Prozone confirms effectiveness of ozone dental therapy

These pictures show agar plates with bacterial strain Escherichia coli. The left plate was treated with Prozone for 24 seconds and shows areas that are visibly bacteria-free. (DTI/Photo courtesy of Salzburg University, Austria)

Daniel Zimmermann
DTI

LEIPZIG, Germany: Clinical tests from the Department of Molecular Biology at the University of Salzburg in Austria have confirmed that dental treatment with Prozone, a next-generation ozone generator by Austrian manufacturer W&H, is highly effective against bacteria strains that are responsible for orodental infections and the development of dental caries. In the control study conducted in 2009, samples of Streptococcus mutans and Escherichia coli were gassed immediately and after 1.5 hours with ozone for 24 seconds and several times.

The results demonstrated that treatments with 24 seconds of ozone had visible effects on the treated area. In all tests immediate treatment was more effective than treatment after 1.5 hours. When the duration of the treatment was increased, the areas which contain no bacteria or have a low bacterial count also increase.

W&H’s ozone generator has been available to dentists worldwide since 2008. Despite its sterilizable ergonomically hand-piece, it features preset predefined treatment times which make it easy to manage, the company states. Prozone is suitable for a wide range of dental applications including cavity and surgical disinfection as well as periodontal and endodontic treatment. Treatment with ozone, a reactive three-oxygen molecule also found in earth’s atmosphere, is a relatively new concept in dentistry. Earlier studies indicate that it only takes a few seconds of therapy to kill 99 percent of bacteria making it a thousand times more powerful than other bacteria killing agents. The new study shows that in order to reach the total potential, treatment has to be performed immediately. Delayed treatment also results in reduced bacteria count but the visible effects are less significant.

Devices utilizing ozone technology such as Prozone expose filtered air to a highly electrical voltage which is directly applied to the treatment area where it destroys bacteria and viruses through oxidation.

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**Gene control early tooth development**

Several genes affect tooth development in the first year of life, according to the study conducted at the Imperial College London, the University of Bristol, & the University of Oulu in Finland. The research found that the babies’ teeth with certain genetic variants tend to appear later & that these children have a lower number of teeth by the age of one. In addition, those children whose teeth develop later have a 55 percent increased likelihood of requiring orthodontic treatment.

Some of the genes identified have been linked, in previous studies, with the development of the skull, jaws, ears, fingers, toes, and heart. The discovery may lead to innovations in the early treatment and prevention of congenital dental and occlusion problem.

**Techology**

**CAD/CAM-fixed prosthesis**  
Page 22
Nano-Bio-Chip detects oral cancer

Photo courtesy of Textbook of Oral Pathology by Halsted Mehman.

Claudia Salzwicker

ERLANGEN/LEIPZIG, Germany: The brain is not able to discriminate between a painful upper tooth and a painful lower tooth, researchers found. The results of a new imaging study, which will be published in the journal Pain, may help devise better treatments for acute pain, such as cavities or infections, and more chronic conditions like phantom pain of a tooth after it has been removed.

The researchers led by Prof Clemens Forster of the University of Erlangen-Nuremberg in Germany analysed the brain activity in healthy volunteers as they experienced tooth pain. By delivering short electrical pulses to either the upper left or the lower left canine tooth, a painful sensation similar to that felt when biting into an ice cube was triggered. To see how the brain responds to pain emanating from different teeth, the researchers used functional magnetic resonance imaging (fMRI) to monitor changes in activity when the upper or the lower tooth was stimulated.

“At the beginning, we expected a good difference, but that was not the case,” Forster stated.

Many brain regions responded to top and bottom tooth pain—carried by signals from two distinct branches of a fibre called the trigeminal nerve—in the same way. The maxillary branch (V2) carries pain signals from the upper jaw, and the mandibular branch (V3) carries pain signals from the lower jaw.

The researchers found that regions in the cerebral cortex, including the somatosensory cortex, the insular cortex and the cingulate cortex, all behaved similarly for both toothaches. These brain regions are known to play important roles in the pain projection system, yet none showed major differences between the two toothaches. “The activation was more or less the same,” Forster said, although, he added, “their experiments might have missed subtle differences that could account for why some tooth pain can be localised.”

Because the same regions were active in both toothaches, the brain—and the person—might not feel the two pain was coming from. “Dentists should be aware that patients aren’t always able to locate the pain”, Forster says. “There are physiological and anatomical reasons for that.”

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IDEM confirms role as major APAC meeting

Organiser announces plans for 2012/More variety in the scientific programme

Daniel Zimmermann

DTI

SINGAPORE/LEIPZIG, Germany: With final participation numbers having been announced, the International Dental Exhibition and Meeting (IDEM) confirmed its position as a major dental meeting for the Asia Pacific region. An improved scientific programme & a higher number of exhibitors again drew more than 6,000 dental professionals to Singapore. Exhibitors and the organiser said that they were satisfied with the number and type of visitors this year.

IDEM, which is organised by Koelnmesse Singapore Ltd, is held biannually in cooperation with the Singapore Dental Association and the FD I World Dental Federation.

This year’s scientific programme focused on implantology and aesthetics—two of the most successful sectors in the Asia Pacific dental market. Although sales figures were significantly affected by the global financial crisis in 2008/09, growth rates are expected to pick up once the economy begins to recover, a May 2009 industry report stated. According to the same report, sales figures of dental implants in the Asia Pacific region experienced doubledigit growth rates back in 2008.

Implantology was a significant part of this year’s trade exhibition, which saw increased numbers of dental surgical equipment and bone-grafting tools to aid dental implant procedures on display. Besides classical equipment like instruments, units or fillings, digital dentistry specialists also presented 3-D imaging systems that aim to streamline communication between dentists and laboratories, and thus improve long-term treatment outcomes.

For the first time, manufacturers from the republics of Slovenia & Colombia showcased their portfolio in Singapore. The British Dental Trade Association hosted their first national pavilion at the show alongside trade participations from Australia, Taiwan, Singapore, Korea, France and Switzerland. The US and German dental industry were the most well represented, with more than 20 companies representing all sectors in dentistry.

Michael Dreyer, Vice-President Asia Pacific of Koelnmesse Pte Ltd, told Dental Tribune Asia Pacific that despite organisational changes and the economic turndown, IDEM 2010 was in line with IDEM 2008. He said that his company will aim to improve the meeting further in order to make it available to further professional groups like dental assistants.

Singapore Dental Association President Dr Lewis Lee said that the decision to hold pre-congress courses and master classes this year was well received by most congress attendees. He announced plans to broaden the scientific programme in 2012, incorporating more topics like dental materials, orthodontics or oral medicine. A larger number of hands on workshop will be offered as well, he added.

Dentists crucial for detecting mouth breathing symptoms

Daniel Zimmermann

DTI

NEW YORK, USA/LEIPZIG, Germany: Medical and dental problems associated with mouth breathing often go unnoticed by health professionals, a new study from the US suggests. The habit, which is caused by abnormalities of the upper respiratory tract, usually occurs in spring when many people suffer from pollen and seasonal allergies.

Dentist are advised to regularly check for mouth breathing symptoms and swollen tonsils especially in children as young as 5 years of age, the author recommends.

If untreated, mouth breathing can cause a wide range of medical issues such as poor oxygen concentration in the blood, high blood pressure or sleep-apnoea. In addition, it has been found to be responsible for abnormal facial growth primarily in the upper and lower jaw shape of children, leading to Long Face Syndrome, gummy smiles or other malocclusions.

Moreover, poor sleeping habits that result from the condition can adversely affect growth and academic performance.

Dentists may be the first to identify the symptoms of mouth breathing, as they typically request that their patients return every six months, which means that some people see their dentist more frequently than they see their physician.

Treatment for mouth breathing can be beneficial for children’s medical and social conditions if caught early. Swollen tonsils and adenoids can be surgically removed by an ear-nose-throat specialist & dentists can use expansion appliances to help widen the sinuses and open nasal airway passages if the face and mouth are narrow.

In Pericoronitis / Tooth Abscess

![Image](https://via.placeholder.com/150)

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Does dentine hypersensitivity affect oral health-related quality of life?

Dr Katrin Bekes
Germany

Dentine hypersensitivity is an oral complaint frequently reported in clinical dental practice. While many individuals do not seek treatment to desensitise their teeth because they do not perceive dentine hypersensitivity to be a severe oral health problem, a substantial number of patients experience discomfort to the extent that it interferes with their eating, drinking, oral hygiene habits and sometimes even breathing. These symptoms often have a considerably adverse impact on their daily quality of life (QoL). This article reviews the impairments of oral health related quality of life in patients seeking care for dentine hypersensitivity.

Traditionally, dentists have been trained to recognise & treat oral diseases & to describe them using dental indices. Dental indices provide a quantitative method for measuring, scoring, and analysing dental conditions in individuals and groups. They describe the status of individuals or groups with respect to the condition being measured. However, important as these objective measures are, they only reflect the end-point of the disease processes. They give no indication of the impact of the disease process, especially oral disorder, on function or psychosocial well being, and only provide little insight into the impact on daily living and QoL.

Therefore, QoL research in medicine & dentistry has attracted increasing attention over the past years. QoL is defined as an individual’s perception of his or her position in life, in the context of the culture and value systems in which he or she lives and in relation to his or her expectations, goals and concerns. QoL has multiple dimensions (such as cultural factors, social integration, socioeconomic status, quality of environment and personal autonomy). One dimension of QoL is health. The real impact of health and disease on QoL, especially on health related quality of life (HRQoL), oral health related quality of life (OHRQoL), is that part of HRQoL that focuses on oral health and orofacial concerns (Fig. 1). The concept of OHRQoL facilitates studying the impact of a disease on a person’s total oral health because it can be used across conditions. It describes the way in which oral health affects a person’s ability to function, his or her psychological status, social factors and pain or discomfort.

How to measure OHRQoL

OHRQoL is a multidimensional construct that cannot be observed directly. It needs to be visualised by means of suitable indicators. In order to comprehend a construct like this, target persons, that is patients, have to be asked pertinent questions. For example, some questions focus on function, some are concerned with pain and discomfort, and others evaluate self-image and social interaction. The Oral Health Impact Profile (OHIP) is amongst the most widely used instrument in studies evaluating OHRQoL. It attempts to measure both the frequency and severity of oral problems on functional & psychosocial well being. This tool was developed by Slade and Spencer in Australia in 1994.

The OHIP is a 49-item measure, with statements grouped into seven theoretical domains, namely functional limitation, pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. Examples of some OHIP questions are:

- Have you had trouble pronouncing words because of problems with your teeth, mouth or dentures?
- Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?
- Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?

For each of the 49 OHIP questions, subjects are asked how frequently they have experienced the oral problem. Responses are according to a Likert-type scale: 0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often, and 4 = very often.

A summary score of between 0 & 196 results from the 49 questions, with 5 scoring steps each, which provides a good impression of the extent to which OHRQoL is affected. A score of 0 indicates the absence of any oral health related problem. Higher scores represent an OHRQoL that is more impaired. The most extensive impairment of the OHRQoL is expressed by a score of 196. This is termed the problem index and demonstrates that all oral problems are frequently encountered. A table of standard values representatives of different populations is provided, according to which the patient’s score can be compared and evaluated.

To be able to assess levels of OHRQoL in non-English speaking populations, cross-culturally adapted translations of the original English-language version of the OHIP into Chinese, Dutch, Hungarian, Italian, Japanese, Portuguese, Spanish & Swedish has been achieved in several countries. The demand for an internationally comparable German tool led to the development of a German version of the OHIP (OHIP-G), which determines the OHRQoL of German speaking persons. OHIP-G includes the 49 items of the English original, as well as four additional items that were regarded as important for the German population specifically. OHIP-G can be applied to patients of 16 years and older.

A study was conducted at the Martin Luther University, Halle-Wittenberg, Germany to describe and evaluate OHRQoL in patients with dentine hypersensitivity. Data was collected through a questionnaire as part of a larger study targeting several areas of oral health beyond hypersensitive teeth, such as oral hygiene, prevention efforts, and oral behaviours and habits.

There were 724 patients (mean age: 42.8 ± 13.0 years) who participated in the study, presenting at 161 German dental offices because of hypersensitive teeth and reacting positively to an air stimulus applied by the dentist. Patients with removable partial dentures & patients with missing answers in the OHIP questionnaire were excluded. After these exclusions, 656 patients remained in the study for analysis. These patients were compared with 1,541 subjects without removable partial dentures from a national, general German population sample (mean age: 57.7 ± 15.4 years). OHRQoL was assessed using OHIP-G. The patients completed the OHIP-G questionnaire in the dental office.
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- **Porcelain Liner M** – Adhesive Primer for Porcelain Bonding

Sun Medical is one of the strongest dental adhesives manufacturing companies in the world.
Delegates that joined the first precongress sessions on Thursday morning confirmed that the program was a large improvement to the offerings in 2008. Most of the people interviewed said that because of these changes they were able to attend most of the sessions held during the course of the meeting.

“I think the congress was pretty well organised and there was less overlapping which made it easier to get into more sessions,” said one dentist from Singapore.

According to Mr Dreyer, preparations for the next edition of IDEM in 2012 have already begun and the first speakers have been announced. Amongst others, there will be sessions on the management of endodontic disasters, the biological effects of current restorative materials on the pulp-dentine complex and current concepts on posts and cores.

The next meeting is scheduled to be held 20-22 April 2012.
A case report: Unusual anatomy of maxillary second molar

Dr PD Joshi
India

Introduction
The main objectives of an endodontic treatment are the elimination of microorganism from the root canal system and prevention of subsequent reinfection of the system. Inability to find and properly treat the canal may cause failure.

This case report presents an unusual maxillary right second molar with four roots (mesiobuccal, distobuccal, mesiopalatal, and distopalatal). The unusual morphology of roots of the maxillary second molar may be a challenge in diagnosis and treatment execution.

Diamond, in his textbook on dental anatomy, has shown two cases of maxillary first molars with two distinct palatal roots.

Sahala, et al, in a radiographic survey, found that the most common aberration of maxillary molars involved the fusion of 22 percent of the facial roots of second molars. They discovered that aberrations occurred in less than 1 percent of the cases and that of 90 percent of such aberrations were bilateral. Lihfeld and Rostein also examined 1200 teeth radiographically, and reported that four rooted maxillary second molars occurred in 0.416% of cases. The four roots in maxillary molar is more frequent in second molars, the conclusion made by Christie, et al.

This case report illustrates the importance of knowledge about unusual variations in morphology of root and canal, proper access opening, gaining straight line access, proper cleaning and shaping of canals, and obturation.

Case report
A 54-year-old female reported to the clinic with the chief complaint of pain in relation to upper left back tooth region since two days, and pain usually occur after stimulation with hot and cold liquids. The patient gave the history of pain getting worse on lying down, and waking up with pain in the middle of the night. The clinical examination showed a large carious lesion on the buccal surface of the maxillary left second molar (#27). Vitality test with cold stimulant revealed severe, rapid, and long-lasting pain from maxillary left second molar. Pre-operative periapical radiograph revealed a large carious lesion on buccal surface of #27 involving the pulp (Fig. 1). Based on clinical and radiographical evidence, it was diagnosed as irreversible pulpitis.

The careful observation of periapical radiograph shows that the second molar has unusual root morphology, i.e., it has four separate roots. The unusual two separated palatal roots are long and diverging like horns.

The non-surgical endodontic therapy was planned for tooth #27. The treatment was started with administration of local anesthesia using 2% lignocaine with 1:200000 adrenaline. Caries was removed, and then the missing buccal surface of the tooth was build up using glass ionomer cement Fuji type II, to facilitate the isolation of tooth using Rubber Dam (Hygienic Corp., USA).

Files were placed in the canals (Fig. 7) according to WL determined by EAL, and then one more periapical radiograph was taken to confirm the WL (Fig. 8).

The cleaning and shaping of canals were carried out with rotary NiTi Protaper instruments series (by Dentsply Maillefer, Ballagues), according to the manufacturer’s instructions. The final instrumentation was carried out with sizes S1 to F5 of NiTi Protaper instruments (Fig. 9). For irrigation, 5% sodium hypochlorite was used during instrumentation and as well as after completion of the preparation. Concret was carried out with non-standardized gutta-percha of medium size (Sure-endo, Korea) with the help of gutta-percha gauge (Dentsply Maillefer, Ballagues) (Fig. 10 & 11).

The extensive search with Ultrasonic tip #2 of Start X was carried out for second MB, but could not be located. They were further straightlined with X-Gates of cavity access set (by Dentsply Maillefer, Ballagues) (Fig. 5 & 6). The working length (WL) was determined using Root X electronic apex locator (EAL), (by Dentaport ZX, J. Morita, Japan).

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Now, the canals were dried using paperpoints of size F5 (by Dentsply Maillefer, Ballagues) and then obturated with selected cone, using down pack with system B and back pack with obtura II device (Fig. 12). A periapical radiograph (Fig. 15) was taken to confirm the quality of obturation. Permanent restoration was done on the next appointment.

Discussion
Incidence of four rooted maxillary second molar is very rare. Etienne Deveaux presented a case report in Vol. 25, No. 8, JOE Aug. 1999, and Peter M Dr Fiore presented first molar in Vol. 25, No. 10, JOE Oct. 1999. Hartwell and Bellizzi reported that 9.6% of maxillary molars, they examined, had four canals, but had not mentioned about any case with four roots.

Christie, et al, have proposed a classification system for four rooted maxillary second molar abnormalities.

Fig. 1: Pre-operative radiograph
Fig. 2: Triangular access opening
Fig. 3: Modified (Rhomboidal) access opening
Fig. 4: Ultrasonic Tip
Fig. 5: X-Gates being used for straight lining of access
Fig. 6: Access after orifice enlargement
Fig. 7: Files in position for WL
Fig. 8: WL radiograph
Fig. 9: WL radiograph for buccal canals
Fig. 10: Shaping with Protaper Instruments
Fig. 11: Conifit
Fig. 12: Conifit Radiograph
Case Report

Ty with long tortuous divergent separate palatal roots

Ty with short blunt and parallel roots

Ty those with three convergent roots and distinctly divergent fourth distobuccal root.

The tooth treated in this case appears to be of Type I variety according to the Christie’s classification. According to literature, it occurs bilaterally, but in this patient it was unilateral.

References

Dr P D Joshi graduated in dentistry from Nair Dental College, Mumbai in 1980, and has specialized in conservative dentistry & endodontics. He has a private practice specializing in endodontics in Mumbai. In addition, he has taken specialized training in microsurgical endodontics from the University of Pennsylvania, USA, and in implant dentistry from Germany. He is an instructor in the department of micro-dentistry at Government Dental College, Mumbai. He lectures & demonstrates extensively in India and abroad on endodontics and micro-dentistry. He can be contacted at drjoshi01@gmail.com.

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Treating a peri-radicular abscess

Dentist Nicolai Orsteen presents a clinical case study looking at the treatment of a maxillary left lateral front tooth

The patient is a 24-year old white Northern European male. His chief complaint was pain from the maxillary left lateral front tooth, with periodic swelling of the left anterior palatal.

The patient's dental history indicated previous problems in this region, documenting an emergency appointment in March 2007 due to pain and swelling from tooth 22. He was prescribed a seven-day course of Penicillin V tablets (660mg qds x 4) for acute apical periodontitis tooth 22. Following this appointment, the patient was referred for examination and treatment of tooth 22.

**Diagnosis**

The extra-oral examination on 50th January 2008 was within normal limits, shown in Figures 2 and 5.

However, as is visible in Table one, the intra-oral examination revealed gingival bleeding on prodding, no sinus tract and fluctuant swelling of the palate mucosa in the area of teeth 21, 22 and 23. The periodontal pockets however, were within normal limits.

<table>
<thead>
<tr>
<th>Table 1: Clinical findings</th>
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<tr>
<td>Sensitivity to cold</td>
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<td>Percussion</td>
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<td>Palpation</td>
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<td>Probing Depth (mm)</td>
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<td>Restorations</td>
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<td>21</td>
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<td>Yes</td>
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Further radiographic investigation in April 2008 revealed that the patient was suffering from a wide root canal, and an open apex with large apical lesion.

The structured treatment plan involved conventional root canal treatment, and to be assessed for surgery after six months.

**The treatment plan**

Treatment commenced on 5 April 2008. Following an initial clinical examination, the tooth was diagnosed with apical abscess (no sinus present). Access was gained under a rubber dam and the canal was filled with exudate.

The root canal length was determined both by apex locator (RootZ X) and a periapical radiograph. The root canal disinfection was completed mechanically using Hedstrom files (size 90/20 mm/incisal edge).

Particular care was taken during irrigation due to the open apex, & ultrasonics were used for the further cleaning of the canal. A formula of one per cent NaOCl, two per cent CHX and 17 per cent EDTA were used for chemical root canal disinfection. The canal was dressed with Ca(OH)2 and IRM was applied as a temporary filling.

Five days after the completion of the treatment, the patient sought an emergency consultation because of severe pain and swelling from tooth 22. He was prescribed an eight-day course of clindamycin (300 mg x 3*5) to ease the discomfort.

Following the surgery, on May 26, tooth 22 was asymptomatic and still sensitive to percussion. The temporary filling was removed and the root canal disinfected again with Irrisafe, as well as a formula of one per cent NaOCl, two per cent CHX and 17 per cent EDTA. Long term intra-canal dressing with Ca(OH)2 was placed, and IRM was applied as a temporary filling.

**Preparing for root treatment**

The patient missed the following three appointments, but returned on October 14. On this date the tooth was still sensitive to percussion and palpation. As there were no real signs of improvement, it was decided that the tooth should be root filled & an appointment for apical surgery was made. To ease discomfort, the root canal was filled with an 8mm length of white MTA, & a wet cotton pellet was placed over the MTA. On top of the cotton pellet, a temporary filling with IRM was placed.
The re-operative procedure was carried out on November 6. A marginal incision from the mesial aspect of tooth 21 and to the distal aspect of tooth 23 was made, followed by 5mm vertical releasing incisions at the mesial aspect of tooth 21, and a length of 10mm at the distal aspect of tooth 25. The mucoperiosteal flap was elevated (see Figure 10), and a pathological fenestration of the cortical buccal bone was evident, approximately 3mm from the marginal bone crest between teeth 22 & 23. The root end was inspected through the operating microscope, & no fracture was found.

The adaptation of the white MTA to the root canal was judged as good and the operation site was inspected and rinsed with sterile saline, before being sutured with five 6-0 silk sutures. The patient was informed about the prognosis of the tooth and given post-operative instructions. Six 400mg Ibuprofen tablets were dispensed, and the patient was instructed to take one every four hours in the first day following surgery. A prescription of Penicillin V tablets (gds 660 mg *4) for seven days was also given.

The sutures were removed on November 15, and there was evidence of good soft tissue healing. The patient experienced no discomfort from the surgical site.

The temporary filling and cotton pellet were removed during the post-treatment restoration procedure, and replaced by a composite restoration (55 per cent phosphoric acid, Adper, Scotchbond, Filtek Flow (A3) in the apical part, Filtek Supreme (A3D and A2B) in the coronal part). Teeth 21 and 25 maintained vitality. The histological report of the lesion showed a partial epithelium lined cystic wall with intense chronic to acute inflammation, consistent with a radicular cyst. **Result**

**Prognosis**

The patient’s long-term prognosis is uncertain, due to the thin root canal walls and risk of fracture.

**Follow-up**

On November 15 for a twelve-month post-surgery appointment, the patient was still asymptomatic. Teeth 21 and 25 were sensitive to ice-test, and there were no periodontal probing depths over four millimetres around tooth 22.

The radiograph showed evidence of healing.

![Fig. 14: Suturing at the junction between the mesial vertical releasing incision and the horizontal marginal incision](image1)

![Fig. 15: Wound healing before removal of sutures](image2)

![Fig. 16: Wound healing at the junction between the mesial vertical releasing incision and the horizontal marginal incision before removal of sutures](image3)

![Fig. 17: Wound healing after removal of sutures](image4)

![Fig. 18: Occlusal view after removal of sutures](image5)

![Fig. 19: Composite filling on the palatal aspect of tooth 22](image6)

![Fig. 20: Post-operative view](image7)

![Fig. 21: Post-operative periapical radiographs](image8)

**About the author**

Dr Nicolai Orteen graduated from the University of Oslo in January 2002, completing his specialist training in endodontics in June 2009. He then worked in general practice in Oslo from February 2002 and was also a secretary on the regional dental board in Norway from 2004 to 2006. From August 2008, Nicolai worked at a specialist practice in Oslo before joining the specialist team at Endocare Richmond and Harley Street. For more information please call 020 7224 0999 email reception@endocare.co.uk or visit www.endocare.co.uk.
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Dr Oliver Hennedige is the Secretary General of Asia Pacific Dental Federation (APDF) and is Executive Director, International College of Continuing Dental Education (ICCDE). He runs a very successful group dental practice in Singapore, and lectures and demonstrates extensively on mini dental implants. DT India editor, Isha Goel, had a chance to speak with Dr Oliver during a workshop, organized by APDF, ICCDE, and Indian Dental Association (IDA) recently in New Delhi, India.

Isha Goel: The dental implants have been the most influential change in dentistry and you recently shared your views about evolution of mini-implants in a workshop organized by Asia Pacific Dental Federation, ICCDE, and IDA recently in New Delhi, India. Can you give our readers an overview of the rationale for use of mini-implants?

Dr Oliver: Mini dental implants evolved because of the drawbacks and failures of the larger diameter conventional implants. Conventional implants, while being promoted as the panacea for missing teeth, have a high failure rate as these would require an invasive procedure, a very skilful operator, a lot of understanding, and the use of a complex range of specialized and specific instruments. The complexity has resulted in strict protocols that hoped to minimize failures.

While conventional dental implants are successful in the hands of an experienced and competent operator, it generally failed in the hands of those with less experience. It took time, and usually a lot of failures on the way before a dentist or specialist became adept in placing conventional implants.

About 24 years ago, an accomplished implantologist, Dr Victor Sendax of America, decided to question the protocol and rational in placing large diameter implants. He developed the small diameter implants with a straightforward protocol, which, in most instances require no surgery, and with an initial entry point with only a pilot drill, he proposed a self-tapping (screwing) procedure, which not only delivered the implant into the bone but also firmly secured it into its place. It was minimally invasive, incredibly less traumatic, and painless. It allowed the operator to stabilize dentures and securely fix crowns and bridges. Today, it is widely used worldwide and will, in my view, replace conventional implants. There are very few instances indeed and mini-implants, once it is understood, will become standard practice. In fact, there is an exponential growth of mini-implants in America and worldwide, because of simplicity, extremely high success rate, and above all patients talk about the straightforward procedures and good aesthetic results.

Mini-implants growth is phenomenal and will be a procedure, which every dentist of the present and future generation will need to know. Its growth will be driven by patients’ demand.

How do mini-implants osseointegrate and what is your experience on their long-term stability?

The probability of osseointegrating of mini-implant is much greater, as it does not utilize osteotomy (in simple terms, cutting out large chunks of bone in order to introduce the conventional implants). Without the trauma of this procedure, which may generate excessive heat, may ultimately result in bone necrosis & failure of the conventional implants, mini-implants utilize a self-tapping procedure, which allow, intimate and firm contact of mini-implant to bone, once it is introduced.

With the specific design like a typical screw and surface coating osseointegration takes place, I must caution not all mini-implants and conventional implants are the same. They are not generic products, and you have to choose your mini-implant carefully, i.e., the company that produces it.

I utilize Mini Drive-Lock, (MDL), coming from the United States of America. It has really good properties which allow easy placement and long-term stability, especially for crowns and bridges. The Food and Drug Administration from America, which is very stringent in its protocol, has accepted MDL for long-term use in the mouth.

My experience having placed more than 5000 units, is that mini-implants not only work, patients love them and these are an excellent practice builder. I can safely say that I enjoy at least a 95 percent success rate. I see my patients regularly for all dental procedures on a 6 monthly recall and mini-implants placed in more than seven years ago (that is when I embarked on mini-implants) are still functioning well. It is truly an advancement that the dental profession cannot ignore.

Can mini-implants also be placed in the socket immediately after the tooth extraction like we do with the regular implants?

In my practice and in my lectures, I teach the use of mini-implants in immediately extracted socket. What I do, is measure the length of the extracted root, choose a mini-implant at least 2-3 mm longer than the length of the root, and utilize the same procedure of the initial use of a pilot drill, I introduce the mini-implants into the socket. It is firm and I always pack a bone augmentation material into the socket and stitch tight the opening. If the opening is large, e.g., molar extraction, I place a membrane over the socket, so as to prevent washing out of the bone augmentation material.

I allow initial healing for about 4-6 weeks and then proceed to do the prosthetic aspect. I’ve met with very good results. I use Perioglas from the USA for best results.

An observant selection, appropriate treatment plan, precise surgery, and proper design of prosthesis are essential for optimal outcome. How will you grade the success rate of mini-implants in comparison with conventional implants?

Frankly speaking, there is really no comparison. Mini-implants were actually developed because of the drawbacks and failures of conventional dental implants. They are affordable and are really revolutionizing the use of dental implants. As I predicted, seven years ago in an article, it will bring about a paradigm shift in the use of dental implants. Mini-implants are so successful that these are experiencing exponential growth wherever these are introduced.

What are the advantages and disadvantages of mini-implants over conventional implants, and are there limits for their use?

Really, the advantages of mini-implants are phenomenal. You can even use in medically compromised patients with controlled diabetes, heart condition, and forthose who are suffering from Alzheimer where there is very poor control of jaw movement, stabilized dentures with mini-implants or fixed crowns and bridges have been a gift to them.

Very old and frail patients with badly resorbed jaws need not undergo invasive procedures of bone build-up. They can be really benefitted with the use of mini-implants. I’ve placed mini-implants in such patients in their late seventies and eighties. Some of my patients are still eating well and living quality lives right into their nineties.

I believe mini-implants will continue to evolve and a whole range of uses will come into existence, as they are minimally invasive, easy to use, operator friendly, patient friendly, and will be really a boon to patient care. Mini-implants are affordable and cost a fraction of conventional implants.

Dr Oliver thank you very much for the interview.
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YOUR PARTNER IN ORAL HEALTH
Dentin hypersensitivity is described clinically as a short, sharp pain due to exposed dentinal tubules responding to a variety of external stimuli which includes thermal, osmotic, mechanical, evaporative, and tactile stimuli.

Common treatment modalities usually involve prevention of the occurrence of nerve stimulation by either occluding the dentinal tubules or altering the nerve stimulation process. Reduction or elimination of risk factors, which include appropriate behavioral conditioning among others, is also an integral component of managing dentinal hypersensitivity.

The exposure of dentinal tubules is generally attributed to the loss of tooth substance, both enamel and cementum. One of the factors contributing to the surface loss is poor tooth brushing technique. If done injudiciously, toothbrushing, the very activity designed to protect the health of the dentition, may actually be a significant factor in undermining the tooth structure and, in consequence, oral health, itself.

Vigorous and horizontally directed strokes particularly on the gum area can wear a v-shaped abrasion on the neck of the tooth. This will render a large number of dentinal tubules exposed and open to the oral environment and the fluids inside vulnerable to rapid pressure changes which in turn elicit nerve response perceived as a painful sensation by the patient.

Behavioral modification coupled with the use of “tissue friendly” soft toothbrush and gentle toothpaste may significantly prevent the unnecessary exposure of dentinal tubules. Using soft-bristled tooth brush, the patient may direct the tufts at a 45-degree angle around the gum area and apply deliberate but gentle sweeping strokes along the tooth surface towards the incisal or cuspal surfaces. The gum area should also be covered in the gentle brushing to aid in
Dentin Hypersensitivity

the top five oral problems which may compel an individual to seek dental care.

There is a growing professional awareness that dentinal hypersensitivity is one of the factors contributing to the surface loss is poor tooth enamel and cementum. One of the factors includes thermal, osmotic, mechanical, evaporative, short, sharp pain due to exposed dentinal tubules Dentinal hypersensitivity is described clinically as a nerve stimulation process. Reduction or elimination of pain or discomfort due to dentinal hypersensitivity can be achieved by turning on the toothbrush to aid in dental care. A gentle brushing to aid in the elimination of plaque and calculus, and the use of a toothpaste is said to be sufficient to provide immediate and lasting relief from dentin hypersensitivity with the use of a naturally occurring amino acid found in saliva.

Brushing the teeth correctly, at least twice a day, with fluoride-containing toothpaste may help provide the individual with an acid-resistant protective layer. And in case of the onset of symptoms of dentinal hypersensitivity, one may find relief by using hypersensitivity relieving paste. In search of such appropriate relief, scientific advancements are directed towards the use of natural existing ingredients and more natural ways of relieving dentin hypersensitivity (e.g. sealing or occluding the dentinal tubules with calcium and phosphate-rich materials). As reported a more recent technological breakthrough paved the way towards the development of a toothpaste which is clinically proven to provide immediate and lasting relief from dentin hypersensitivity with the use of a naturally occurring amino acid found in saliva.

A two-minute brushing is said to be sufficient to clean the different surfaces of the dentition. It is just like enjoying your favorite music while doing something after savoring your favorite dish or meal. Undoubtedly, it is also like brushing off a potential problem like dentinal hypersensitivity while enjoying an after-meal personal hygiene activity towards a healthy smile.

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Saddle stool in dentistry

Veli-Jussi Jalkanen, specialist in sitting ergonomics discusses a healthy and comfortable way to sit

While some dental professionals have insufficient knowledge to be able to recognise or manage sitting disorders, others realise that back pain and shoulder tension have a lot to do with sitting. Poor circulation in the lower extremities, shortage of oxygen; hip, knee and shoulder joint problems; sitting fatigue, and genital health problems are some examples of the ailments that belong to the large group of SDs (Sitting Disorders). All people working in dentistry are affected by these disorders whether they are aware of them or not. Many of those who are aware of SDs would usually like to improve the situation and look for a more healthy, productive and comfortable way to work.

Healthy posture for long term sitting:
1. Good, relaxed posture, balanced and without harmful supports
2. Thighs 90° apart and pointing down enough to keep the upper body in balance
3. Close to 155° angles in hips and knees
4. Weight on the sitting bones, not the muscles
5. No pressure on the genitals and under the hip (especially for men)

This ideal position can be obtained with a saddle stool.

Sitting on a saddle stool is based...
...on the sitting bones that are located under the hip. They keep the buttocks and thighs from being pressed against the seat if they have a firm support. Thighs point down at a 45 degree angle, tilting the pelvis to a near neutral position, as when standing. This allows the lower back and upper body to find a relaxed, natural posture without the need for a backrest. Feet rest on the floor on both sides of the body as if you were riding a horse. This way it is easy to operate pedals with your feet - they must be placed on the side.

General benefits from a saddle stool in dentistry
• Good, natural and relaxed posture which also keeps improving for years
• Less shoulder area tension by allowing lower positioning of the patient
• Relieving or eliminating lower back pain (oftentimes it disappears in a week)
• Preventing fatigue & improving productivity through deeper breathing
• Preventing shoulder, hip and knee joint problems, angles are more natural
• Easier movements and good working positions
• Improved circulation in lower extremities prevents varicose veins + cellulite built up
• Easy visibility into the mouth by leaning forward with a straight back
• Working at a close distance (also the assistant) with legs under the hoisted chair
• Easy rolling & turning; makes picking materials fast and effortless

A divided seat is helpful...
...because the free space allows proper pelvis/hip position without pressure or discomfort in the soft tissues on the pubic bone.

For men (who have the pubic bone much further back than women) a divided seat is a safer solution in the long run. Pressure on the pudendal nerve & tissues on the pubic bone can lead to erectile dysfunction. Loose, light and stretching trousers are highly recommended for men when sitting on any seats. With women, an additional advantage is the decreased growth of bacteria as a result of better ventilation, lower humidity and temperature in the genital area. This has a positive effect on the Footoperated height control (accessory) keeps the gloves clean & is very helpful in maintaining the welfare of your body and accuracy of your work while you change positions and sitting height in the middle of a long procedure.

Shoulder joint problems...
...often come from elevated shoulder positions, which stress the joints. A riding-like sitting position allows lower positioning of the patient, which allows you to relax your shoulders.

Sitting down & standing up...
...is easy because on a saddle stool you are half way up already. Sitting down could not be any more fluent since the backrest is never in the way. You just lift your leg over the seat from the back and sit down. This kind of mounting puts you instantly into the right kind of relaxed sitting position with good posture.

Data entering...
...is more fluent and time-saving when you can roll back and forth fast and easily with your saddle chair. The movements you do while using the chair keep your muscles active and improve your metabolism.

The Scandinavian working concept...
...is shown in the pictures. Oftentimes, both the dentist and the assistant utilise a saddle stool. Good posture, easy visibility into the patient’s mouth, efficient and free movement can all become reality. The saddle stool allows close proximity to the patient, leaving more room for the legs under the patient. This method of working dramatically decreases problems for both the dentist and the assistant, and is becoming the most common way to sit and work for dentist in Scandinavia.

Adapting to a saddle chair takes some effort...
...because almost everything changes. The body needs time to adjust. Learning to use the saddle chair takes a few days and the “saddle sorrows” in the buttocks and inner thighs as well as fatigue of the back muscles last two-14 days.

It is worth it, but...
...nothing comes for free. Financially, the change is cheap. But most importantly, you need to learn about sitting physiology to be motivated to make the change, alter your working movements and positions and tolerate temporary discomfort. As a return you may achieve a healthier body, better posture, higher productivity (more patients with the same energy), improved quality of work and more satisfying years at work.
Current concepts in gutta-percha removal for re-treatment

Two-part series by Dr Roheet Khatakar & Dr Vivek Hegde—Part I

Common reasons for an endodontic failure include missed canals, ledge formation, perforations, separated instruments, inadequately filled canals, coronal leakage, and error in post placement.

For a successful orthograde retreatment, the removal of the endodontic filling material, such as gutta-percha, is essential to allow access to the canals for a successful debridement and re-obturation of the root canal system. This article deals with the removal of gutta-percha based obturating material, as an essential step in a successful endodontic retreatment.

The first step in planning for a tooth requiring retreatment is – “Coronal disassembly”. This involves removal of the coronal restoration including full coverage restoration, core build-up material, and post placed into the canal. After gaining access into the pulp chamber, it is a prerequisite for the clinician to inspect the chamber floor for any missed canals, which can also be a cause of failure.

Techniques for Gutta-percha Removal

The clinician can use various options for the removal of obturating material:

1. K-files or H-files
2. Gutta-percha solvent
3. Combination of paper points and gutta-percha solvent
4. Rotary instruments
   a. Gates Glidden drill/Pesso reamer
   b. GPX gutta-percha remover
   c. NiTi rotary instruments
5. Specialized rotary instruments designed for retreatment
   a. ProTaper Universal retreatment instruments
   b. Mtwo retreatment files
   c. K-Endo retreatment files
6. Heat transfer devices
   a. Heat carrier tips
   b. Ultrasonic tips
7. Soft tissue laser.

A. Gates Glidden Drill and Peeso Reamer

The Gates Glidden drill (Dentsply Maillefer) is a specially designed tool for re-treatment, the removal of the softened gutta-percha for- mals. The ‘wicking technique’ is used, i.e., flushing the root canal with solvent followed by drying it with paper points, which helps in removing the softened gutta-percha along with paper points.

The use of solvent softens the gutta-percha, and then softened gutta-percha can be easily removed from the canals by placing the file into the canals and applying firm pressure against the canal walls.

Micro-debriders and openers (Dentsply Maillefer) are small files having 90-degree bend at the working end and an attached handle (Fig. 1). It may also be used to substitute standard K-files and H-files.

B. GPX Gutta-percha Remover

The GPX gutta-percha remover (Prestige Dental) is a specially designed file used in a slow-speed handpiece. It plasticizes the gutta-percha by frictional heat and facilitates its removal from the root canal by its H-file like flute design. These stainless steel drills are more effective in the coronal and middle–third portion of the root canals. These drills are available in various sizes, ranging from ISO 25–50, and more recently introduced NiTi GPX removers that can be used in curved canals as well (Fig. 3).

C. NiTi Rotary Instruments

The use of NiTi rotary instru- ments have the advantage of removing gutta-percha as well as shaping the root canals in an under-prepared tooth, simulta- neously. The number of studies carried out for comparing the gutta-percha removal efficacy of rotary with the hand instru- mentation, have shown both techniques to be almost equally effective. It has been advocated that the use of rotary devices in endodontic retreatment should be followed by hand instru- mentation to achieve optimal cleanliness of root canal walls. The rotary instruments reach the gutta-percha quickly. Later, hand instruments can refine and com- plete the removal. These instru- ments are recommended to be used at rotational speed of three-four times more than that of the rotational speed which is recom- mended for routine cleaning and shaping procedures. The rotary instruments also have increased chances of fracture in case they are forced through the mass of gutta-percha.

About the authors

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Editorial note: The references will be published with part II of this article in the next edition of Dental Tribune India.

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**Figure 1:** Micro-debriders and Micro-openers from Dentsply Maillefer

**Figure 2a:** Gates Glidden drills nos. 1–6 can be identified by the head-design and rings on the latch-type attachment

**Figure 2b:** Pesso removers nos. 1–6 can be identified by the longer length of flutes on the head-design and the rings on latch-type attachment

**Figure 3:** GPX Stainless Steel & NiTi instruments available for removal of gutta-percha in straight and curved canals respectively.
Case report: Interdisciplinary full mouth rehabilitation

By Dr Ratandeep Patil, Dr Kripa Shetty, and Dr Kavita Mahesh, India

Introduction
The success of functional and aesthetic restorations in a case requiring full mouth rehabilitation is often dependant on our understanding of interdisciplinary concepts. With every patient being unique and representing a special blend of age, personality characteristics as well as expectations, our knowledge of interdisciplinary concepts can open a whole range of treatment options and outcomes. Today, every dental practitioner must have a thorough knowledge of the roles of these disciplines in producing an aesthetic makeover, with the most conservative and biologically-sound interdisciplinary treatment plan.1,2

Case Report
A 57-year-old female patient reported with the complaint of mobile teeth, spacing in anterior dentition, missing bridge, and desire to restore her smile. During clinical examination, it was noted that the patient had deep periodontal pockets, missing teeth, mobile and migrated teeth. Diagnostic periapical radiograph revealed horizontal bone loss and missing teeth. Based on the clinical and radiographical evidence, it was diagnosed that the patient was suffering from generalized moderate periodontitis with trauma from occlusion. The treatment plan was made keeping in mind the end-result, harmonious with biological and functional aspects. The treatment plan involved:
- Periodontal therapy involving subgingival curettage.
- Extraction of hopeless teeth.
- Crowns and bridges on remaining teeth, along with implant-supported prosthesis for missing teeth. Rehabilitation of occlusion is the crucial phase to ensure long-term oral health.
- Intentional root canal treatment was performed for remaining teeth in order to alleviate post-periodontal therapy hypersensitivity.
- Maintenance and recall.

Material options were given to the patient and a metal ceramic prosthesis was chosen.

Treatment Sequencing
Treatment was carried out in the mandibular arch followed by the maxillary arch in the following phases:

Phase 1
Subgingival curettage of the lower arch along with the extraction of lower right (LR) 1, 2, and 2, followed by placement of immediate extraction implants (Xive/Frialit by Friadent, GmbH) on LR 2 (5.4 x 11), 4 (5.8 x 15), 6 (4.5 x 9.5); UL 1 (3.8 x 11), 2 (5.4 x 11), 4 (5.8 x 15), 6 (4.5 x 9.5) was done. Prefabricated provisional acrylic fixed prostheses were given after bite adjustment. During the following visit, intentional root canal treatment was performed in LR 3, 4, 5, 7, and UL 3, 5, 7, 6 teeth.

Phase 2
The loading of abutment in the upper and lower arch implants was performed six months after the stage 1 surgery. UL 5 was also extracted due to persisting mobility, hence, poor long-term prognosis. Intentional root canal treatment was performed in UL 5, 7 and UL 5, 7 to improve their prognosis and prepared to receive crowns.

After a week, final impressions were made using rubber base impression material, and working casts were prepared to make abutments. The working casts were then mounted on a non-arcon, semi-adjustable articulator using facebow records. The centric relation and vertical dimension were also transferred to the articulator from the patient, using polyvinyl siloxane putty bite. During metal trial, fit of the castings and occlusal clearance were checked. A Bisque trial was done to confirm fit, shade and occlusal parameters.

Later, the final metal ceramic prosthesis was constructed. The final prosthesis, after all occlusal adjustment, was cemented using Glass Ionomer Cement. Recall appointments were given for cleaning and maintenance of the prostheses at every 6 months.

Restorative and Occlusal Considerations
The final occlusion given to the patient was Class II with anterior guidance, which...
allowed direct axial forces and had minimized off axial forces on the implant. Discussion in excursive movements was given attention. Since, upper left canine was missing and was replaced with an implant supported bridge, a group functions was advisable, whereas on the right side, canine-guided occlusion was given, since natural canines were present.

Discussion
Dental problems are often multi-factorial, and may not be satisfactorily resolved by the restorative treatment alone. Creating the perfect smile along with health is a challenging procedure that requires a multidisciplinary approach, and meticulous treatment planning. Emphasis was given on occlusal adjustments in both temporary and final restoration, since occlusal rehabilitation is the key to long-term success of the restorations and the oral health.

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About the authors
Dr. Rama Deep Patil has maintained a successful private practice specializing in aesthetic and implant dentistry in Mumbai, since 1998. He is a diplomat of the International College of Oral Implantologists and is an active member of International Association of Dental Research. He has authored a clinical textbook on aesthetic dentistry (Esthetic Dentistry: An Artist’s Science) and been actively involved in conducting continuing dental education programmes.

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Dr. Kavita Mahesh has been in clinical practice since she graduated from the Government Dental College and Hospital, Mumbai in 2002. She completed her post-graduate certificate in implant dentistry at New York. She is actively involved in clinical research and continuing dental education programs with the Smile Care® team.
Representatives from FDI World Dental Federation, including Dr Roberto Vianna, FDI President, were recently in Dubai for the 2010 UAE International Dental Conference and Arab Dental Exhibition (AEEDC Dubai), where they participated in the AEEDC Conference Program, the Gulf Cooperation Council Preventive Dentistry Conference and the 7th Annual Arab Asian Scientific Dental Alliance, introducing the FDI Global Caries Initiative to key opinion leaders of the Gulf Region.

The Global Caries Initiative (GCI) was first conceived during the Bio Carses Conference in July 2009, where conference attendees—including leading experts in epidemiology, cariology, dental education, prevention and change management—conceded there is a need to establish a broad alliance of key influencers and decision-makers to effect fundamental change across health systems and in individual behaviour in order to eradicate caries worldwide by 2020.

Departing from this objective, FDI World Dental Federation embarked upon a global consultation process to assess the potential challenges and impact of introducing a preventive model to existing systems for caries management. The most recent seminar took place at the 2010 AEEDC Conference Program: Dr Julian Fisher, FDI Associate Director of Education and Scientific Affairs, described the context of GCI in a presentation entitled, “The Global Caries Initiative: A Profession-Led Call to-Action” and Dr Nigel Pitts, of the University of Dundee (Scotland), presented his research related to “A New Approach to Caries Classification, Detection and Assessment: The Experiences of ICDAS”, which addresses an underlying theme identified early in the GCI consultation process; that is, the need for the profession to establish a common language for caries. Dr Pitts has been working with FDI World Dental Federation to explore an international caries classification system within the context of GCI.

Dr Roberto Vianna reinforced the FDI World Dental Federation commitment to oral health in an address to attendees of the Gulf Cooperation Council Preventive Dentistry Conference, paying a special thank you to Professor Abdullah Al Shammery, Dean of Riyadh Colleges of Dentistry and Pharmacy and AEEDC International Scientific Advisory Board Member. Dr Vianna said, that FDI World Dental Federation “is delighted to participate in this Conference and looks forward to working together with the Gulf Cooperation Council and FDI member associations to further prevention at the national level.”

FDI World Dental Federation introduces the Global Caries Initiative to the Gulf Region as part of a global consultation process

Patient safety is an emerging discipline, aiming to reduce harm to patient caused by health care and to identify opportunities for improving patient care. According to the WHO Research Priority Setting Working Group on Patient Safety, tens of millions of patients worldwide suffer disabling injuries or death due to unsafe medical care every year.

The multi-professional WHO Patient Safety Curriculum Guide was first published in 2008 to provide medical schools with guidelines for teaching patient safety, and has since been downloaded by more than 1000 institutions in 100 countries. In growing recognition of the harms caused by health care, the WHO initiated a review of the Guide and invited FDI World Dental Federation to participate as a primary partner in the project, together with the International Council of Midwives and other members of the World Health Professions Alliance (WHPA), International Council of Nurses, International Pharmaceutical Federation and World Medical Association. Professors Takashi Inoue and Yermin Yamalik, of the FDI Education Committee, will be contributing to the review. Details are expected to be finalised during a consensus meeting at the 2010 OSAP Annual Symposium in June. An address to attendees of the Gulf Cooperation Council Preventive Dentistry Conference, paying a special thank you to Professor Abdullah Al Shammery, Dean of Riyadh Colleges of Dentistry and Pharmacy and AEEDC International Scientific Advisory Board Member. Dr Vianna said, that FDI World Dental Federation “is delighted to participate in this Conference and looks forward to working together with the Gulf Cooperation Council and FDI member associations to further prevention at the national level.”

The annual FDI Corporate Partners meeting took place at the end of February during the 145th Chicago Dental Society Mid-Winter Meeting. FDI President Dr Roberto Vianna opened the meeting, welcoming & thanking FDI Corporate Partners for their unwavering support, particularly in view of the economic challenges still affecting businesses worldwide. Joining the FDI President at the meeting were FDI President-Elect, Dr Orlando Monteiro da Silva; Councillor, Dr Kathryn Kell; Executive Director, Dr David Alexander; and other full-time FDI professional staff from the Finance, Communications and Congress departments.

Dr David Alexander presented a detailed report on ongoing FDI activities & achievements in 2009, including the introduction of a new FDI website, preparations for the 2010 Annual World Dental Congress in Salvador da Bahia, Brazil, future congress venues, progress on the Global Caries Initiative and a summary of internal process improvements across the organisation. Dr Alexander reminded participants of the critical importance of partnership between FDI World Dental Federation and the dental industry, encouraging an “open dialogue, which strengthens our relationship and brings mutual benefits to both parties.” The presentations portion of the meeting included a financial review by Jerome Estignard, FDI Director of Finance & Operations, who summarised the 2008 year-end results and budget forecasts for 2010 and beyond.

The annual FDI Corporate Partners meeting is held in the first quarter of each year, alternating venues between the Chicago Dental Society Mid-Winter Meeting and the International Dental Show in Cologne, Germany.

FDI Corporate Partners meeting in Chicago

FDI teams up with OSAP to improve global patient safety standards

FDI World Dental Federation is participating in an official review of the WHO Patient Safety Curriculum Guide, together with the Organization for Safety and Asepsia Procedures (OSAP), International Federation of Dental Educators and Associations (IFDEA), and other leading global medical profession associations.

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Complete maxillary implant prostodontic rehabilitation with a CAD/CAM-fixed prosthesis

By Neo Tee-Khin, Ansgar C. Cheng, Helena Lee and Ben Lim, Specialist Dental Group, Singapore

Endosseous implant treatment has been widely reported as a highly predictable treatment modality with a low percentage of clinical complications. Prudent clinical judgement and careful consideration of the risks and benefits of various treatment options are essential for the treatment planning and long-term success of prostodontic treatment.1

Traditional implant prostheses are commonly fabricated using acrylic resin teeth supported by a metal framework. Significant space is designed at the tissue surface of the prosthesis to enhance oral hygiene maintenance. However, application of this prosthetic design in the maxillary arch is occasionally esthetically inadequate and speech may be compromised.

Conventional porcelain-fused-to-metal restorations require the placement of labial restoration margins below the free gingival margin in order to mask the hue and value transition between the sub-gingival implant sub-structures and the supragingival crown restorations. From a periodontal point of view, sub-gingival placement of restoration margins is related to adverse periodontal tissue response.2–5 As a result, restoration margins are best placed coronally from the free gingival margin.6–8

Porcelain-fused-to-metal restorations are commonly used in the posterior teeth because of their well-documented long-term clinical track record.4–11 CAD/CAM ceramic-based materials are prescribed nowadays, owing to their demonstrated promising physical properties11,12 and clinical longevity.13

This article describes the clinical application of high-strength zirconium oxide restorations in the prostodontic management of an edentulous maxilla with a failing implant prosthesis.

Clinical report
A 62-year-old female with an implant-supported maxillary prosthesis was evaluated at the Specialist Dental Group in Singapore. She presented clinically with a maxillary fixed complete denture supported by six endosseous implants (Nobel Replace, Tapered Groovy, Nobel Biocare).

The prosthesis had acrylic resin teeth supported by a gold alloy metal framework. The implant at the patient’s maxillary right canine area was exposed. The patient reported no symptoms (Fig. 1). An occlusal examination revealed a stable maximal intercuspation position with insignificant centric relation to maximal inter-cuspation slide at the teeth level. A canine-guided occlusal scheme was noted. No parafunctional habits
were reported. Sub-optimal maxillary lip support was noted.

A significant amount of dead space was identified between the intaglio surface of the prosthesis & the maxillary soft tissue.

Upon removal of the maxillary prosthesis, all the maxillary implants were found to be osseointegrated. The patient desired to correct the failing implant, restore lip support, masticatory function and facial esthetics.

The overall treatment plan included removal of the implant at the maxillary right canine area, replacement of a new implant at the maxillary right canine region and fabrication of a full-arch, zirconium oxide-based ceramic restoration in the maxilla.

Under local anaesthesia, the implant at the maxillary right canine area was removed surgically (Fig. 2) and a new 15 mm long regular platform implant was placed (NobelReplace, Tapered Groovy). The new implant was submerged and primary wound closure achieved. The existing prosthesis was reinserted during the healing period to serve as a provisional prosthesis.

Once osseointegration was achieved a few months later, the new implant was exposed and the maxilla was ready for prosthodontic rehabilitation after a few weeks of soft-tissue healing.

Six implant-level impression copings (NobelReplace) were placed onto the maxillary implants. High-viscosity vinyl polysiloxane material (Aquasil Ultra Heavy, DENTSPLY DeTrey) was carefully injected around all the impression copings. A stock tray loaded with putty material (Aquasil Putty, DENTSPLY DeTrey) was seated over the entire maxillary arch to make the definitive impression.

A jaw-relation record at the treatment vertical dimension was made with a vinyl polysiloxane material (Regasil PB, DENTSPLY DeTrey).

The maxillary and mandibular definitive casts were mounted arbitrarily in the center of a semi-adjustable articulator (Hanau Wide vue, Teledyne Waterpik) using average settings. The custom zirconium oxide abutments with gold-alloy fitting surface (Procera, Nobel BioCare) were CAD/CAM fabricated according to the prosthesis design.

The development of the planned definitive maxillary restoration was carried out using a CAD/CAM process. The maxillary definitive cast with the custom full-ceramic abutments were scanned (Zeno Scan, Wie land Dental + Technik), and the prosthesis framework was designed using a software program (D1700, 3Shape).

The framework was milled in zirconium-base-material (Zeno Zs Bridge, Wieland Dental + Technik) with a milling machine (Zeno 40/30 MI, Wieland Dental + Technik). The prosthesis framework was sintered according to the manufacturer’s recommendations.

Subsequently, overlaying low-fusing, tooth-colored porcelain material (IPS e.max, Ivoclar Vivadent) was manually applied onto the exterior to create proper anatomic form (Fig. 5). Low-fusing, gingival-colored porcelain material (IPS e.max) was applied to create proper lip support (Fig. 4).

During the delivery clinical session, the old prosthesis was removed and the new custom abutments were torqued to 32 Ncm (Fig. 5).

The new prosthesis was tried in to verify color, occlusion, lip support, teeth form, and comfort.

Upon confirmation of the patient’s acceptance, the implant abutments were sealed in gutta-percha (Fig. 6) and the prosthesis was cemented in resin-modified glass-ionomer luting agent (Relly U nicem, 3M ESPE).

The patient was evaluated 2 weeks postoperatively. Anterior guided occlusal schemes were verified intra-orally before and after prosthesis cementation (Fig. 7). The patient reported no discomfort and she had been functioning well with the new restorations. No abnormal clinical signs were noted.

**Discussion**

Osseointegration is a well-documented and predictable clinical treatment option. On the other hand, management of implant-failure is also a clinical reality.

In this clinical report, the failure of one implant at a crucial location indicated the need for re-fabrication of the entire implant prosthesis.

As the patient desired a high level of esthetics, full-ceramic restorations were selected. By prescribing tooth-colored ceram ic abutments & full-ceramic restorations, prosthetics margins were made at the gingival level and gingival retraction procedures were eliminated during impression and prosthesis insertion.

Full-arch prosthodontic rehabilitation using fixed prostheses usually requires longer-term provisional restoration in order to facilitate a predictable treatment outcome.

In this patient, the existing maxillary prosthesis served as a long-term provisional restoration for verifying her adaptability, & multiple professional clinical adjustments of provisional restorations were not required.

This treatment sequence increased the margin of safety in the execution of the definitive full-ceramic restoration.

Intra-oral verification of the new treatment occlusal scheme and detailed in situ clinical adjustment of the restorations on the day of prostheses insertion still formed the essential foundation for proper treatment execution.

In any major prosthodontic treatment, the patient should be informed of the potential financial and time implications should the need for refabrication of the restorations arise.

**Conclusion**

The functional management of an edentulous maxilla using a full-ceramic implant-supported maxillary prosthesis has been reported. New CAD/CAM-based restorative materials were used in treating this case.

The use of high-strength full-ceramic restorations enhances overall esthetic predictability and long-term functional outcome.

_A complete list of references is available from the publisher._

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**Fig. 1:** Pre-treatment intra-oral frontal view: A large space was noted between the intaglio surface of the prosthesis and the maxillary tissue, and there was significant tissue resorption on the labial surface of the implant over the maxillary right canine area. The patient was asymptomatic.

**Fig. 2:** Full-thickness flap revealed the advanced bone loss on the labial surface of the implant. In spite of the tissue damage, this implant was clinically firm.

**Fig. 3:** Anterior view showing the CAD/CAM-fabricated full-ceramic implant abutments at the approximated vertical dimension of occlusion.

**Fig. 4:** Occlusal view of the maxillary arch before insertion of the maxillary prosthesis; favorable anterior-posterior spread allowed the replacement of posterior teeth with distal cantilevering.

**Fig. 5:** Maxillary prosthesis before the application of tooth-colored porcelain; excessive crown length was noted at this stage.

**Fig. 6:** Completed maxillary prosthesis with gingival-colored porcelain applied to provide adequate lip support; excessive crown height was reduced.

**Fig. 7:** Completed maxillary implant-supported prosthesis; note the placement of the supra-gingival margins.

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**About the author**

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Epulis gravidarum mimicking a neoplasm
A case report by Dr Deepak Chopra, Dr Mayur Kaushik, Dr Deepak Kochar, and Dr Sibirathar Malik, India

Introduction
Pregnancy is a delicate condition, involving complex physical and physiological changes. Modification of metabolism, immunology, and high level of hormones make it possible for fetus to grow & develop, ending up with labor. Variations of these hormones cause some changes on skin and oral mucosa. The changes progress due to increased level of sex hormones and grew very rapidly over a three week period. The histological picture (hemangiomalike) and “pregnancy tumor”. The term “hemangiomatosus granuloma” was suggested by Angelopoulos to accurately reflect the characteristic histopathologic picture (hemangiomalike) and the inflammatory nature (granuloma) of the lesion. 

Excisional biopsy of the lesion with a wide margin was performed (Figs. 2 & 5). The histopathological examination revealed young granulation tissue, as granuloma implies. It has been called an epulis, because it is located more frequently in the gingiva. Some other terms used are “granuloma telangiectaticum” and “pregnancy tumor”. The term “hemangiomatosus granuloma” was suggested by Angelopoulos to accurately reflect the characteristic histopathologic picture (hemangiomalike) and the inflammatory nature (granuloma) of the lesion. 

Clinically it presents as a lesion that is pedunculated or broad based, highly vascularized, smooth, edematous, hemorrhagic, soft, red with glossy surface and hardened when it had been longstanding. It could be a single or multiple well localized outgrowth, painless or with dull pain. It usually is not bigger than 2 cm in the diameter.

Differential diagnosis includes peripheral giant cell granuloma, epulis, peripheral ossifying fibroma, metastatic cancer, hemangioma, conventional granulation tissue, hyperplastic gingival inflammation, angiosarcoma, kaposi’s sarcoma and non-hodgkins lymphoma. 

Conclusion
Epulis gravidarum represents an important differential diagnosis of oral masses and can behave in a very aggressive fashion, mimicking a malignant tumor. Excised specimens should be sent for histopathological reports to exclude malignancy. It is acceptable practice to excise aggressive variants of this lesion during pregnancy to avoid distressing side effects.

References

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Miniscrews—a focal point in practice

Six-part series by Dr Björn Ludwig, Dr Bettina Glasi, Dr Thomas Lietz, & Prof. Jörg A. Lisson—Part IV

Clinical examples (2)

Repositioning individual teeth

The straightening of mesially tipped (2nd) molars in a full dentition represents a therapeutic challenge. The treatment is further complicated if the tooth is not only tipped but also partly impacted. The presence of a non-erupted third molar does not simplify the process (Fig. 1a).

When planning the required appliance, it is important to consider whether it is necessary, for example, to reshape the entire dental arch (Figs. 1a–d) or just upright the tipped tooth. If miniscrews with bracket heads are used, it is possible to employ a special NiTi uprighting spring (such as the Memory Titanol spring, FORESTADENT). A standard multi-bracket appliance can be used to reshape the dental arch. At the same time, a second force element can be applied with the aid of a miniscrew and an uprighting spring (Figs. 1b–d). This avoids the loss of anchorage that inevitably occurs when only an uprighting spring is fixed to the multi-bracket appliance (Fig. 2).

The straightening of an individual tooth may become necessary for periodontological, prosthetic or orthodontic reasons. This is a very simple procedure if a miniscrew and uprighting spring are used, and the appliance remains invisible to the observer. The tooth need only be fitted with an appropriate attachment system that makes it possible to fix this to the uprighting spring. Depending on how the spring is applied, it is possible to achieve intrusion/extrusion of the tooth. This form of treatment is inexpensive for the patient and the orthodontist will find it highly effective.

 Alignment of retinated teeth

The alignment of retained or displaced teeth, particularly in the case of canines, is one of the most common forms of surgical intervention in the field of orthodontic techniques. Numerous appliances are available—rubber bands, springs, orthodontic chains—that are effective to a greater or lesser extent. All these mechanisms have the same underlying problem: the neighbouring teeth must be used—directly or indirectly—to provide an anchorage, so that the required traction forces can be applied. Ideally, the neighbouring teeth will offer the greater resistance so that only the retained tooth moves. Realistically, however, both components tend to move towards each other. In the worst-case scenario, only the group providing anchorage is displaced from its original position. This can occur if there is ankylosis of the retained tooth, something that is difficult to evaluate during initial examination. If an attempt is made to move an ankylosed canine towards insufficient dental anchorage, the result will be...

Fig. 1a-c: The alignment of a displaced canine using a miniscrew. After the canines have been exposed, they are attached to a bracket by means of a miniscrew (a). After removal of the screw, the dental arch can be reshaped using a conventional technique (b, c).

Fig. 2: The uprighting spring fixed to the main arch not only affects the molars, but also causes displacement of the premolars (loss of anchorage). (Photo: Prof. Dominguez, São Paulo, Brazil.)

Fig. 5: The hybrid RPE appliance with adioint anterior hooks for the attachment of a Delaire mask.
stable methods of acquiring more transverse space in the upper jaw. The targeted screw rate should be in the range of 0.2 to 0.6 mm/day. As a rule, the appliance is fixed by means of bands to the molars & premolars. The desired transverse width can generally be achieved within 10 to 20 days. Thereafter, a three-month stabilisation phase should be observed, in order to allow ossification of the ruptured palatine suture. The standard anchorage technique with dental support only has several disadvantages. The most significant is the risk of tipping the anchor teeth. Many appliances have been described that distribute the force over more than one tooth. A further problem is apparent here: as it is necessary to leave the appliance in place for a longer period after the active phase, it is only possible to commence further corrective treatment for teeth in the anterior region. It is possible to overcome these problems by using the ‘hybrid RPE’ (Figs. 4–6). Bands are employed as usual in the molar region. In the anterior region, the RPE appliance is fixed using two miniscrews. These should be placed on a notional transverse line connecting the canine/premolar contact points paramedially. Distraction is achieved using the same method as in standard techniques. There are several advantages to hybrid RPE. Preparation of the apparatus is much simpler and cheaper, whilst the dental arch, including the premolars, is accessible for additional tooth correction measures.

**Class II corrections**

In the case of patients with Class II malocclusion who have completed or are near completing their growth phase, simple techniques for the forward positioning of the lower jaw are usually ineffective. Following a thorough initial examination and diagnosis, there are three possible therapeutic approaches: camouflage, fixed Class II correctional appliances (Herbst splint, Sabbagh Universal Spring, FMA, Jasper Jumper etc.) or orthognathic surgery. The patient must be informed of the advantages and disadvantages of each approach. All fixed Class II
correctional appliances—irrespective of whether these use the Herbst splint or canted plane principle—have the same problem and the same undesirable side effects. There is a risk of protrusion of the lower frontal teeth and/or distalisation of the upper molars. By means of passive stabilisation with the aid of two miniscrews (Figs. 7 and 8), these effects can be readily avoided.

Orthognathic surgery

After surgical intervention to relocate or reposition the jaw (for orthodontic or trauma-tological reasons), it is important to maintain a stable correlation between bone fragments and the jaw in the postoperative phase. This promotes healing and prevents relapse. The occlusion appliance is fixed intraorally, using intermaxillary elastic or wire ligatures, depending on the situation. It is essential to use the appropriate fixing options, whether this is a splint (Schuchardt splint) or a multi-bracket appliance. Where these are really only needed in one jaw or jaw section, the question arises of whether, in the era of the miniscrew, it is necessary to involve the other jaw in the stabilisation of the surgical effect. If miniscrews are used in the opposing jaw (Fig. 9), the same effect is achieved—but with considerably less restriction from the point of view of the patient.

Pre-prosthetics

It is the aim of pre-prosthetic orthodontics to position the teeth optimally for the subsequent prosthesis. This can include intrusion, uprighting, and the opening or closing of gaps, amongst other techniques. As this series and many other publications have already shown, miniscrews are particularly useful in this context. Miniscrews can also be used as anchoring elements for a provisional prosthesis. Where teeth are missing (particularly the second canines, Fig. 10a) and the growth phase is not yet completed, the fitting of an intermediate prosthesis is problematic. As an alternative, particularly where additional anchorage is required, miniscrews can be used. A longer screw (8 or 10 mm) can be inserted in the centre of the dental ridge (Fig. 10b). There should be at least 1 mm of bone to the mesial and distal sides of the miniscrew. The hole for the insertion of a miniscrew (1.6 mm) should thus be at least 2.6 mm. A provisional crown can then be mounted onto the head of the miniscrew. If necessary, a bracket can be fixed to this crown (Fig. 10c).

Outlook

The clinical use of miniscrews supports a wide range of tasks. Dental repositioning that was previously deemed impossible becomes achievable, whilst possible repositioning techniques are improved and supported. In order to achieve this, miniscrews alone are not sufficient; an appropriate range of equipment is also necessary.

Several suppliers of miniscrews offer, in addition to screws and insertion tools, a number of devices that facilitate the use of miniscrews. The fifth part of this series will focus on the wide range of useful auxiliaries that are available.

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Editorial Note: The next edition of Dental Tribune India will feature part V of this article.
If cold means pain, it is a sign of Sensitive Teeth.

Fast relief from pain of sensitive teeth

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