservatives, this toothpaste is only composed of natural, organic compounds, which greatly reduces the risk of side effects," Moon said.

As the oral mucosa is very susceptible to absorbing harmful substances into the body, it is especially important to use natural ingredients for oral care products, he emphasised. Tested among his patients, the toothpaste’s formula proved to help relieve inflammation, as well as sore gingivae and toothache.

The toothpaste is not available for purchase yet, but Moon is working on releasing it to market soon.

SEOUL, South Korea: A Seoul dentist has developed an all-natural toothpaste that aims to reduce the health risks posed by Streptococcus gordonii, an oral bacterium that initiates dental plaque formation. Once in the bloodstream, which it may enter through bleeding gingivae, for example, the bacterium also causes blood clots, which can lead to life-threatening conditions such as infective endocarditis, heart attack or stroke.

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Advanced Restorative Techniques and the Full Mouth Reconstruction. The Dahl Appliance. Part Six

In part six of the series, Paul Tipton provides an insight into the Dahl concept by discussing the use of the appliance in today’s modern restorative dentistry techniques.

By Prof. Paul A. Tipton, UK

Born Dahl first described the Dahl appliance in the early 1970's. Since then they have gradually been incorporated into the field of restorative dentistry, although many orthodontists still dispute their efficacy and relevance. This article will cover its usage in today’s modern restorative dentistry techniques, focusing on the use of the traditional chrome cobalt ‘Maryland wings’ style of appliance to the use of splinted temporary or prototype restorations and to definitive restorations used to gain space during restorative procedures.

Dahl preposed creating space in the treatment of localised anterior tooth wear by separating the posterior teeth through an anterior bite plane for about four to six months. A combination of passive eruption (posterior teeth) and intrusion (anterior teeth) allowed the re-establishment of posterior occlusion while maintaining the anterior space. Dahl originally used a cast metal appliance to separate posterior teeth. The same goal can be achieved today using provisional restorations or adhesive dentistry (direct resin composites) for about four to six months. A combination of passive eruption (posterior teeth) and intrusion (anterior teeth) allowed the re-establishment of posterior occlusion while maintaining the anterior space. Dahl originally used a cast metal appliance to separate posterior teeth. The same goal can be achieved today using provisional restorations or adhesive dentistry (direct resin composites) and can be used to create similar space posteriorly.

Tooth surface loss

Tooth surface loss (TSL) is a normal, physiological process that occurs throughout life. Depending on the rate of wear, this physiological process can be described as a pathological one if it occurs rapidly and/or if it is accompanied by acid erosion – as in acid regurgitation at night, bulimia, fizzy drinks consumed excessively, etc.

In the majority of patients, TSL is accompanied by dento-alveolar compensation, including alveolar bone growth and cementum deposition. These physiological compensatory processes ensure that, for the majority of patients, occlusal contacts are maintained in order to retain the efficacy of the masticatory apparatus. This lack of interocclusal space presents a problem for the restorative dentist.

One approach is to conform to the existing intercuspal position (ICP) and create the necessary interocclusal space by further occlusal reduction of the worn teeth. Occlusal reduction of already worn teeth may lead to a lack of axial height and thus insufficient retention and resistance for conventional restorations. Periodontal crown lengthening procedures will add retention but, unfortunately, introduce other disadvantages.

Tooth preparation and the associated loss of coronal tissue can risk further insult to the pulp and limit the options for future restoration replacement and many patients do not enjoy this surgical option.

An alternative approach is to create the necessary space by reorganising the occlusion by means of an increase of the vertical dimension of occlusion but many will require a full-mouth reconstruction. A different variation involves reconstruction of the occlusion to a retruded contact position (RCP) in a case where there is a large horizontal slide from RCP to ICP.

Orthodontic appliances can be used to create sufficient interocclusal space by a combination of relative vertical and horizontal bodily movements and a change in the axial inclination of the teeth. These compensatory and specialised techniques may be more appropriate when other features of the occlusion require treatment such as anterior crowding or midline changes.

A typical example of this is shown in Figures 1 to 6. This 35-year-old lady was referred by the GDP because of the wear on her lower anterior teeth and for the replacement of the missing upper left canine tooth and correction of the associated centre line discrepancy.

In this instance, traditional orthodontics not only corrected the centre line but also moved the upper anterior teeth upwards, creating space for the restoration of the worn lower anterior teeth.

Anterior Dahl appliance

A typical example of a Dahl appliance is shown in Figures 7 to 11. The patient was a 55-year-old man who was referred by his GDP with extensive erosion of the palatal surfaces in the upper anterior teeth to a degree that he was concerned about the sensitivity of the teeth. Although all teeth had a degree of tooth wear, only the upper anterior teeth were worn sufficiently to justify intervention.

A nickel chromium fixed Dahl appliance covering the palatal surfaces of all the upper anterior teeth was made on a working model articulated with a lower model in the terminal hinge axis position. The interocclusal distance was increased by raising the incisal pin point on the articulator and the appliance waxed up to produce an occlusal platform at right angles to the long axis of the lower incisor teeth. The cast appliance was then sandblasted and cemented to the teeth with glass ionomer cement. The appliance was adjusted to establish even contact of all lower anterior teeth in occlusion with the Dahl appliance and it was confirmed that none of the posterior teeth made contact in any excursion of the mandible. There was no problem with retention of the appliance throughout the active phase of treatment, even though the amount of enamel around the exposed dentine on the palatal surfaces of the teeth was minimal. An alternative approach could have been to do a similar treatment using direct composite, splinting the anterior teeth.

After 12 weeks, the posterior teeth had fully erupted until occlusion, allowing for removal of the Dahl appliance and restoration of the ended...
palatal aspects with Empress (Vivadent) palatal veneers.

**Posterior Dahl appliance**

Tooth wear affecting only posterior teeth is usually part of a generalised condition affecting the whole dentition. Occasionally, the pattern of this tooth wear is such that individual posterior teeth may require restoration. More often, however, the Dahl appliance principle can be used to reverse the over-eruption of posterior teeth due to opposing teeth being extracted.

Where space is at a premium, the selection of a gold alloy as opposed to porcelain will be advantageous. Because of the normal arc of mandibular closure, there will often be more space available in the premolar regions, allowing the opportunity to use more aesthetic restorations. Aesthetic demand is often greater for occlusal surfaces in the mandibular arch.

In selected cases, it is possible to consider a full mouth reconstruction of the worn dentition using resin-bonded ceramic restorations. The longer-term durability, particularly of the posterior onlay restoration, remains unpredictable and characteristically small fracture lines can appear in time, which may eventually result in catastrophic failure.

**Alternative Dahl appliances**

The same principles can be used in traditional crown and bridge work by leaving the prototype crowns high and waiting for over-eruption. Figures 13 to 19 is a typical case study of a young lady with bulimia requiring anterior restoration, by using the Dahl appliance theory with ‘high’ anterior prototype crowns to gain space, the palatal aspects of the eroded teeth need not be prepared.

Over-eruption, when it does occur, is seldom axial and involves tipping as well. In this scenario palatal upper cusps often appear to grow longer and, likewise, lower buccal cusps. This increases the potential for the introduction both RCP-WP and also non-working side interferences. Thus, every Dahl appliance treatment should finish with careful assessment of the occlusion and where appropriate occlusal adjustment in order to maintain the five principles of occlusion in the restored case.

**Conclusion**

It is hoped that this article gives you an update and insight into the Dahl concept. Although there is a need for further research, the evidence to date indicates that the technique can be confidently and successfully used in a variety of PDC/clinical situations and for many patients, irrespective of age or sex.

The technique appears to be safe and avoids performing destructive restorative procedures on compromised teeth. The development of adverse events is very rare. If they do occur, they tend to be minor in nature and transient with no long-term adverse sequela.

The Dahl concept tends to be associated with the management of the worn dentition. However, the technique could also be applied to compromised and root-filled teeth, and to correct localised distortions in the occlusal plane.

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**Certificate & Diploma in Restorative Aesthetic Dentistry**

**From British Academy of Restorative Dentistry**

**DUBAI 2017-2019**

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Complex esthetic and functional rehabilitation using glass-ceramic materials

Given the enamel-like properties of glass-ceramic materials, minimally invasive treatment options provide a reliable method to restore the function, esthetics and biomechanical characteristics of the dentition while minimizing the damage to the biological structures.

By Prof. Dr. Daniel Edelhoff and Oliver Brix, Germany

Resin-bonded single-tooth glass-ceramic restorations such as veneers and onlays have been used for many years in dentistry. Nonetheless, their use for complex rehabilitation – e.g. in patients with generalized hard tissue defects – is still critically discussed. These reservations can be increasingly abandoned in view of the beneficial preliminary results reported in controlled clinical studies and the experiences gained in specialist practices. It is essential for the long-term and reliable application of this method to accurately coordinate the stages between the dentist and technician and allow the patient to be actively involved. These stages consist of a careful treatment planning process including a study wax-up/mock-up (esthetic evaluation), treatment planning (functional evaluation), selection of appropriate tooth morphology and thereupon planning of the permanent restorations after having been in situ for more than eleven years.

Pre-operative situation

A 40-year-old female visited the practice with the request to have her severely worn dentition restored. She said that she had begun to experience increased sensitivity to thermal and chemical stimuli and complained about the unfavourable esthetic impact of her teeth (Fig. 1). When we recorded her dental history, she told us that she had become aware of an uncontrolled change in her anterior teeth and in the fullness of her lips, particularly when she was looking at photographs of herself. The clinical findings and dental history showed a large and, at times, substantial destruction of her tooth structure and extensive changes in the proportions of her teeth. These changes were primarily caused by abrasive processes and resulted in a reduction of the vertical dimension of occlusion (VDO). The functional analysis of the dentition did not reveal anything unusual. However, the loss of canine guidance and the rise of anterior and posterior group guidance were conspicuous (Figs 2a and b). The special challenges of this case were: high complexity of the rehabilitation, the patient’s request for a prompt and minimally invasive improvement of her situa- tion, the need for creating an appropriate tooth morphology and therefore for reconstructing the VDO as well as the permanent placement of the restorations on damaged tooth structure.

Treatment planning

Fillings were placed on the teeth, some of which were severely dam- aged, using an adhesive composite system (Syntac®, Tetric Ceram®) before planning of the permanent reha- bilitation was commenced. This enabled us to better assess the extent of the destruction and obtain a better idea of where the potential prepara- tion margins would be located. To achieve an esthetic and functional rehabilitation, the following treat- ment goals were defined:

- create an adequate tooth morphol- ogy on the basis of a suitable width- length relationship of the teeth,
- establish an anterior canine-pro- tected dynamic occlusion and
- rebuild the vertical dimension of occlusion (VDO).

The destructive processes to which the damaged teeth had been ex- posed should be halted and a last- ingly stable occlusion should be created.

The patient wanted a long-lasting rehabilitation based on a minimally invasive procedure and tooth-col- ured restorations.

Clinical implementation and long-term evaluation

Crowns made of lithium disilicate cer- amic in the laying technique (IPS e.max® Press/Ceram) were used for the upper anterior region because of the high degree of tooth destruction present (large composite fillings, Fig. 3a). In the lower anterior region, glass-ceramic veneers layered on refrac- tory dies (IPS d. SIGN®) were inserted (Fig. 3b). Full-contour veneers pressed from leucite-reinforced glass-ceram- ic and customized using the staining technique were placed in the poste- rior region (IPS Empress® Esthetic). The onlays exhibited a minimum occlusal thickness of 1.5 mm (Fig. 4).

Cementation was achieved with a multi-component adhesive system in conjunction with the total-etch technique (Syntac) and a dual-curing lowviscosity luting composite, using where possible rubber dam isolation (Fig. 5).

Recall after more than eleven years

At a follow-up examination conducted more than eleven years after the restoration had been placed, a total of 27 units were still present, 15 posterior onlays were retained in an undamaged state (Figs 6a and b). However, cracking had been noticed on the glass-ceramic onlay of tooth 24 after more than six years of clini- cal performance and for this reason the onlay had subsequently been re- placed. Close inspection of the man- dibular anterior veneers revealed a severe wear facet on veneer 43 (Figs 7a–c). Similar to the other veneers, this area was in direct contact with the lithium disilicate crowns on the maxillary anterior antagonists during dynamic occlusion.
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Dental Photography Part II: Protocol for shade taking and communication with the lab

By Dr. Eduardo Mahn, Chile

Abstract

Part I of this article discussed the basic equipment that is necessary for dental photography. In addition, a few examples of pictures taken that were better than others for the same situation were also shown. In part II, a protocol of taking digital photographs will be presented which has been of great help to the author, specifically in achieving the right shade and value.

It is based on standardized pictures that should be taken in order to show certain individual characteristics of the teeth to be treated and standardized comparisons of the shade tabs and the natural tooth structures in order to give the technician more information than the usual A2 or A3 written on a piece of paper.

Shade taking

The evolution in digital photography and the possibility of taking pictures and evaluating them immediately as well as almost instantaneous access of the information by someone located off-site in the same city or even another country, we have a great resource available that can help us achieve the right shade of our indirect restorations. Standardized high-quality photographs are also an advantage when the shade is taken for a direct restoration - for example a direct veneer or a class IV.

In this case a picture can really help the clinician identify the opalescent areas and the halo effect of the adjacent tooth, before re-doing the restoration (Figure 1).

Dental shade taking at the dental lab or in the dental practice can be frustrating as most dentists do not really know how to use the shade guide when they finish their undergraduate studies. In particular, if work has to be redone, because the clinician does not know what was done incorrectly wrong or how to obtain the right shade.

Dental shade guides are used by dentists, dental assistants and dental laboratory technicians to communicate proper tooth color, translucency, and brightness.

However, many variables come into play no matter what system you decide to use. Before even starting to think about shade taking, you need to answer an extremely simple and obvious question: are you using exactly the same shade system at the lab? There are many shade taking systems available, with variations in the shades between different manufacturer, even though the concept may be the same.

They are also manufactured from different materials with different optical properties. For example, some tabs are familiar with the Chromeo scope system, most of the dentists with the A-D shade guide, while the younger generation of dentists learned with the 3M master shade guide. The role of a shade guide is to help standardize the perception and so facilitate the communication in order to match the shade of the natural teeth with the required restoration.

Shade guides are not a perfect representation of what is actually seen but are close enough to identify a range of tooth colors. They are still used as a comparison under the same light conditions. When the technician compares the color of the restoration with the shade guide, he can take a picture that will create an image to be used as a comparison under the same light conditions as the natural tooth in the image sent by the clinician (Figures 3-5).

Figure 2. Example of different shade guides showing the same shade. The differences are obvious.

Figure 3. The picture will help the clinician to understand the challenge of reproducing the opalescent areas and the halo effect at the incisal third.

Figure 4. Different appearance of the shade tabs under different light conditions.

Figure 5. Different appearance of the shade tabs under different light conditions.

Figure 6. The technician should always check the final appearance of the restorations with the use of the natural die materials shade guide on order to come to the optimum result.

Figure 7. Different appearance of the shade tabs under different light conditions. The differences are obvious.

Figure 8. Mayor differences in the appearance of the same veneers teeth 11 and 21, due to the use of light or lack of light. (Thanks for the pictures to CDT Juergen Seger, Liechtenstein)

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The use of shade guides should be used in conjunction with digital photography if no direct light is projected to the mouth and the shade tabs, the main light source will be the flash of the camera, which has always the same temperature (between 5500° and 6000°K) and can be used by the dentist in the clinic and the technician in the lab. When pictures are taken under different light conditions, the variations between the same shades can be considerable. A good photo for both the dentist and the lab technician can be emailed so that they are both looking at the tooth color under the same conditions. When the technician compares the color of the restoration with the shade guide, he can take a picture that will create an image to be used as a comparison under the same light conditions as the natural tooth in the image sent by the clinician (Figures 3-5).

Due to the flash of the camera, the technician can then compare, under the same light conditions as the clinician, whether the restorations look similar to the original shade tab sent by the clinician. (Figure 6). Veneers by CDT Juergen Seger, Liechtenstein

Tooth Color Basics

Color has two basic characteristics. Hue and Chroma. Natural tooth color also displays these same characteristic. Hue can be defined as the actual color such as, yellow or gray. Chroma is the intensity of that color and is sometimes called saturation. Hue and Chroma are typically represented by a shade guide in terms of which color comes closest to the actual tooth being measured. For example, shade guides will have a range of A2 to A3 or B1 to B4, plus C and D shades (Figure 6).

Value is the brightness of a tooth. It is therefore given a separate classification than color when communicat- ing shade. Teeth also exhibit translucency and can be measured by how much light can pass through different sections of a tooth. Shade taking problems arise because most natural teeth are not an exact match to a shade guide, nor do shade guides adequately express tooth translucency.
5. The operatory light should be turned off or pointed in another direction. It must not focus on the patient.

6. The room light conditions should have a temperature of 5000-6500° K. (when parameters are taken, these parameters are no longer relevant, because the light of the flash will prevail)

7. Obtain value levels by squinting.
8. Women are far less likely to be color blind than men, so it is a good idea to have your assistant assist in shade taking decisions (assuming that the assistant is a woman and not color blind).

In Part 1 of this article, the necessary equipment and accessories for adequate intraoral pictures was discussed. Please refer to it for the necessary information if you are planning to purchase adequate equipment. Once the patient is ready, place the shade tabs in front of the anterior teeth, before starting the treatment itself. The same applies for pictures with lips. It is important to repeat the same protocol intracorally, as well as extraorally, because of the large influence of the reds in shade taking (Figures 7-8).

In addition to the points presented before, the following should be considered initially when photographs are taken (Figures 9-15):

1. Avoid the large reflection areas of the metal parts of the shade guide as they reduce the detail of the pictures.
2. Take pictures using two different shade tabs.
3. The surface of the shade tab must be at exactly the same level of the buccal surface of the teeth, as even minor discrepancies can make a tooth look darker or brighter due to the power of the flash.
4. The incisal edge of the tabs should be at roughly 1mm distance from the natural teeth, or as close as possible, without touching each other.
5. Take pictures with and without contrasting. This is especially relevant in young teeth with opalescent areas and clear halo effects.
6. In cases where an all-ceramic restoration is planned, the shade of the stump should also be given to the lab, using a special shade guide, such as the natural die material shade guide of the IPS e.max system (Ivoclar Vivadent, Liechtenstein).

7. Consider taking some pictures in black and white. A black and white photograph will help show the value of the shade tab in relation to the patient’s tooth. (Figure 14)

Clinical case
A 27-year-old female patient came to our office unsatisfied with the appearance of her 2 anterior pfm crowns (Figure 25). The value of both crowns clearly did not match the other teeth and her smile line unfortunately also showed the discolored cervical part of tooth 11 (Figure 26).

An overview picture of the stump shade was taken with a reference (Figure 17a). This reference should ideally be the natural die material A+D shade guide (Figure 17b). Both shade guides, the natural die material guide and the A+D shade guide have some similarities, for example, as a rule of thumb an ND2 looks quite similar to an A2 (Figure 17b).

Obviously, the natural die material shade guide has shades that are dark since its purpose is to correlate to artificially discolored stumps and not to recreate natural shades as the A+D shade guide (Figures 17c and 18). Internal bleaching of the stump was performed with 35% hydrogen peroxide (Figure 28) in 2 sessions of 20 minutes each. Figure 29 shows the final result after the composite build-up with Excite DSC and Multi- core flow (Ivoclar Vivadent, Liechtenstein). An impression was taken and sent to the lab.

The cast was scanned and an IPS e-max CAD LT block was milled (Figure 20). The appearance of the crowns is always checked with the natural die material stumps in order to get the correct value and chroma (Figures 21 and 22). Finally, contacts and final integrations of the crowns were checked in the solid cast (Figure 23, laboratory work done by CDT Volker Brosch, Germany). A retraction cord was placed prior to bonding the crowns (Figure 24).

The stumps are etched with phosphoric acid (Figure 25) and Excite DSC was applied (Figure 26). Variolink N (base and catalyst, translucent shade) were mixed and applied to the crowns (Figure 27).

After 4 weeks a natural integration of the crowns with the right hue, color, chroma and effects can be seen in Figure 29.

Acknowledgements
The author would like to thank CDT Juergen Seger and Volker Brosch for their valuable technical work presented in this article. 

Dr. Eduardo Malm, DDS, PhD, graduated from the University of Chile in 2004. He received the German DDS, one year later. The New York University College of Dentistry certified him as Implantologist in 2007 and he submitted his thesis in 2008 titled “Osteointegration of zirconia implants, an in vivo study” and got his doctorate degree in 2010 from the University of Düsseldorf, Germany.
Endo, Ortho and Digital Dentistry during Module 2 of the Restorative & Aesthetic Diploma

CAPP Tipton Dental Academy and The British Academy of Restorative Dentistry (BARD) welcomed two groups of dentists from 18 different countries to Module 2 of the Restorative and Aesthetic Dentistry Certificate and Diploma program between 02-05 November 2016 in Dubai.

By Dental Tribune MEA / CAPPmea

DUBAI, UAE: The two groups finally had the chance to meet and share their experiences as they gathered together for Module 2 of the Restorative and Aesthetic Diploma Course. Group 1 began the first two days with “Enhance your Expertise in Endodontics” presented by Professor James Prichard (UK) – visiting Professor and Program Leader, MClinDent in Endodontology at the BPP University which collaborates with the City of London Dental School. Prof. Prichard has awards as Fellowship awards from the International Academy of Dental Facial Esthetics in New York and recently gained his Associate Fellowship from the Higher Education Authority as part of a post-graduate teaching certificate in professional education. The remaining days of the module covered “Digital Dentistry and Lab Flow” as well as “Modern Ortho combined with Restorative Dentistry Concepts” – taught by Dr. James Russell (UK) and Mr. Jonathan Parkinson (UK). Dr. Russell is the youngest dentist to ever be accredited by the British Academy of Cosmetic Dentistry which is awarded in recognition of excellence in cosmetic dentistry.

The two groups will once again come in Dubai coming February 2017 for the highly anticipated Module 3. The topics will be “The Art and Science of Aesthetic Dentistry – Anterior Diagnostic Waxing and Posterior Diagnostic Waxing” and “Implant Prosthodontics” which will be taught by Prof. Paul Tipton (UK) and Prof. Goran Urde (Sweden). Module 4 will then take place in May 2017 with delegates graduating for the Year 1 Certificate upon successful completion. Participants then have the opportunity to continue to Year 2 where they can obtain a Diploma in Restorative and Aesthetic Dentistry issued by BARD and also serving as a pathway to MClinDent with City of London Dental School and BPP University or Master of Science (MSc) in Restorative and Aesthetic Dentistry from The University of Manchester and Healthcare Learning.

The organizers have now officially opened registrations for dental professionals willing to start the program from September 2017 (group 3).

More information could be found on www.cappmea.com/capptipton.

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"The hands-on sessions with the one-to-one approach from the entire BARD faculty were really exceptional."
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MODULE 5 | April 2018 (4 days) | Restoration of Endodontically Treated Teeth
Plastic Restorations, The Use of Posts, Cuspal Coverage, Occlusion

MODULE 6 | July 2018 (3 days) | Management of Endodontic Failure
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INTERCONTINENTAL DUBAI FESTIVAL CITY
Poster Presentation submission open for dental professionals at the 12th CAD/CAM & Digital Dentistry Conference/Exhibition

By Dental Tribune MEA / CAPPmea

Are you impatiently looking for a thriving opportunity to exhibit your recent dental research on one of the largest dental events in the Middle East region?

CAPP (Centre for Advanced Professional Practices), has announced the upcoming 12th CAD/CAM & Digital Dentistry Conference/Exhibition. The international dental conference is scheduled to be held on 05-06 May 2017 at the InterContinental Hotel Festival City in Dubai. It opens up an exciting opportunity for competent professionals to submit their poster presentations.

The CAD/CAM & Digital Dentistry Conference is the twelfth edition organized by CAPP, particularly designed for the skilled dentists who are aiming to expand their educational and business knowledge. The dental conference and exhibition ensures a possibility to uplift the careers of dental professionals, thus providing a gateway for acquiring the utmost benefits.

Additionally, at the event, a number of participants enjoy the privilege to show their capabilities & knowledge among internationally high-qualified experts. It enables the dental professionals to nourish their absolute skills and show their capabilities to the outer world which are analyzed by an expert team of judges after their in-depth reviews.

Earlier in November 2016, over 20 posters were submitted by dentists from various countries during the annual 8th Dental Facial Cosmetic International Conference in Jumeirah Beach Hotel, Dubai.

CAPP invites all dental professionals to present their papers at 12th CAD/ CAM & Digital Dentistry Conference/Exhibition. The conference will also include educational lectures led by industry experts, hands-on courses, face-to-face business opportunities and an exclusive chance to avail networking opportunities with the industry peers.

If you are confident about your educational research and intend to submit a poster presentation, submit it on the organizers website (www.cappmea.com/cadcam).
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Computer simulations show lasers effective in killing oral bacteria

By DTI

NEW YORK, USA: A team of researchers at the New York Institute of Technology in the U.S. has developed a computer model that demonstrates how dental lasers attack oral bacterial colonies in gingival tissue. The results of their study suggest that certain dental lasers used for sulcular debridement can effectively remove oral pathogens buried deep in the soft tissue while sparing the gingiva.

Lasers are used in various dental procedures, including nonsurgical periodontal treatment, which is aimed at removing bacterial debris in order to treat and prevent gingivitis and periodontitis. However, the cost of dental lasers can range from $5,000 to over $100,000, and healthcare professionals have to undergo extra training to use them.

In order to establish whether these additional costs and effort are justified, the U.S. researchers aimed to determine whether there is a definite benefit of using dental lasers in periodontal treatment. Moreover, they wanted to ascertain how certain laser parameters, such as wavelength, peak power and pulse duration, affect the destruction of oral bacteria.

Based on the optical characteristics of gingival tissue and pathogenic microorganisms, the researchers developed a mathematical model that simulates the periodontal procedure of laser sulcular debridement. They then produced simulations of three different types of lasers commonly used in dentistry and their effects on two types of bacterial colonies. The virtual colonies, consisting of Porphyromonas gingivalis and Prevotella intermedia, were of various sizes and placed at different depths in the gingival model.

“One of the questions we asked is how deep could the bacteria be and still be affected by the laser light,” explained study author Dr. Lou Reinisch, an expert in laser surgery and optical biomedical diagnostics and Associate Provost for Academic Affairs at the university.

Dental lasers tested in the study included diode, Nd:YAG and Er:YAG lasers. According to the computer model, two of the laser types—diode lasers and Nd:YAG lasers—proved to be effective in removing the bacterial colonies. “The findings are important because it opens up the possibility of tweaking the wavelength, power, and pulse duration to be the most effective for killing bacteria,” Reinisch said. The simulations indicated that 810 nm diode lasers, when set to short pulses and moderate energy levels, are able to destroy bacteria buried 3 mm deep in the gingival tissue. Nd:YAG lasers with a wavelength of 1,064 nm also proved to be effective with similar penetration depth.

Moreover, both lasers spare the healthy tissue, the researchers found. Their simulations showed minimal heating of the surrounding tissue and therefore minimal thermal damage, which leads to faster healing, Reinisch explained.

According to him, the simulations validate the effectiveness of dental lasers in removing oral bacteria and contributing to better oral health after periodontal treatment. The researchers expect that clinical trials based on the results of their study will be designed to confirm their findings.

The study, titled “Selective photoanastisepsis,” was published in the October issue of Lasers in Surgery and Medicine. In a first for the journal, the published results include video depictions of the computer simulations. A video of the simulations can be watched below.
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Herbal toothpastes effective in reducing inflammatory markers, study finds

By DTI

SANGLI, India: When it comes to harmful ingredients, herbal oral care products, which usually do not contain artificial substances such as sweeteners, colourants or preservatives, are considered a safer alternative to most conventional dentifrices. However, to date, sufficient research on the efficiency of plant-derived oral care products has been sparse. Aiming to change that, researchers from India have now compared the effect of three different herbal toothpastes on salivary enzymes that are important for maintaining oral health.

It is estimated that about 80 per cent of people in developing countries still rely on plant-derived traditional medicine for primary health care purposes. In the Western world too, herbal products are increasingly considered a healthier and safer alternative to products containing chemicals. However, when comparing the oral health benefits of conventional dentifrices, existing research mainly focuses on the antimicrobial properties of herbal toothpastes. Expanding on this approach, the Indian researchers investigated changes in the levels of salivary alkaline phosphatase (ALP) and salivary acid phosphatase (ACP) with the use of herbal toothpaste over the course of four weeks.

ALP is an inflammatory marker that promotes the inflammatory process and ultimately periodontal disease and ACP is a salivary factor associated with calculus formation and hence inflammation, lead author Dr Mahesh Khairnar told Dental Tribune Online.

The toothpastes evaluated in the study were Dant Kanti (Patanjali), Complete Care (Himalaya Herbals) and Vicco Vajradanti (Vicco). The study was conducted among 45 dental students, who were grouped into 15 subjects per group and toothpaste) and instructed to brush twice daily with the respective toothpaste: saliva samples, consisting of an unstimulated saliva sample taken first thing in the morning and one after brushing, were obtained on a weekly basis on Day 1, 7, 14, 21 and 28.

All three toothpastes showed significant reductions in salivary ALP and ACP levels after brushing at each interval. When the dentifrices were evaluated individually, the Dant Kanti and Vicco Vajradanti toothpastes were found to be more effective in reducing the levels of salivary ACP and ALP than the Complete Care toothpaste, the researchers wrote.

While all herbal toothpastes tested inhibited ALP and ACP activity in the saliva of the participants, long-term clinical trials are needed to quantify the efficacy of herbal toothpaste, the researchers emphasised. Moreover, they suggested that future studies assess the combined effect of herbal toothpastes and herbal mouthwashes.

The study, titled “Comparative evaluation of efficacy of three different herbal toothpastes on salivary alkaline phosphatase and salivary acid phosphatase—A randomized controlled trial”, was published in the September issue of the Journal of Clinical and Diagnostic Research.

The preliminary results of a similar study by the same research group corroborate these findings on the oral health potential of herbal toothpastes. In the study, the findings of which are yet to be published, Khairnar and his colleagues evaluated the effect of herbal toothpastes on pH values and glucose levels in saliva—both of which are factors that influence oral health. Increased salivary glucose is responsible for increased caries incidence, and acidic salivary pH values can facilitate caries formation.

According to Khairnar, the results thus far indicate that herbal toothpaste is effective in reducing salivary glucose levels, while salivary pH values increased and shifted to the alkaline range, which is considered most beneficial for oral health.
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*The final closing date for entries is Saturday, 31th December 2016. Multiple entries are possible, there is no maximum number, but the same image can only be entered once. Each image should be saved in the .jpg/.jpeg format not larger than 3 MB with a medium to high quality. Only entries submitted by e-mail to ifeelgood@ems-ch.com will be accepted. The illustration should show the smiling face of your patient. The price for the best entered picture is a trip to the EMS headquarters in Nyon, Switzerland (incl. air fare, free board and lodging and an exclusive EMS plant tour).
By Dental Tribune Asia Pacific

Prof Denis Bourgeois is not only the Dean of the University of Lyon’s dental faculty in France but also a pioneer in research on oral prophylaxis, interdental biofilm management and interdental brushing techniques. He was the first to test for 19 major pathogens in the interdental biofilm known to be involved in periodontitis in young healthy adults. Furthermore, he has suggested interdental brushes to prevent interdental biofilm accumulation as well as to decrease the development of periodontal diseases and even systemic diseases. “An interdental brush can remove around 16 billion bacteria from each interdental space,” said Bourgeois during his presentation at the FDI Annual World Dental Congress in Poznan, Poland.

Despite advances in good oral health care, many patients and dental professionals remain uncertain about oral physiopathology and the concept of disruption of biofilm instead of elimination of dental plaque. According to various studies, conventional toothbrushing is not effective in removing interproximal plaque successfully. Recommendations on oral hygiene practices from dental practitioners have focused on the methods of daily toothbrushing and interdental cleaning instruments as standard for achieving and maintaining good oral health. However, uncertainty has remained about oral physiopathology and the concept of disruption of interdental biofilm.

**Sixteen billion bacteria in one interdental site**

So why does interdental cleaning actually matter? The anatomy of the interdental space does not allow for an efficient salivary self cleaning mechanism and makes cleaning this area difficult. As a means of further understanding the mechanism of periodontal pathologies, Bourgeois was the first to use real time polymerase chain reaction to quantify and qualify the interdental biofilm in healthy adults and explain the role of interdental biofilms management in preventative oral health.

In his study, an astounding approximate 16 billion bacteria were collected on average from each interdental site. Of the 19 major periodontal pathogens quantified in the study, bacteria of red and yellow complexes constituted the majority of interdental bacteria. In particular, red complexes such as Porphyromonas gingivalis, Tannerella forsythia and Treponema denticola were recognised as the most important pathogens in adult periodontal disease. P. gingivalis was detected in 19 per cent of healthy subjects and represented 0.02 per cent of the interdental biofilm. As dental research has confirmed, P. gingivalis alone can induce alveolar bone loss, and in combination with T. denticola and T. forsythia, periodontal disease is likely to occur. This means that the interdental biofilm of even healthy individuals is composed of bacteria that could lead to periodontitis. “The effective presence of these periodontal pathogens is a strong indicator of the need to develop new methods for disrupting interdental plaque and qualify the interdental biofilm,” concluded Bourgeois.

**Bleeding as a clinical reference**

Despite good oral hygiene habits, many patients experience interdental bleeding. “As we have seen, the interdental space is a source of bacterial contamination and has an effect on overall health,” said Bourgeois in his presentation. According to the latest research, 5 per cent of young adults without periodontal disease or clinical gingivitis have experienced interdental bleeding at least once. This information should be considered critical for daily oral hygiene and interdental cleaning in particular. “There is a need to use interdental cleaning tools in order to achieve optimum oral health. If you do not use them, you could essentially stop using a toothbrush, as bleeding will occur otherwise anyway in the future.”

In a study titled “Efficacy of interdental calibrated brushes on bleeding reduction in adults,” a group was asked to use a standard manual toothbrush twice daily and an interdental brush daily. Based on the hypothesis that interdental brushes reduce interproximal bleeding, Bourgeois and his team investigated periodontally healthy and young individuals how to use interdental brushes daily and correctly. In addition, a calibrated colorimetric probe helped to effectively determine the interproximal space and young brush size. As the study suggests, the overall interproximal bleeding was reduced by 47 per cent after one week and 71 per cent after three months. Bourgeois and his team concluded that interdental cleaning can be considered as “an effective means to help individuals maintain and/or achieve optimal oral health.”

As the general access widths of interdental spaces were mostly unknown in young adults, Bourgeois and his colleagues also assessed the distribution of these spaces and was able to access 94 per cent of interdental spaces. Over 80 per cent of sites required a small diameter interdental brush (0.6-0.7 mm) from the Curaprox CPS Prime series. As a result, the study concluded that most interdental sites can be cleaned using interdental brushes, but accessibility of interdental spaces would need to be established in the dental practice by the dental professional.

**Interdental brushes prove to be superior**

Conventionally, interdental brushes were only recommended for patients with large interdental spaces, while dental loss was recommended for narrow spaces. As technology advanced, so did the innovation with interdental brushes, and as a result, interdental brushes can now be used for very small interdental spaces to clean the space between teeth effectively. “Dental loss used to be the common tool for narrow spaces. However, dental loss is no longer preferred, as its use is not supported by conclusive scientific evidence. For interdental brushes, we have scientific evidence. Interdental brushes have now become the best tool for cleaning interdental spaces,” said Bourgeois.

As Bourgeois concluded at the end of his presentation, “The interdental brush currently represents the primary and most effective method available for interproximal cleaning. Interdental brushes are specifically designed to clean between the teeth in accordance with the interdental space access diameter. The method of choice for interdental cleaning when brush space permits is to select the largest size that can penetrate into the interdental space and then to fill this space completely without causing discomfort or trauma.” By using a calibrated Curaprox SAP colorimetric probe, a suitably sized interdental brush will help individuals achieve optimal biofilm disruption through interdental cleaning with minimal trauma.

For all studies, Bourgeois and his team selected the CPS prime series of the Swiss oral care brand CURAPROX. More information can be found at www.curaprox.com.

Prof Denis Bourgeois, is working as a professor in the Faculty of Dentistry at the University of Lyon (18 Rue Guillaume Panélias, 69372 Lyon Cedex 08, France, and can be contacted by phone at +33 478578864 or by e-mail at denis.bourgeois@univ-lyon1.fr. 

**Why interdental brushes are essential for good oral health**

“There is a need to use interdental cleaning tools in order to achieve optimum oral health.”

**News**

**Dental Tribune Middle East & Africa Edition | 6/2016**

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Dental fillings may contribute to increased levels of mercury in the body

By DTI

ATHENS, Ga., USA: Although the potential adverse health effects of mercury have been the subject of debate for a long time, the extent to which dental fillings affect mercury levels in the body was still unclear. A new study has now found that people with multiple dental fillings exhibited significantly elevated levels of mercury in their blood compared with people who did not have dental surface restorations.

The study, which analyzed data from nearly 15,000 individuals, is the first to demonstrate a link between dental fillings and mercury exposure in a nationally representative population. The researchers found that patients with more than eight fillings had about 150 percent more mercury in their blood than those with none.

They further analyzed exposure by specific types of mercury and found a significant increase in methylmercury, the most toxic form of mercury, associated with dental fillings, suggesting that the human gut microbiota, a collection of microorganisms living in the intestines, may transform different types of mercury.

Mercury exposure from dental fillings is not a new concern, but previous studies were inconsistent and limited, according to Dr. Xiaozhong Yu, co-author and Assistant Professor of Environmental Health Science at the University of Georgia’s College of Public Health. “This study is trying to provide the most accurate levels of exposure, which will form the scientific basis to make future risk assessment,” Yu said.

In response to the study, the American Dental Association (ADA) issued a press statement at the end of September that clarified that the association’s position on dental amalgam remains unchanged. “The mercury levels cited in the study did not exceed a level that according to the National Academy of Sciences would be known to cause adverse health effects. Thus no conclusions about the safety of dental amalgam should be drawn from this study. In addition, the study used data that included two different types of dental materials: composite, which does not contain mercury and dental amalgam, made from a combination of metals including silver, copper, tin and mercury. It is important to note that since the study does not differentiate between the two filling materials, the study’s findings may be prone to over-interpretation,” the ADA stated.

The ADA and the U.S. Food and Drug Administration consider dental amalgam fillings safe for adults. However, they advise against its use in pregnant women and children under the age of 6.

The study, titled “Associations of blood mercury, inorganic mercury, methyl mercury and bisphenol A with dental surface restorations in the U.S. population, NHANES 2003–2004 and 2010–2012,” will be published in the December issue of Ecoscience and Environmental Safety journal. It was conducted by researchers at the University of Georgia and the University of Washington.
Eleven tips for success in your dental clinic

Part I: SWOT analysis and loyal patients

Do you offer a large variety of services that fulfill your patients’ needs? Can your patients find you and book an appointment easily with your clinic? Is your clinic characterised by high-technology and do your patients appreciate this? Is your dental clinic in a convenient location, allowing your patients to find you and reach you with ease?

Weaknesses
What are the areas that need improvement at your dental clinic? Are your payment options flexible? Do patients have to wait for more than 5 minutes for their appointment in the waiting area? Is the clinic decoration old and out of fashion? Should you change it?

Opportunities
What are current social, financial, or other trends that you could benefit from? For example, the demand for invisible braces for adults could be useful for an orthodontist to explore. The general dentist could consider including an aesthetic treatment based on the latest trends, such as whitening or restoration with white aesthetic material.

Threats
Is there anything happening in your environment that could be detrimental to your clinic? For example, a larger and newer clinic is to be opened in the neighbourhood or an existing competitor clinic is installing better technological equipment than that in your clinic. Other threats include political and environmental ones, such as an unstable political situation.

As a conclusion, it is evident that performing a SWOT analysis for your dental clinic will allow you to be proactive in your marketing strategies, since you will have the information necessary to develop effective strategies for the promotion of your clinic.

The second tip of this article is realising the importance of having patients who are not just satisfied but loyal. In order to understand the significance of this, let us explore the major difference between these two categories.

Satisfied patient
A satisfied patient is one who comes to the clinic for treatment and is not unhappy with the treatment or the service provided, but when a friend, a relative, or a colleague proposes that he or she see another dentist would do so. Such a patient too would not refer the clinic to others, or tell others about your good treatment.

Loyal patient
A loyal patient, however, is one who will spread through word of mouth what a wonderful dentist you are, and what a brilliant scientist, advising others to visit your clinic, and promoting your well-being. This is a patient who comes to your clinic regularly, is appreciative of your treatment and demonstrates this.

It is important to understand that we do not deliver a service in isolation, but as part of a culture, the culture of our clinics through the experience that our patients receive. They do not expect us to be the best just in our health care industry. We have to be the best, period. Our patients will not compare us only with other dentists but with all the services they receive and have experienced, such as in a hotel or a restaurant. Our competitors are anyone with whom our patients can compare us. People have expectations regarding how they should and want to be treated and these become the standard by which they judge their experiences.

When nothing in particular about an experience stands out, this indicates that one was merely satisfied. It takes something memorable to turn an ordinary experience into something special. Dissatisfaction comes from something bad that one experienced and remembers; loyalty is created through memorable things that happened that one did not expect. If our treatment is not memorable, why would patients continue coming to us?

Another essential question is how do we establish the areas in which we are lacking and in which we should improve our clinics to increase the group of loyal patients? The answer of course is nothing but obvious: by asking. We can obtain patients’ opinions through satisfaction surveys.

Several studies have highlighted the growing impact of patient satisfaction on the business success of dental clinics. In a more recent study, those patients surveyed cited being unhappy with their dentist as being their main reason for not referring the clinic to others.

The two tips provided in this article are a good start for all dentists in order to begin the improvement and evolution of our clinics, as well as ourselves. In the next part, we will offer two new tips that will reveal opportunities and potential of your dental clinic. Until then, remember that you are not only the dentist in your clinic, but also the manager and the leader.
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By FKG

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Twisted-Files Adaptive: A Novel Approach to Endodontic NiTi Instrumentation

By Dr. Adi Moran, UK

A major goal of Endodontics is the prevention or elimination of “apical periodontitis.” In Endodontics, it is the general term for endodontic related periapical/periradicular inflammation that is histologically a granuloma, cyst or abscess, in a symptomatic or asymptomatic form. 1 When root canal treatment is indicated, we rely on the triad of instrumentation involving removal of infected tissue to achieve this goal.

In a reciprocating movement the file rotates in one direction, engaging and cutting the dentin, and then rotates back to a lesser degree, disengaging from the dentin. This extends the cyclic fatigue resistance on the file, reducing stress on the instrument to a degree where it is possible to prepare the entire root canal using a single NiTi file (Fig. 1). 2 This is usually not possible when using NiTi files in a continuous rotation motion especially as a strong self-rotation by preparation by reciprocation vs. by rotation.

The other major advantage of reciprocating movement is that it helps to preserve better original canal trajectories, (Fig. 1). 3-6 This is attributed to the pure linear motion of instruments when applied on canal walls. However, other factors need consideration too. Use of files or with cutting tip designs would (negatively) greatly affect and promote transportation even when a file reciprocates. It can also be argued that preparing canals with a single NiTi file is simpler and to some degree might be quicker. 4-6

On the other hand preparation by pure reciprocation is known to increase the incidence of post-operative pain, brushing laterally may be less effective, less emphasis is given to the straight line coronal access (pre-framing) phase of preparation and also apical enlargement is not always achieved by a single NiTi file. 7

1. Increased incidence of post-op pain that is due to significantly greater debris pushed out as a consequence of the file movement in a full reciprocating mode. 8-10 This is true for vital cases and even more so, when in non vital cases, the debris being pushed out is impacted. 8-10

On the other hand, in pure, rotation, file debris is designed to push debris upwards away from the apex, resulting in significantly less debris pushed out. 11-14

2. After shaping to entire canal length and reaching the master apical file, we see that NiTi file is slightly flexible enough to achieve as much maximal canals circumferential cleanliness as possible in an extremophile canal where our instrument is round and centered. We get both ultra flexible files (such as Twisted Files) with effective cutting blades does this job more efficiently than with a reciprocating motion. 15-19 This is achieved beautifully utilizing the TF Adaptive System in the “TFA Program Mode”. Given the width of the canal at this stage, the file works in rotation only with low torque applied on it. The same could be achieved also by switching to the pure “Twisted File Full Rotation Mode” at a push of a button on the motor.

3. Single file endodontics is not always advised, especially when treating molars since the canals of the same tooth may vary greatly in dimensions. For example, preparing the master file size with taper and coltuff might be sufficient when preparing M1 and DB canals of an upper first molar tooth. Yet most cases this file size would not be as compatible for M2, or certainly not controllable for the palatal canal of the same tooth. In such cases, if a single reciprocating file is used, we may need to rest at a later stage to the step back or other rigid files techniques for apical enlargement. This is still far less than using any file file of various taper and apical dimensions to tailor our needs and combat each canal more specifically, without complications. 20-22 The TF Adaptive System lets us decide during each case whether to complete the work using a single NiTi file or to adapt with one or two more files. The “bigger” files yellow and then red are designed with enlarged apical size but with re- duced taper. They therefore remain highly flexible without being bigger in size. 23-27 This feature is important when the canal is highly curved but at the same time a greater size apical enlargement is required. This is easily and safely done with the apically wider yellow and red TFA files for the smaller green one (Fig. 2) took care of the taper in the coronal two thirds of the canal.

4. Lastly, there is the misconception about pure reciprocating systems being truly single NiTi endodontics, where in reality it is recommended to firstly produce a glide path wide enough to require up to three more files, which may be NiTi ones 28-30

R-Phase technology

R-Phase technology (highly flexible) and have shape memory (return to original shape after flexing) due to a reversible atomic crystal lattice shift between the Austenite and deformed Martensite states. 31 This atomic shift happens when external tension is applied on the file by the root canal. 32-34

However, the ability to create this atomic shift also depends on ambient temperature and on the alloy’s thermal pre-treatment during the manufacturing of the endodontic file. Manufacturing with specific thermal pre-treatment, (know as R-Phase) further contributes to the ability of the NiTi file to absorb stress and resist fatigue resulting in greatly enhanced file flexibility compared to NiTi’s manufactured with traditional ways. 35-38

• The Twisted Files’ cross section is a triangle. One this results in effective and cleaning out to use the same file both as a reamer and then later as a Hedstrom file to effectively brush laterally.

• The Twisted Files’ pinch configuration varies along the file rather than being constant. This reduces the “pull-in” effect and creates smooth tracking during root canal preparation.

• The Twisted Files’ tip is a smooth non cutting tip. The tip guides and does not dig. This helps in reducing occurrences of canal tortuosity.

The TF Adaptive way

Operator uses free different combination of warm rotating modes, the overall learning curve is quick and you get to love the entire system very soon.

The system is designed to shift automatically between interrupted rotation to start with and reciprocation. The rotation reaches 60 degrees then stops and restarts to a new 60 degrees loop. This gives the benefits of a rotated, i.e. better cutting and debris being pushed upwards. With increased load further down the canal and up to the root canal, the system will then gradually shift to varying reciprocation angles, as required.

This is different to the traditional reciprocation systems with constant (clockwise/clockwise-angle) modes. Under higher torque stress, TF Adaptive rotates 970 degrees clockwise and up to 95 degrees counterclockwise. This provides further safety against file separation and canal transportation is highly respected (Fig. 5 and 6). 39-40 The ML (Medium Large) file set is a true crown down technique. The taper of the first file facilitates better irrigation while the next ones work more on apical enlargement. The SM (Small) set makes serrated clinical tips.

Clinical tips

Following access cavity prepared, achieving straight line access is an...
important step prior to inserting a file and measuring the working length. Next, achieving a glide-path is important. In the ML set, the green file .08/25 will usually do most of the work in the canal. It is tempting for the clinician to pick it up/down apically all the way to working length in one go because the system is efficient and therefore in many cases capable of doing so. Avoid doing this and once the file engages dentin, take it out to clean flutes, irrigate the canal and remember to maintain recapitulation. File unwinding is unlikely to occur if the above rule is followed. However, in rare cases when it does happen, it should serve as a unique cautionary sign before file separation, and as a warning to the operator that the hand pressure applied apically on the handpiece was higher than advised.

After ML1, the ML2 .06/35 will often go effortlessly straight to working length. This is greatly beneficial for apical enlargement, reduces the risk of file separation. Depending on original canal size/complexity, this is also true when ML3 is needed. Achieving MAF (master apical file) of ML2 (.06/35) also means we can use an EndoVac irrigation system to better disinfect the root canal system. After MAF is achieved, I prefer final lateral brushing in the regular “TF Full Retraction Programme Mode” however this can also be done in the “TF Adaptive Mode”. The file will feel minimal torque and therefore brush in interrupted rotation 600-0 degrees and not reciprocation reciprocation.

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Fig. 4: X-ray results of the starting situation.

A 27-year-old came to our dentist and had neglected his teeth; sensitivity and poor esthetics. He was now determined to have his teeth cleaned and examined. The examination suggested extensive caries and gingivitis, which required treatment and were responsible for the tooth sensitivity; 13 - tooth crown completely broken, 14. 15. 25. 26. 37. 40. 49. 47. fractures and breakages with partially exposed pulp. 35 and 46 - missing. The sensitivity test and spectroscopy examination suggested extensive endodontic treatment, which was verified by an X-ray. It was possible to avoid extractions. Gingival recession due to periodontitis was identified in both the upper and the lower jaw. The papillae had fully receded, in particular the central papilla 11, 21, exposing black triangles. The patient had a neutral bite (single Class I), however an increase in the vertical dimension was necessary (sunken bite in the molar region).

Based on the results of the diagnosis, the dental team drafted a restorative plan. The dentist presented this to the patient including other possible alternatives. A metal-ceramic bonded solution was decided - which included single crowns and small bridges in the lower jaw.

Metal-ceramic bonded restorations are well proven solutions with a history of very long clinical success; this is supported by in-vivo studies. In comparison to zirconium oxide, metal-ceramic frameworks have the advantage of higher elasticity and lower hardness, which in this patient’s case should restore the natural masticatory feeling again.

As the patient had previously posted a visit to the dentist, the emphasis now had to be placed on rehabilitation with good long-term perspectives. This way it would be possible to minimize the amount of procedures required and therefore calm his fears.

The temporary restoration, fabricated in the laboratory for this healing phase, was necessary for verifying the endodontic situation and in particular to allow the gingiva time to recover (Fig. 5). This served as a vertical dimension therapy with a so-called „functional and esthetic test drive“.

The vertical dimension was not changed. It was validated by the temporary restorations for 3 months. The temporary restorations were produced in a centrifugal relationship. Functional diagnostic procedures, a sophisticated treatment plan and an extensive esthetic analysis of a photo status were required to produce the temporary restoration - measures that formed the basis for the patient’s individual dental rehabilitation (Figs 6 to 8). For the esthetic analysis (Figs 9 and 10), we used the program and procedure protocol from Digital Smile Design (DSD) according to Dr. Christian Coachman, São Paulo/Brazil. It includes tools and gauges for a wide range of virtual measurements and uses the information from patient’s portraits with a variety of facial smile expressions.

This extensive input showed that the anterior length of the existing crowns in the upper jaw could be maintained. However, the tooth angles needed to be changed and the incisal edges had to be moved in order to accommodate the lower incisors and the lower lip. Function and esthetics played an important role in the design.

The three-month therapeutic trial run showed that further measures to eliminate the black triangles, resulting from the degeneration of the pulp, had to be taken. The dentist then prepared the teeth for the final restoration according to metal-ceramic requirements, and gave our laboratory the impression (Fig. 11) to cast the master model.

Preparing and covering the framework

The following information is based mainly on the dental technically interesting upper jaw. We wanted to use the new mixed-glass ceramic IPS Style Ceram, so the metal we chose for the crown frameworks was the non-precious metal alloy 848 from Ivoclar Vivadent. This was cast in the conventional method, and included holding pins to protect the framework during the following procedures. The metal copings were carefully finished. An oxide firing was carried out in preparation for the ceramic layer. Time and care invested in this phase prevents bubbles in the ceramic layer.

It is effective to use a modern shade selection method from the very start, so that the best suitable opaque material is selected in the framework.

The first steps in the practice and the laboratory

Almost all teeth required root canal treatment (Fig. 4). This was carried out under the operating microscope and completed with root post and subsequent crown restoration. This was also possible in tooth 13. The preparation was carried out according to the Dr. Domenico Massironi technique. The final impression was taken with the impression material Impregum® from 3M ESPE using the double cord retraction method. In addition, the patient underwent periodontitis treatment once and was thoroughly instructed in oral hygiene. These treatment steps prepared the patient’s teeth and gingiva for the temporary restoration. A three month regeneration period followed.

The temporary restoration, fabricated in the laboratory for this healing phase, was necessary for verifying the endodontic situation and in particular to allow the gingiva time to recover (Fig. 5). This served as a vertical dimension therapy with a so-called „functional and esthetic test drive“.
Figs 17 to 19: The fired results

Using a brush, we built up the body shape opaque layer (Figs 15 and 16). Any amount of IPS Style Ceram Deep ceramic material and fully enhance opaque surface with the subsequent uid to the required consistency. The temperature of 870°C. A complete covering firing (2nd opaque firing), this time at the usual temperature of 870°C. A complete and very good coverage of the powder opaquer is easily achieved using either a brush or other instrument (Fig. 14). We never use the opaque residues of the wash firing for the covering opaque layer, even though the manufacturer states that the dried residues can be mixed with liquid to the required consistency. This time was no exception, the surface was white with no micro porosities (Fig. 15). In order to optimize the bond of the opaque surface with the subsequent ceramic material and fully enhance the light optical properties of the IPS Style ceramic, we dusted a small amount of IPS Style Ceram Dentin and Margin material onto the second opaque layer. To do so, we used a large dry brush into the jar of ceramic powder and then dusted this onto the yet undusted second opaque layer (Figs 15 and 16). Any surplus was tapped off within the apatite, two minutes opaque drying powder. In usual firing was carried out (Figs 17 to 19).

Building-up the anatomical shape

Using a brush, we built up the body of the tooth with a generous application of Style Ceram Deep Dentin. Instead of the usual method of only building up to the incisal edge of the framework, we applied the material to cover the complete upper and middle third of the tooth (Fig. 20). We used it as a first layer of body material to create the ideal anatomical shape. This extended use was possible due to the light flowing characteristics of the IPS Style materials (light transmission). The outline of the metal framework was well covered. For this reason, it was not necessary to additionally conceal these areas. The marmolons and fissures were already incorporated in this step.

As the second body material we used IPS Style Ceram Dentin in the usual manner to build up the ideal tooth shape. The extremely finely grounded IPS Style Ceram Dentin materials are very easy to apply and highly homogenous. Small amounts of IPS Style Ceramic Cervical Transpa (orange-pink and yellow) create an appearance of vibrality in the cervical region. Using these four materials, the complete anatomical tooth shape was built up then checked for size.

Information:

Tip:

When spraying a silicone matrix of a wax-up produced in the early stages, time can be saved during the ceramist’s build-up (in our experience 40-45%). However, this does not re- produce the same layering technique by hand. The IPS Style Ceram layering materials are stable, efficient and well suited for cut-back procedure (Figs 21 to 23).

Individual patient design

In order to achieve a vibrant, true-to-nature, patient-oriented appearance, we used IPS Style Ceram Koenig yellow-orange in the palatal region and IPS Style Ceram Incisal A2, in the incisal region in the incisal and lateral regions. The latter is coloured green so that it is easier to recognize (Fig. 24). In our opinion, intense colouring of the different ceramic materials helps us to create our artistic design. When fired, the pigments are burned-out completely without residue and a natural shade appearance is revealed.

IPS Style Ceram Mamelon yellow-orange and IPS Style Ceram Mamelon light were mixed together to a ratio of 1:2 (Fig. 25) and used as ultra thin accessits to the vestibular marmolons structure.

Information:

Tip:

It is advisable to use IPS Style Ceram Mamelon materials cautiously and economically as they are extremely opaque and highly fluorescent. A very nice result is achieved if you give them a vertically curved shape. The high degree of material cohesion and edge stability of the material allow us to create sharp and structurally correct to be easily created.

Further effects were applied to the incisors and canines, as follows (Fig. 26). In the mesial areas we integrated IPS Style Ceram Incisal 1z, IPS Style Ceram Opal Effect 0E1 and 0E2, as well as IPS Style Ceram Opal Transpa blue and in the distal areas we added IPS Style Ceram Transpa blue. We also included IPS Style Ceram Opal Effect Violet and IPS Style Ceram Incisal 1z. We applied IPS Style Ceram Opal Effect OEF 0E1 and 0E2 as a coating of the centre of the tooth continuing over the minimal-maximal incisal areas. To finalize the design we imitated the so-called “halo effect”, which in this particular case was realized with IPS Style Ceram Dentin A1. Unlike the marmolons - these effects were created with smoother transitions.

The occlusal surface was designed age-appropriately with a pronounced occlusal inclination. The patient had a cross-bite in the molar region so that the lingual surface was made wider than usual, in particular in the second quadrant. This was done by incorporating the cusp of Carabelli (Tuberculum Carabelli) so that the cusps and fissures of the upper and lower teeth were completely aligned and an even distribution of pressure could be achieved.

Dentin firings and assessment of the results

The ceramic surface was compacted with a dry brush and then fired with a first dentin firing (700°C). The shade and shape results are always eagerly awaited. In our patient case, the results were spectacular (Fig. 27). Knowing our past experience with previously successful applications, these were the results we had expected. We must emphasize first and foremost: The IPS Style Ceram ceramic shrinks only minimally. Based on our experience this material has the lowest shrinkage of all ceramics we have used before. We needed to add only a small amount to completely the vesti- bular surface (in this case with IPS Style Ceram Dentin A2). The second dentin firing (80°C) allowed next to no shrinkage. Only small corrections were required with IPS Style Ceram Incisal 1z. The layered build-up maintained its shape and the youthful design of an occlusal-inferior surface and of any of its steep cusps (Fig. 28). The light transmission from the depths of the tooth was as we had hoped, as was the shade gradation (Fig. 29). If corrections are necessary and therefore further ceramic firing, rest as- sured, the shape and colour will not change.

Finishing the surface and shade optimization

The next step was to work on the fac- ial surfaces of the teeth to 15 and 21 to 25, to create an age-appropriate form. Diamond burs were used in particular to create the perikymata and longitudinal grooves (interproximal and marginal-segmental ridge) and to shape the occlusal surface. It was shown that this allowed the examination of the surface texture and all surface structures, including in the poste- rior region (Figs 44 to 52). Important.

After use, it is extremely important to clean thoroughly with a steam cleaner to prevent discoloration when firing.

The surfaces were individually char- acterized using the universal stain and glaze range IPS Tocolor, which can be used for all layering, and CAD-CAM ceramics from Ivoclar Vivadent and also zirconium oxide from Wiel- land Dental. This enhanced the res- toration’s macro and micro texture and created more expression. We be- gan with the base shade A2. Through individualization using the IPS bio- color stains we were able to produce a shade A3 tooth with a cervical area in A35 (Figs 30 to 37). The character- istic surface had an outstandingly natural looking appearance. This is due to the fact that no opaque cer- amic materials were used, but instead stains, which allowed the light to flow into the depths. Even the posterior teeth had a very vibrant de- sign with the mesio-palatal Carabelli cusp and with the stained fissure de- tails (Figs 38 to 41). We carried out a glaze firing bake in the usual method (750°C). The ideal texture can be de- termined by the amount of glaze used in any areas. The results were impressive, literally “from all sides” (Figs 42 and 43). Shape and tex- ture surface had a naturalized exactly as we had planned.

Patient rehabilitated, dentist satisfied

The final fettle, the veneered restorations were first inserted and checked, (Fig. 53) and then conven- tionally cemented. Both dentist and patient were so delighted with the results that a whole series of photos and lights and under different lighting (Figs 54 to 70). The patient felt confident again to give a wide opened mouthed
Fig. 29: A good result after the final dentin firing: oral view of the crowns, without individualizations.

Figs 30 to 32: Checking the results after the application of stains and after the glaze firing. The translucency, the shade and light transmission are pleasing to the eye from all perspectives (angles).

Figs 33 to 37: Checking the results after the application of stains and after the glaze firing. The translucency, the shade and light transmission are pleasing to the eye from all perspectives (angles).

Fig. 53: X-ray examination and checking the fit.

Figs 44 to 52: Careful examination of the surface texture and tooth shape.

Figs 42 to 43: The finished upper crowns after having been polished, as given to the dentist.

Figs 42 to 43: The finished upper crowns after having been polished, as given to the dentist.

Figs 44 to 52: Careful examination of the surface texture and tooth shape.

Figs 38 to 41: A trick we used: The deliberate incorporation of Carabelli cusps to avoid a cross-bite and to achieve an even distribution of masticatory forces. Even though this shape is different from the patient’s original bite, it provides the patient with greater comfort.

Figs 38 to 41: A trick we used: The deliberate incorporation of Carabelli cusps to avoid a cross-bite and to achieve an even distribution of masticatory forces. Even though this shape is different from the patient’s original bite, it provides the patient with greater comfort.

Figs 44 to 52: Careful examination of the surface texture and tooth shape.

The patient is confident and self-assured once again. Is this still the same metal-ceramic as we know it?

Conclusion

According to the manufacturer, all colour components in the IPS Style contain oxyapatite crystals in different quantities. For this reason, the opaquer is also an essential part of the colour concept of the restoration. In the end result, the metal-ceramic IPS Style Ceram impressed us in particular through its natural translucency and the depth of light transmission. IPS Style helps the dental technician to achieve highly esthetic restorations efficiently with easy material handling and a low level of shrinkage during firing. There are no particular specifications to observe in terms of design on the metal. The dental restoration is so vibrant and life-like that no one would think it had a metal substructure.

One specific advantage of the visual properties of IPS Style is that the outline of the framework is not seen through the ceramic as sharp edges. Due to the high degree of reflection and wide range of light-scattering, much less Deep Dentin material is required for concealing in comparison to conventional metal-ceramic materials. Less space is required for the ceramic. Without the problem “framework outline”, less experienced ceramic technicians are also able to use the IPS Style Ceram layering ceramic.

Dental technical assessment of the new veneering ceramic

How the IPS Style Ceram is for us dental technicians: We are able to fully concentrate on the layering technique and build-up process. The IPS Style materials are very easy to work with: finely granulated and homogeneous, with a pleasant and individually adjustable consistency. They are stable. Sharp edges and detailed structures can be easily created. The layers adhere well to one another.

In addition, a very important point is the working efficiency. The ceramic has a low degree of shrinkage, only slight over-contouring is required. The built-up morphology design is maintained. Our assessment, which also applies to this patient case: When using the IPS Style materials, the ceramist can let his artistic abilities and skills run free.

We would like to thank Dr. Adrian Bacila for the good working cooperation.

Florin Stoboran

graduated from the Dental Technician School in Oradea, Romania, in 1994. He continued his studies in ceramics and specialized in fixed prosthodontics, aesthetics, and implantology.

Dr. Adrian Bacila, Romania

smile. The chosen restoration gave him his joy of life back. His confidence grew.

Conclusion

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Dr. Adrian Bacila, Romania
CAD/CAM Final spurt 2016: Dentsply Sirona presents inLab CAD Software 16.0

By Dentsply Sirona

The inLab CAD SW 15.0 software has been an indispensible part of the digital workflow in dental labs for over a year now. The extensive update inLab CAD SW 16.0 now offers additional options. The wide range of inLab applications has now been extended even further with new indications, tools and functions as well as the option for additional implant systems.

For the first time, scan data from inos X5 for suprastructure can also be transmitted to Atlantis®. Dentsply Sirona continues to enable access to individual implant restorations for dental laboratories.

Following the successful market launch of inLab Software 15.0 last year, the first update is now available. The latest inLab CAD SW 16.0 offers new features across all CAD modules. In the Removable dental prosthesis module, dental splints and individual impression trays can be designed for the first time using the new inLab Splint plugin.

The Implantology module has been extended to include screw-retained bridges and dental bars at implant level, thus allowing the FLO-S Scanbodies from Atlantis® to be scanned and identified with inos X5 and inLab SW 16.0. Starting next year, the scan data can be transmitted to Atlantis® for the design and production of suprastructure. Coinciding with the introduction of this software, infiniDent, Dentsply Sirona’s production center, is launching a new production service for directly screw-retained bridges that have been independently designed by the customer in inLab CAD SW 16.0. The corresponding design database can be exported directly from the inLab software to infiniDent for subsequent production. The Atlantis® and infiniDent services will be launched as a beta phase for selected customers in November. After successful completion, it will then be available for all inos X5 users. For the production of individual adhesive abutments (TiBase), the following implant systems are also supported by inLabCAD SW 16.0: Astra Tech Implant System EV and Ankylos from Dentsply Sirona Implants as well as BioHorizons and Osstem TS.

For the production of restorations on other milling machines, STL data export via the inLab software interface module is required. In addition to the actual STL dataset, the additional *.sci file (Sirona case information) is also created. This supplements the STL data with additional information, such as implant positions, preparation margins, information on materials, etc.

As the only laboratory software on the market with J.O.B.S. (Jaw Orientated Biogeneric Setting), inLab supports rapid patient-specific positioning of teeth with minimal of corrections, even for work over long spans. The inLab CAD SW 16.0 is now extending this convenience with a new function: inLab Check. The new plugin tests the designed restorations with an FEM analysis for critical, strain-sensitive areas and visualizes these areas. The tool offers inLab users practical design support for large, complex cases or where space is constrained.

The inLab CAD SW 16.0 now runs under both the Windows 7 and Windows 10 operating systems. Furthermore, it comes with numerous optimizations in terms of processing power, tools and design options, like screw channel design, additional tooth shapes for the restoration design (for example a third premolar in tight spaces) or the implant-independent tooth position in the design of implant bridges.

In addition, the current inLab CAD Software 16.0 update for the inLab MC X5 and inLab MC XL production units will be available free of charge as an automatic update or internet download in the next few days.

More information at: http://www.sirona.com/inlab

Screw-retained bridges and bars at implant level with the inLab CAD SW 16.0

Implantology module.
Skeletal Class III Malocclusion with Canine Transposition and Facial Asymmetry

By Dr. Wei Ming-Wei, Dr. Chris Chang, Singapore & Dr. W. Eugene Roberts, NZ

History and Etiology
A 13-year-6-month-old male presented with a chief complaint of prognathic mandible (Figs. 1-3). There was no other contributory medical or dental history. The etiology was hereditary tendency for prognathic mandible with eruption of the maxillary central incisors into crossbite, which resulted in a functional shift of 4mm anterior and 3mm to the left. Clinical exam indicated transposition of the permanent right maxillary canine and premolar, general crowding and anterior crossbite (Fig. 2). Extraction of all four first premolars was proposed to correct the canine transposition and create space for retraction of lower anterior dentition. The patient was treated to an acceptable result as documented in Figs. 4-9.

Diagnosis
In centric occlusion, a severe dental asymmetry was noted. Class III molar relationship on the left side, Class I molar on the left side, and an intermaxillary malocclusion discrepancy of -7mm. There was a concave profile and asymmetrical facial form with the mandible deviated to the left. Relative to the facial midline, the upper dental midline was 2mm to the left, while the lower dental midline was 5mm to the left. The anterior crossbite extended from the right lateral incisor to the left 2nd premolar. Cephalometric and panoramic radiographs (Fig. 7), as well as anterior segment photographs (Fig. 10) document the complexity of the malocclusion.

Skeletal:
- Maxillary: Class III (SNA 70°, SNB 75°, SNA-SNB 5°)
- Mandibular: Plane angle (SN-MP 37°, ANB -5°)

Dental:
- Class III on the right and Class I molar relationship on the left.
- Maximum overbite 3mm
- Maximum overjet -3mm
- Severe crowding of ~10mm in the upper arch and 7mm in the lower arch
- Right maxillary canine blocked-out and transposed with the adjacent 1st premolar

The ABO Discrepancy Index (DI) was 46 points as shown in the subsequent worksheet.

Specific Objectives of Treatment
Maxilla (all three planes):
- A - P: Maintain
- Vertical: Maintain

Mandible (all three planes):
- A - P: Maintain
- Vertical: Extrusion of molars
- Inter-molar Width: Maintain

Mandibular Dentition:
- A - P: Retraction of anterior teeth
- Vertical: extrusion with increased vertical dimension of occlusion
- Inter-molar / Inter-canine Width: Maintain

Facial Esthetics:
- Posterior movement of chin point and lower lip

Treatment Plan
All four 1st premolars were extracted to create space to align the transposed right maxillary canine, as well as to retract the protruded lower anterior segment, to correct the crossbite (Fig. 10). Anterior bite turbos were bonded on the lingual surfaces of the mandibular central incisors and the left lateral incisor to open the bite for crossbite correction. Early light short Class III elastics were used in the initial stage of treatment to assist crossbite correction (Fig. 11). After the crossbite correction and alignment of the maxillary anterior segment, a torquing auxiliary was indicated for the maxillary right canine. A mandibular pre-torqued rectangular NITI wire, with vertical elastics were used to flatten and align the arch (Fig. 13). A mandibular anterior torquing auxiliary and asymmetric intermaxillary elastics (Class III right, Class II left) were used to achieve the desired final result.

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**Discussion**

Surgical correction is routinely indicated for asymmetrical Class III malocclusions because of a questionable prognosis for orthodontics only management of large skeletal discrepancies and unsatisfactory esthetic outcomes. However, if there is a substantial functional shift, the asymmetrical profile and mandibular shift are accentuated increasing lower facial height and correcting the functional shift are more readily achieved with nonsurgical treatment. Carefully considering the pros and cons of conventional and surgical treatment is important elements of diagnosis and treatment planning.

Growth potential warrants additional consideration if a patient exhibits signs of mandibular overgrowth. In the present case, although the mandibular prognathism was noted at the beginning of treatment, little or no further increase in mandibular length was noted during treatment. Bacetti provided an assessment method for determining skeletal maturation by evaluating the cervical vertebras in routine lateral cephalograms. For the present case, skeletal maturation exceeded CS 5, indicating a mature skeletal pattern, suitable for treatment as an adult. There were additional indications favoring non-surgical orthodontic options: (1) the chief complaint was mandibular prognathism without consideration of facial asymmetry, (2) reduced lower facial height (nasolabial angle), (3) negative overjet less than 4mm, and (5) a moderate Class III molar relationship with a discrepancy that was less than a molar's width.

A conservative treatment approach was selected which consisted of a camouflage dental correction (Fig. 17) with counter-clockwise rotation of the occlusal plane.

**Maxillary Dentition:**
- A-P: flaring of the incisors
- Vertical: Molar extrusion and mesial movement
- Inter-molar / Inter-canine Width: Maintained

**Mandibular Dentition:**
- A-P: flaring of the incisors
- Vertical: Molar extrusion and mesial movement
- Inter-molar / Inter-canine Width: Maintained

**Facial Esthetics:** Retraction of the lower lip and chin point.

**Retention**

Fixed retainers were bonded on all maxillary incisors and from second premolar to second premolar in the mandibular arch. An upper clear overtop retainer was delivered. The patient was instructed to wear it full time for the first 6 months and nights only thereafter. Instructions in home care and maintenance of retainers were provided.

**Final evaluation of treatment**

The ABO Cast-Radiograph Evaluation score was 25 points. The major discrepancies were in the lingual occlusal contacts and alignment/rotation. Deviation of the lower dental midline was decreased to 1 mm to the left of the maxillary midline. The transposed canine was well aligned, and the gingiva texture was reasonably predictable dental prosthesis. Collectively, molar extrusion and mandible clockwise rotation improved facial symmetry. The Class III molar relation was corrected. Overall, this Class III asymmetric malocclusion was treated to an appropriate facial and dental result. The roots of the maxillary incisors were out of focus on the post-treatment panoramic radiograph, but it appears that there was significant root resorption of both maxillary central incisors and the left lateral incisor. The latter may have been due to the occlusal stress of the premature contact with the anterior bite block during correction.

**Applications and treatment progress**

A 0.022” Damon Q” bracket system (Ormco) was used. To the maxillary arch was bonded with standard torque brackets, and low torque brackets were selected for the lower anterior teeth to counter the force of Class III elastics (Fig. 12). After seven months of active treatment, the right maxillary canine was aligned into the arch. Positive overjet was achieved and the canting of the lower occlusal plane (Fig. 10) was improved (Fig. 18). Anterior root torque springs (ART) were placed on both the lower anterior teeth and right maxillary canine for early torque control (Figs. 13-14). After eleven months of active treatment, maxillary space was closed, but the excessive Curve of Spee of the lower arch and the midline deviation were still evident. Clockwise rotation of the mandible corrected the severe Class III relationship on the right side to Class I but the slight Class III on the left evolved into a Class II molar relationship. A 0.022 x 0.025 pre-torqued NITI wire with asymmetrical elastics were used to flatten the Curve of Spee and correct the molar relationship in this stage of treatment (Fig. 14).

From the 12-20 months of treatment, a Class III L-shaped elastic from the second premolar bracket to the right maxillary 1st molar was used for space closure and settling of the posterior occlusion (Fig. 15). Seven months were required to correct the asymmetric molar relationships. In the last two months of treatment, elastics were applied to settle the occlusion. Upward U-shape elastics in the anterior and a vertical elastic in the second molar area bilaterally were applied to settle the final occlusion (Fig. 16). After 29 months of active treatment, all appliances were removed.

**Results achieved**

Maxilla (all three planes):
- Vertical: Maintained
- Transverse: Maintained
- Mandible:
  - A-P: Maintained
  - Vertical: Mild clockwise rotation to increase the vertical dimension
  - Transverse: Maintained

**Table 1: Cephalometric summary**

<table>
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<tr>
<th>Planes</th>
<th>ANS/PNS</th>
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<th>ANB</th>
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<td>81°</td>
<td>1°</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

**Orthodontic treatment options:**
- Options: 1) the chief complaint was mandibular prognathism without consideration of facial asymmetry, 2) reduced lower facial height (nasolabial angle), 4) negative overjet less than 4mm, and 5) a moderate Class III molar relationship with a discrepancy that was less than a molar's width.

**Fig. 12. Class III elastic provided horizontal and vertical forces to improve canting in the lower arch and to facilitate early correction of Class III relation.**

**Fig. 13. 7th month of treatment. leveling and treatment progress**

**Fig. 14. Asymmetrical elastics and pre-torque NITI wire were introduced in the 12th month of treatment.**

**Fig. 15. A L-shaped Class III vector elastic was utilized for space closure, settling posterior bite and better stabilization.**

**Fig. 16. Elastics used at the end of treatment to settle occlusion.**

**Fig. 17. Camouflage dental correction with counter-clockwise rotation of the occlusal plane.**

**Fig. 18. Elastics used at the end of treatment to settle occlusion.**

**Fig. 19. Camouflage dental correction with counter-clockwise rotation of the occlusal plane.**

**Fig. 20. Elastics used at the end of treatment to settle occlusion.**
Changes included proclination of the maxillary incisors and retroclination of the mandibular incisors. Torque control was essential in camouflage treatment in order to prevent further periodontal problems. Loss control of anterior teeth might compromise long-term stability, particularly in extraction cases. Early usage of ARTs and the pretooned NRT wire on the lower arch delivered a continuous light force as opposed to a heavy interrupted force from a twist-ed rectangular wire at a later stage in treatment. As the transposed right maxillary canine was moved mesially, an ART spring was used to correct the axial inclination (Fig. 18).

Higher torque canines brackets would have been more favorable for the present case (Fig. 12). Anterior or posterior placement of bite turbos can be used for bite opening. For the present patient, molar extrusion and clockwise rotation of the mandible were part of the treatment plan, so anterior bite turbos were appropriate for this purpose. With bite turbos and early light short elastics (Class III vector), the anterior cuspable was corrected within seven months. Short Class III elastics on the right side also provided an extrusion for the infra-occlusion right side and often involved various mechanisms, including intra-arch auxiliaries and multiple loops, for realigning and coordinating the arch. These special mechanics are often associated with undesirable side effects like compromised molar angulation to meet occlusal goals at the end of treatment. As proposed by Kondo, the anterior limit for incisor retraction is the posterior border of the symphysis, where the PM or ramus line is the posterior limit for arch retraction (Fig. 23).

Asymmetrical correction is complex, and often involves various mechanisms, including intra-arch auxiliaries and multiple loops, for realigning and coordinating the arch. These special mechanics are often associated with undesirable side effects like compromised molar angulation to meet occlusal goals at the end of treatment. Low friction, self-ligating brackets with special elastics configurations simplify this challenge significantly. Although the angular and lineare deviation, that was evident after correction of the functional shift, was not completely corrected for the present patient, but the result was satisfactory. The ORE score was 22, with most of the points deducted for inadequate third order correction of the maxillary posterior segments, which is reflected in the scores for buccolingual inclination (4 points) and lingual cusp contacts (3 points). More buccal root torque in the maxillary buccal segments and additional detailing with wire bending in the finishing stage would have improved the final result.

**Fig. 18** Early torque control in right maxillary canine contributed good torque express in the middle of treatment (Arrow: root torque spring).

**Fig. 19** Flattening of smile arc after Class III correction is a common side effect in traditional orthodontic mechanics.

**Fig. 20** An acceptable upper lip profile without TADs anchorage.

**Fig. 21** Anterior and posterior boundary of the entire arch stabilization in the mandible.
Tomas® TAD Event
Abu Dhabi, UAE I September 30 + October 1, 2016
Discover new TAD-based solutions utilizing both indirect and direct anchorage mechanics

By New Al Farwaniya

TOMAS® (Temporary Orthodontic Micro Anchorage System)

The Tomas® system has been one of the leading skeletal anchorage systems for many years. Users value its easy, clearly structured handling and high reliability. It is a distalization, intrusion, extrusion, palatal expansion or indirect anchorage system that offers a complete system for all of these indications. Discover new TAD-based solutions utilizing both indirect and direct anchorage mechanics. Experience the evolution of TAD-supported aligner therapy including new TAD design and auxiliaries. Introduce your practice to a revolutionary new TAD-based advanced molar distalizing appliance.

Seminars program consist of the following:

Evidence based temporary orthodontic micro anchorage & the Tomas® concept

Orthodontic mini-screws for temporary anchorage have become enormously popular as a clinical option for the practitioner. However, published evidence-based data is still rare, although numerous systems and clinical reports are available. The objective of this seminar is to present the fundamentals of the mini-screw concept, submit an overview of available mini-screw systems, describe the mini-screw system “Tomas®”, which has been clinically tested and extensively applied in daily practice for more than 6 years, demonstrate the pin placement procedure, provide specific data about indications, mechanics, screw failure rates, and address 3D control of tooth movements.

Tomas® TAD Event has been successfully organized by New Al Farwaniya Surgicals & Medical Equipment, Abu Dhabi with the immense participation of Dentaurum, Germany.

For more information, kindly visit www.dentaurum.com/tad2016 or contact our Sales Team: Dr. Mohammad Bashar Alkassab: m.bashar@alfarwaniya.com
DHS gathers over 270 dental professionals from MEA region during Dubai Dental Week

By Dental Tribune MEA / CAPPmea

DUBAI, UAE: Dental Hygienist Seminar was organized as a new partnership between CAPP and Colgate Oral Care Academy on 05 November 2016 at Jumeirah Beach Hotel in Dubai. The event was organized as part of the 8th Dental Facial Cosmetic Int'l Conference on 04-05 November 2016 under the constantly expanding umbrella “Dubai Dental Week” - November edition which gathered over 2,500 dental professionals from around the world.

Dubai Dental Week – November edition incorporated several continuing dental education events organized by CAPP. Over 15 multidisciplinary hands-on courses, 2-day Conference & Exhibition and the Dental Hygienist Seminar all took place between 01-07 November 2016 at Jumeirah Beach Hotel with over 49 CME attainable from local health authorities as well as ADA CERP CE credits as CAPP is an ADA CERP Recognized Provider of continuing education.

During 04-05 November 2016, the Jumeirah Beach Hotel in Dubai was enlightened by the positive energy of the dental experts who came here, for brightening and modernizing their independent dental practices during the two days of conference and exhibition. Its stunning and inspiring structure was the main location where professionalism meets quality in a spectacular way.

Colgate was the title sponsor of the Dental Hygienist Seminar which took place on 05 November 2016 and will be remembered as remarkable for all dental hygienists from MEA region, Pakistan, India and several other countries who were treated to a lineup of interesting lectures. The event was organized as a joint partnership between CAPP and Colgate Oral Care Academy with the support of the International Federation for Dental Hygienists (IFDH). It was designed to increase the level of enlightenment of all passionate dental professionals. Dental virtuosos from around the world featured throughout the day including:

- Mrs. Robyn Watson, IFDH, Australia (President of the International Federation of Dental Hygienists)
- Dr. George Sanoop, UAE (Dental Faculty Higher Colleges of Technology, Dubai & Sharjah Women’s College)
isms may increase their virulence exchange” among the microorganisms interacting in the neighborhood setting. This “friendly exchange” among the microorganisms may increase their virulence level and antibiotic resistance in multiple folds compared to them existing separately in planktonic state. Thus, mechanical removal is still the mainstay of treatment for biofilm-initiated conditions like caries, gingivitis and periodontitis.

Dental plaque represents a true biofilm, and its existence can easily be revealed to the patients using disclosing agents (Figure 1). Its potential to calcify to form calculus increases the difficulty for removal and makes it all the more important to eradicate it in a timely or prophylactic manner. Conventional removal of sub-gingival plaque includes the use of ultrasonic scalers or hand instrumentation, while rubber cups with prophylaxis polishing agents can be used to remove supragingival plaque. The types of abrasive particles incorporated in the polishing pastes include pumice, aluminum oxide, silicon carbide, garnet, feldspar, zirconium silicate, emery, perlite, etc. These conventional treatment modalities have been shown to be effective in plaque removal and restoring patients back to gingival health. However, there have been concerns regarding extensive tooth hard-substance loss and patient comfort and experience during treatment which may affect patient compliance to proceed with the maintenance phase after initial periodontal therapy. Thus, extensive research and technological innovations have been carried out in recent years to come out with a more novel approach for biofilm removal.

Biofilm Removal - An Innovative Approach

By Dr. Wong Li Beng, Singapore

Biofilm revisited

It would not be an exaggeration to say that without the formation of biofilms in the mouth, oral hygienists and periodontists would never have existed. The oral cavity is a dynamic environment, where there is a constant accumulation of microorganisms, embedded within an extracellular polymeric matrix, that adhere to the tooth surface or any hard non-shedding material [1]. Within the biofilm, the microorganisms interact via quorum sensing, pretty much like how we exchange greetings, marketing tips, and Christmas gifts with the residents living nearby in a neighborhood setting. This “friendly exchange” among the microorganisms may increase their virulence level and antibiotic resistance in multiple folds compared to them existing separately in planktonic state. Thus, mechanical removal is still the mainstay of treatment for biofilm-initiated conditions like caries, gingivitis and periodontitis.

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Air polishing with the appropriate powder: Its indications have been extended from biofilm removal for natural teeth to a new state of preventive, efficient and comfortable care in implant maintenance and management of peri-implantitis.

Dr. Nijad Mina, DDS, MSc, MRDM, Lebanon

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The risks that carbonated soft drinks, alcoholic mixers and wine pose to your patients’ teeth are well-known – increased consumption of acidic food and drinks can lead to tooth erosion and hypersensitivity.

However, even your patients following a healthy lifestyle may be at risk due to the acidic nature of fruit juices and sports drinks. Hypersensitivity results when the tiny dentine channels directly linking to nerves in the tooth become exposed and is associated with pain and discomfort triggered by heat, cold or touch.

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In a double-blind, parallel group study, 120 patients directly applied either Colgate® Sensitive Pro-Relief™ toothpaste, a regular desensitising toothpaste† or a regular toothpaste‡ to sensitive teeth. Change in hypersensitivity was assessed using air blast sensitivity scores, where a lower score indicates better pain relief.

Not only did Colgate® Sensitive Pro-Relief™ provide instant relief of dentine hypersensitivity, both immediately after direct application and after 3 days of use, but it also provided superior pain relief when compared with the other toothpastes.

### INSTANT AIR BLAST SENSITIVITY RELIEF IN VIVO

<table>
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<th>Air blast sensitivity score</th>
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<td><strong>Baseline</strong></td>
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<tr>
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<tr>
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<tr>
<td><strong>Immediately</strong></td>
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<tr>
<td><strong>3 days</strong></td>
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</tr>
</tbody>
</table>

* p < 0.05 compared to baseline  
* * p < 0.05 compared to control

Recommend Colgate® Sensitive Pro-Relief™ to your patients suffering from hypersensitivity due to acidic tooth erosion – clinically proven to treat hypersensitivity and relieve pain fast.*2

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* When toothpaste is directly applied to each sensitive tooth for 60 seconds.
† Containing 5% potassium nitrate and 1450 ppm fluoride as sodium fluoride.
‡ Containing 1450 ppm fluoride as MFP.

References:

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**www.colgateprofessional.com**

*BRAND MOST USED BY DENTISTS*
Air Polishing Devices: Basic Principles

The basic concept for air polishing is nothing new. In fact, it was first introduced in the dental market in 1945 for cavity preparation using aluminum particles [1]. Modern air polishing devices use pressurized air and water to deliver a controlled stream of powder in a slurry through a handpiece nozzle. There are usually 2 concentric openings, with the air and powder through the inner one and water through the outer one [2] (Figure 4). This is directed towards the tooth surface to remove surface stains, dental plaque and other soft deposits.

The ability of the combination of air, water and powder to remove substances on the treated surface is dependent on several factors and we can broadly classify them under hydropneumatic factors, abrasive media related factors and user-related factors [3].

Hypodermic factors:
- a) Amount of water
- b) Air pressure

Abrasive media related factors:
- a) Emitted powder mass
- b) Grain size
- c) Grain shape
- d) Grain hardness

User-related factor:
- a) Distance between nozzle and treated surface
- b) Angulation of nozzle
- c) Instrumentation time

To explain briefly, for example, the higher the air pressure, the higher the energy given to substance removal. Large [4] or small grain size can either angular edges and higher mohs hardness or smaller grain size for higher abrasiveness.

The tables below (Table 1,2,3) illustrate the mohs hardness values of various materials used for polishing, and how they vary in respect to their hardness with the hardness of tooth structures as well as other abrasive materials. Conventional material used as polishing aids include pumice, sodium bicarbonate or chromium oxide etc all have a higher mohs hardness value than tooth structures and restorative materials. Prolonged usage can result in irreversible and uterogonic tissue removal of enamel, dentin and cementum. In addition, restorative material can be worn down and roughened, and this can cause them to be more prone to retainant in the long run.

Sodium bicarbonate powder (e.g. EMS Classic Powder) has been used in the market since the 1980s. It is non-toxic and water soluble, although up to 0.8% of silicon oxide or tricalcium phosphate is usually incorporated to enhance hydrophobicity, an important characteristic to sustain powder flow when mixed with water. It is commonly used for removal of supra-gingival stains and plaque from intact enamel surface because it is safe and efficient when efficacy clinically significant surface alterations. A study was published in 1984, which has shown that air polishing using sodium bicarbonate takes only three minutes to achieve supra-gingival stains and plaque removal compared with hand instruments or rubber cups with polishing paste [5]. However, sodium bicarbonate powder should not be used for sub-gingival plaque removal. Experimental results have demonstrated substantial root surface loss when it is directed towards de-rooted tooth root [6]. In addition, it has also been documented to cause severe epithelial erosion when it is directed towards the soft tissues [7]. Thus, usage of sodium bicarbonate for sub-gingival plaque removal should always be avoided.

Glycine powder (e.g. EMS Perio Pow-der, 3M ESPE Clingpro Power Powder) came into the market during the mid-2000s to address the clinical limitations of using sodium bicarbonate powder to address supra-gingival plaque removal while minimizing trauma to the root surfaces and soft tissues.[8] The mean particle size of glycine powder used for air polishing is less than 45 µm, a particle size that is smaller than conventional sodium bicarbonate particles, which accounts for its lower abrasive nature [9].

Glycine powder (EMS Plus Powder) was recently launched in 2013 to incorporate the stain removal capability of sodium bicarbonate powder together with the gentle characteristics of glycine powder on both hard and soft tissues. Glycine is a non-essential amino acid and an important component of most polypeptides. It is also known as an enzyme inducer for the conversion of amylase into a pancreatic islet as a way to increase the production of insulin as a way to lower blood sugar levels [10].

The concept of glycine powder on both supra- and sub-gingival use with the powder to be used both supra- and sub-gingivally at the same time. Results from this experiment demonstrated highest bacterial reduction when treated with air polishing using erythritol and chlorhexidine, highest tooth substance loss when treated with hand curette, significantly roughened surface when treated with curette and urea and ultrasonic and highest P20 fibres is attaching when treated with ultrasonic and air polishing using erythritol.

Based on the results obtained from various studies, the following conclusions could be derived:
- The development of abrasive glycerin-based powders and devices with sub-gingival nitriles provide better access to sub-gingival and intertissue areas.
- Mineralised deposits (calculus) can be removed using hand devices.

User-related factors:
- d) Cleaning prior to fluoride application

Clinical evidence

In the modern world of evidence-based dentistry, no product can stand in test of time if it is perceived to lack clinical efficacy, benefits and safety cannot be substantiated through biological, mechanical and clinical data. Thus, clinical indications have been carried out over the years to demonstrate the use of air polishing devices and establish a safe and efficient approach for removing plaque and calculus.

Glycine powder is commonly used as a food component or salt in the mouthwash, toothpaste, chewing gums etc. It is also used for polishing, and this can cause them to be more prone to retainant in the long run.

References
10. Chu K, Chen C, Harnig S, Ho DC, Miller J, Naveh E, Schenck A. Augmentation grafting with a special sub-gingival nozzle (Figure 5) of an emitted powder (5) Both results treated with different treatments between the 2 treatment modalities. Peri- odontal treatment, however, was lower for air polishing than ultrasonic instrumentation.

In a recent in vitro study investigating the use of erythritol powder, a different type of phase in terms of atomic mass compared in terms of biofilm removal and reformation, surface alterations, tooth hardening, together with sub-gingival air polishing with NaF. The results from this experiment demonstrated highest bacterial reduction when treated with air polishing using erythritol and chlorhexidine, highest tooth substance loss when treated with hand curette, significantly roughened surface when treated with curette and urea and ultrasonic and highest P20 fibres is attaching when treated with ultrasonic and air polishing using erythritol.

Based on the results obtained from various studies, the following conclusions could be derived:
- Air-polishing devices have been shown to be efficacious in removing supra- and sub-gingival biofilm and stain.
- Indications for the use of air pol- ishing devices have been expanded from supra-gingival air polishing to sub-gingival air polishing.
- The development of abrasive glycerin-based powders and devices with sub-gingival nitriles provide better access to sub-gingival and intertissue areas.
- Mineralised deposits (calculus) can be removed using hand devices.

Conclusions and future directions

Based on current evidence, the use of air polishing device with the appropriate powder may have opened a new whole horizon in preventing dental decay. With a sound track record of clinical efficacy and comfort in daily dental practice, its clinical indications have also been extended to preserve care in implant maintenance and to reduce periodontal inflammation. With heightened awareness and proper training among the dental professionals and Oral Health Therapists on the use of air polishing devices, better clinical care, especially for patients with difficulty in accessing care measures can be provided for the public for years to come.
PATIENT SENSITIVITY CAN BE GONE IN SECONDS.

COLGATE® SENSITIVE PRO-RELIEF™ WITH PRO-ARGIN™ TECHNOLOGY PROVIDES INSTANT AND LONG-LASTING RELIEF.

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The Relationship between Periodontitis and Atherosclerosis and Diabetes

Heart attack is the leading cause and diabetes is the sixth-leading cause of death in the United States. What goes relatively unnoticed, however, are their respective relationships with oral health especially periodontal bacteria that breed inflammation. This Sunstar E-Brief explores the cell-to-cell interactions behind the inflammation process and features insight from an expert on the subject.

In exploring how periodontal bacteria trigger inflammation in tissues far removed from the oral cavity, oral health professionals need to understand several underlying concepts and the direct role they play in periodontal diseases. Jepsen, DDS, MD, MS, PhD, a professor and chairman of the Department of Periodontology, Operative, and Preventive Dentistry at the University Hospital of Bonn in Bonn, Germany says three things are most important to understanding cell-to-cell communication relative to this oral systemic link.

First, periodontal bacteria are disseminated into the body’s circulation. “Especially in cases of advanced periodontitis,” Jepsen notes, “these bacteria are able to elicit so-called systemic inflammation.” The second key component of this cell-to-cell communication, according to Jepsen, is that systemic inflammation can promote atherosclerosis. “Systemic inflammation can also lead to impaired blood sugar control,” Jepsen says, “which may have negative effects on the periodontium.” And, the third consideration concerns the effects of oral health professionals’ work. “Oral health professionals should be aware that periodontal therapy may positively impact these conditions,” Jepsen points out.

Inflammation and Arteries

In periodontitis, the inflammatory response is caused by the spread of microbes. These microbes can trigger a similar inflammatory response in arterial tissues that sets the stage for the hardening of the arteries, or atherosclerosis, which can lead to heart attack. Additionally, fatty streaks are caused by white blood cells that travel into blood vessel walls and become macrophages. Macrophages assist in the uptake of low-density lipoprotein (LDL) cholesterol, or “bad cholesterol.” The absorption of LDL cholesterol, facilitated by periodontal bacteria, creates foam cells that eventually die and form a dead core within the fatty deposits. Other immune cells are added to the deposits, which causes the artery to narrow further. This process gradually robs heart tissues of vital nutrients and oxygen.

The substances created by periodontal bacteria can harm the underlying connective tissue within the arteries. The vascular deposits eventually break up and leave a wound that allows blood to coagulate, facilitating blood clot formation. The blood ves- sel is increasingly narrowed by the clot formation and can completely close the blood vessel, raising the risk of heart attack and stroke. The bloodstream continues to transport the inflammatory substances produced by the damaged endothelial cells throughout the body, triggering a generalized inflammatory response.

Effect on Sugar Metabolism

Periodontitis and diabetes tend to exacerbate one another. Type 2 diabetes is also related to the general inflammatory reaction caused by bacteria associated with periodontitis. Such inflammation can negatively affect the regulation of blood sugar, or glucose.

Blood sugar levels are regulated by the hormone insulin, which is produced in the pancreas. Insulin binds to insulin receptors located on cell membranes. In turn, the binding activates glucose transporters that take blood sugar into cells, where it is processed for energy or storage. In a healthy body, this mechanism causes blood sugar levels to drop. This mechanism is disrupted, however, in the presence of generalized inflammation, which creates substances that inhibit the binding of insulin and reduce the cell’s uptake of sugar. This leaves the body’s glucose levels high. Inflammatory substances that are by products of periodontitis appear to play a special role in this disruption.

Even when diabetes is absent, a severe case of periodontitis can increase the body’s blood glucose levels. This condition eventually can make the body’s cells unresponsive to messengers, leading to insulin resistance. Diabetes not only affects blood glucose levels, it can also negatively impact periodontal status. For example, when blood sugar remains elevated, significant numbers of proteins adhere to the excess sugar that has attached to hemoglobin in red blood cells. This process creates advanced glycation end products (AGEs). Glycation occurs when insulin does not properly metabolize sugars, thereby promoting the destruction of collagen in blood vessels. In turn, this process causes blood vessels to become brittle and form plaque.

ACGs also promote periodontitis by crosslinking fibers of the connective tissue, impairing periodontal wound healing. The body’s white blood cells and vascular wall cells also recognize ACGs, triggering the formation of messengers that encourage inflammation. The messengers summon inflammatory cells, while disturbing the wound healing process accelerating the destruction of periodontal tissues.

Seeing Is Believing

Sunstar has created a three-dimen- sional (3D) video to better explain these concepts. The 3D video, Cell-to-Cell Communication Oral Health and Systemic Health, for which Jepsen was a creator, outlines specific benefits that are important to oral health professionals. “The film illustrates how periodontitis may contribute to systemic conditions such as atherosclerosis or diabetes, or negatively influence their course. It also shows how diabetes negatively impacts the periodontal tissues,” Jepsen says.

Jepsen describes the video technology as an excellent example of modern science education. “It is hoped that [this video] will help oral health professionals communicate these findings to their patients,” Jepsen adds.

There is more to be learned about cell-to-cell communication that will be an asset to oral health professionals, according to Jepsen. He says that in the future it may be possible to visualize the physio-pathological processes involved in the development of peri-implant infection/inflammation. “The prevalence of peri-implant disease is dramatically increasing, posing an emerging public health problem,” Jepsen says. “The prevention and resolution of peri-implant infection is a new challenge for the oral health care team,” he adds.

With periodontal diseases affecting more than 70% of some adult popula- tions in the US, the challenge of holding periodontal bacteria at bay persists. Oral health professionals, equipped with the understanding of how these microbes affect the entire body and trained with the clinical skills to address them at the source, will continue to shoulder a considerable responsibility in helping at risk patients maintain their oral health.

References

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**CAPP CALENDAR 2017**

**CLINICAL ENDOdontics**
Postgraduate Diploma Programme

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**DUBAI, UAE**
www.cappmea.com/endo

**DUBAI DENTAL WEEK**
Full week of CME dental hands-on events

- May | November

**12TH CAD/CAM & DIGITAL DENTISTRY CONFERENCE / EXHIBITION**

- Conference / Exhibition: May 05-06, 2017
- Hands-On Courses: May 02-08, 2017

**DUBAI, UAE**
www.cappmea.com/cadcam

**DENTAL TECHNICIAN INTERNATIONAL MEETING**
Part of 12th CAD/CAM & Digital Dentistry Conference/Exhibition

- Conference / Exhibition: May 05-06, 2017
- Hands-On Courses: May 02-08, 2017

**DUBAI, UAE**
www.cappmea.com/cadcam

**4TH ASIA - PACIFIC EDITION**
**CAD/CAM & DIGITAL DENTISTRY INTERNATIONAL CONFERENCE**

- Joint Meeting with Dental Technician Parallel Session
- Conference / Exhibition: August 19-20, 2017
- Hands-On Courses: August 18-21, 2017

**SINGAPORE**
www.capp-asia.com

**RESTORATIVE & AESTHETIC DENTISTRY**
Certificate, Diploma and Fellowship Programme

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**DUBAI, UAE**
www.cappmea.com/capptipton

**9TH DENTAL - FACIAL COSMETIC CONFERENCE / EXHIBITION**
Joint Meeting with 6th AAID Global Conference Dental Hygienist Seminar

- Conference / Exhibition: November 03-04, 2017
- Hands-On Courses: November 01-07, 2017

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**DENTAL TRIBUNE MIDDLE EAST & AFRICA**

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