Rare oral condition declared an autoimmune disease

Daniel Zimmermann

NEW YORK, USA/LEIPZIG, Germany:
Patients suffering from a very rare condition that affects the oral mucosa may soon be offered some relief by new research conducted in the US. In a recent study, scientists from Tufts University near Boston claim to have found evidence that chronic ulcerative stomatitis (CUS), characterised by recurring and painful ulcers, is mainly caused by an autoimmune response by the body that destroys the binding of cells inside the surface tissue layer of the mouth.

According to the scientists, only a dozen cases of CUS have been reported worldwide since the condition was first clinically identified in 1989 but the number may be higher, as patients may remain undiagnosed owing to the extensive testing procedure and low awareness amongst dental clinicians. While it was known that patients with CUS have specific auto-antibodies, researchers had not been able to determine the extent to which these contributed to the condition. With help of the new findings, CUS could now be classified as an autoimmune disease in order to allow better management of the symptoms.

Owing to its unique resistance to standard medication like corticosteroids, successful treatment of CUS has been achieved only in some cases through hydroxy-chloroquine, a prescription drug primarily used to prevent malaria, as well as to treat rheumatoid arthritis and lupus. By better understanding the mechanisms linking the autoimmune response to ulcerative sores, new approaches could be developed to treat patients suffering from the condition, the scientists said.

So far, CUS has been found chiefly in middle-aged Caucasian Canadian women. It can only be mistaken identified as oral erosive lichen planus, another more common chronic condition affecting mucosal surfaces and also thought to be an autoimmune disease. [Diagram]

Mouth enzyme could fight caries

Japanese researchers have discovered that the FruA enzyme produced by the Streptococcus salivarius bacteria, a harmless inhabitant of the human mouth, inhibits the development of oral biofilms or plaque. The discovery could lead to more efficient oral health products to fight caries. [.]

Dental stem cell bank expands

India’s first private dental stem cell bank has announced plans to expand into 10 major cities including Chennai and Bangalore within this year. Founded by Stemade Biotech, an Indian-French joint venture, the institution currently operates two branches in Mumbai and New Delhi. [.]

Southern India troubled by fluoride

The health of residents of Bangalore and neighbouring villages in India is under threat by increasing levels of natural fluoride in their drinking water, the national newspaper The Hindu reports.

According to the latest tests by the country’s Department of Mines and Geology, the amount of the mineral found in water reservoirs beneath the city recently exceeded the limit for human consumption by 400%. If consumed over a long period, high amounts of fluoride can significantly contribute to skeletal and dental fluorosis, a condition that weakens bones and teeth.

Experts said that the five-year high may be due to deeper sunk wells that strike fluorid- rich ground water at depths of 500 metres. [.]

Ortho study gives HK people a bad note

People in Hong Kong should brush up on their knowledge of misaligned teeth (malocclusion). According to a new survey conducted by the city’s Society of Orthodontists on more than 1,000 participants, four in five people did not know that it can lead to long-term dental complications, such as temporomandibular disorders or impaired speech and chewing dysfunction. Most saw major consequences for their social life, including loss of attractiveness and self-esteem due to conditions like crowded teeth, crossbite or overbite.

The findings confirm results of earlier studies that showed that Hong Kongese generally lack knowledge of the consequences of bad oral health. The last national survey on the matter conducted in 2001 revealed that only 50 per cent of adults seek regular dental check-ups. Over 50 per cent also considered tooth loss as a nature eventuality in life. In terms of oral health, Hong Kong currently ranks similar to other developed countries in the region. [Image]

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Australia spends millions on kids oral health study

Four times more children admitted to dental hospitals than in the UK

Daniel Zimmermann

HONG KONG/LEIPZIG, Germany: As part of a multi-million dollar health funding package, the Australian Coalition has granted the University of Adelaide in South Australia AUS$1.5 million (US$1.56 million) to investigate poor oral health in children. The study will be conducted nationwide over four years and involve more than 50,000 participants from private and public schools.

According to a governmental survey, teenage children in Australia have an increased risk of developing dental diseases. Every year, over 20,000 children are admitted to hospitals for dental work, a significantly higher number compared with other countries like the UK, where slightly over 5,000 admissions were recorded in 2009.

Researcher Professor John Spencer from the Australian Research Centre for Population Oral Health, who will also lead the study, said that it will look at the organisation and delivery of dental services for children, as well as compare the use and clinical outcomes of school dental services and private dentists. He said that his institute will be partnering with all eight state and territory public dental authorities, who will be committing an additional AUS$1.7 million (US$1.78 million) to the project.

“Public programmes like the school dental services are not reaching as many children, yet private dental services may be out of the financial reach of many families,” Prof Spencer said. “The challenge is to identify and eliminate barriers to dental health services in Australia, improving service delivery, reducing risks and promoting healthy diets.”

Australia currently spends less than the US and countries in Asia and Europe on public health care, a 2009 study by the Organisation for Economic Co-operation and Development has found. The funding for a universal dental health scheme, a key motivation for the Green Party forming a coalition with Labor in the last national election, was recently scrapped from the federal budget by the Ministry of Health.
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"The Japanese people will recover from this disaster quickly"

An interview with Eiichi Nakanishi, President and CEO of NSK Nakanishi, Japan

Eiichi Nakanishi is relieved. His company NSK, Nakanishi, and its staff were unharmed by the 11 March earthquake and subsequent tsunami. Like most Japanese companies, the manufacturer of handpieces and other dental equipment has an obligation to serve its customers in any circumstances. This is the reason Nakanishi says the company is currently working overtime, despite the occasional blackouts, which are still restricting business operations in the country.

Established in the 1950s, NSK has had to face a number of obstacles during its 80-year history, in addition to natural disasters. Production of dental handpieces, for example, had to be stopped in 1945 owing to World War II and was not resumed until 1951. Since then, the small company from Tokyo has evolved into a major international dental player with several business branches outside of Japan. NSK operates not only in major markets like the US or Germany, but also in China, Dubai, France, Spain, Australia and the UK. Recently, a representative office was established in Singapore to enhance sales and services to customers in the Southeast Asian region.

Since NSK conducts most of its sales overseas, the recession that hit the Japanese economy in 2009 had little impact on overall business results. This relative independence of domestic sales also gave the company the opportunity to invest in new technologies. As a result, NSK launched seven new products at the 33rd International Dental Show (IDS) in Cologne, where the manufacturer of dental equipment has an obligation to serve its customers in any circumstances. This is the reason Nakanishi says the company is currently working overtime, despite the occasional blackouts, which are still restricting business operations in the country.

Nakanishi, the wife of our founder. In addition, we have collected donations from our staff that will support people affected by the catastrophe.

How has the disaster influenced business life in general?

We expect to see some effects in our business operations, particularly in the areas most affected by the earthquake and the tsunami. However, the best we can do right now is to help the population affected by the disaster and work together to recover from these events, which have had severe results.

In your opinion, will this catastrophe have any long-term impact on the dental industry in Japan?

It is too early at the moment to make predictions about the long-term effects on our industry, as we are still in the process of recovery. We believe that the Japanese people will recover from this disaster quickly owing to the Japanese spirit, which embraces such characteristics as endurance, perseverance and dignity.

You have just returned from this year’s IDS in Cologne. What are your general impressions regarding your exhibition there and the state of the whole industry?

I believe that this year’s IDS was very successful for us. We had many visitors to our booth and received great feedback on our new products. Unfortunately, we only met a few visitors from Japan, probably owing to the current situation in our country.

You exhibited seven new products, including new handpieces, scalers and hygiene solutions. In your opinion, what product or products will be of the most benefit to dental practitioners?

All our new products are extremely useful but if I had to choose key products, the Z series contra-angle handpieces, as well as the Surgic Pro surgical micro-motor with excellent durability, reliability and great torque accuracy, will be of most benefit to practitioners.

How important have overseas branches outside of Japan become?

Our overseas operations already contribute 85% to our overall business and, therefore, the economic conditions in Japan only had little impact. Actually, our domestic business has grown lately in spite of the recession.

In Europe, we have increased our business thanks to re-organisation of sales and the establishment of our new headquarters in Frankfurt/Main, Germany. We recently expanded our sales network in emerging markets, with new offices in Dubai, Moscow and Singapore. We are also improving our operations in China through our subsidiary in Shanghai and have started to re-organise our sales network in Latin America.

NSK has been on the market for more than 80 years. What business goals do you want to see accomplished by 2016, for the company’s 100th anniversary?

In accordance with our corporate philosophy—by offering high performance and durable products at reasonable prices, NSK contributes to the health and well-being of people through the world—our ultimate goal is to be the No. 1 global dental company.

Thank you very much for this interview.
Bugs threaten health of orthodontic patients
One in two retainers found to host array of harmful bacteria

Daniel Zimmermann
DTI

LONDON, UK/LEIPZIG, Germany: Orthodontic retainers are a potential source of harmful microbes if not properly cleaned, scientists in the UK have warned. In a series of tests conducted at the UCL Eastman Dental Institute in London at least 50 per cent of all tested retainers contained species of Candida and Staphylococcus micro-organisms, including MRSA, a multidrug-resistant bacterium that can be fatal to patients with a compromised immune system.

The Candida yeast, found universally on human skin and other areas, can also cause infections. Amongst other conditions, it has been associated with oral candidiasis, a condition often related to ill-fitting dentures. Both species do not normally occur in the oral cavity.

The researchers said that the high number of harmful bacteria found in retainers is most likely the result of poor cleaning, allowing microbes to build up a resistant biofilm and spread to other areas of the oral cavity such as interior cheeks and tongue. The potential for transmission is also high, as retainers are frequently removed and replaced in the mouth by the person who uses it, they added.

They recommend wearers wash their hands thoroughly before and after inserting their retainers.

Proper dental hygiene through tooth brushing and the use of mouthwash also helps to keep harmful bacteria from entering the mouth.

WHO takes on influenza threat

From news sources

GENEVA, Switzerland/LEIPZIG, Germany: Members of a working group set up by the World Health Organization have agreed upon an international framework to improve preparedness for influenza pandemics that threaten public health worldwide. The agreement, which is expected to provide clear legal regimes and responsibilities for all stakeholders involved in the prevention and management of pandemics, is the result of more than three years of negotiations. It is expected to be ratified during the World Health Assembly in Geneva, Switzerland, in May.

According to a joint statement, one of the key elements of the agreement will be improved cooperation and exchange of information between key players such as the WHO, national laboratories and pharmaceutical manufacturers. Access to life-saving vaccines and other resources for low-income countries, which often cannot produce or afford the required anti-viral medication for their population, is also supposed to be improved.

“This agreement promotes global health security and solidarity in pandemic times,” said Ambassador Bente Angel-Hansen, who also chairs the working group. “It also reflects a unique partnership with industry and contains concrete measures of cooperation with both industry and civil society.”

Owing to increasing global transportation, locally active influenza viruses exhibit an increasing potential to become global pandemics, placing many at risk, especially medical and dental professionals. According to the latest estimates from the WHO, the H1N1 virus or swine flu that first occurred in Mexico has killed almost 20,000 people worldwide.
Periodontal treatment no harm to newborns

From news reports

SAINT PAUL, USA/LEIPZIG, Germany: Pregnant women with gum disease may undergo non-surgical periodontal treatment without fear of consequences for their baby’s health. In a large trial involving 400 infants between the ages of two and three from different pediatric clinics in the US, dental clinicians found differences in development and experimental groups comparing children born to women who were treated for gum disease before and after their delivery. However, the results between the control and experimental groups only differed slightly. Higher motor and cognitive scores were observed in the children of women who saw an improvement in their periodontal health.

Earlier studies indicated that maternal periodontal treatment may be linked to different medical problems including low birth weight, preterm birth and long-term development delays, as bacteria released during treatment may enter the mother’s bloodstream and harm the baby. According to research, pregnant women are prone to gingival bleeding, which is caused by a hormonal imbalance that encourages the growth of certain oral bacteria.

If the new data is verified, pregnant women throughout the US could have their gum conditions treated, confident in the knowledge that it will not have a clinically significant effect on their child’s development, the researchers said. A spokesperson of the American Academy of Periodontology said that although the data remains inconclusive, the organization generally recommends women to maintain their periodontal health during pregnancy.

Renewal of Brunei agreement

Lisa Townshend

LONDON, UK: King’s College London Dental Institute can look forward to three more years of collaboration aimed at the development of the dental workforce in Brunei Darussalam after the renewal of the agreement with the Government of Brunei.

Professor Stephen Dunne, Head of Dental Practice & Policy at the Dental Institute, and Mrs Mabel Slater, Head of Dental Care Professionals Centre for Education and Learning, will take this collaboration forward. In welcoming the news of the signing of the renewal of the agreement, Professor Dunne said: “I am delighted that we are continuing this highly successful collaboration. It is a great pleasure to work with Ministers and colleagues in Brunei Darussalam. Much has been achieved during the past three years, in particular, the establishment of a Brunei Diploma in Dental Hygiene and Therapy Programme.”

“In addition, foundations have been laid for other areas of workforce development, including Dental Technology and a Dental Hygiene Therapy Conversion Programme,” he added. “Discussions are also underway to establish a National Survey of Oral Health Brunei Darussalam to fully inform dental workforce requirements for the future. Thus, I am confident that the next three years of our collaboration will be just as successful as the last.”

In the meantime, discussions led by the Dean continue with the University of Brunei Darussalam in respect of the possibility of collaboration in respect of BDS (Bachelor of Dental Surgery) training.

According to the Brunei Ministry of Health, the country’s dental service is facing a serious shortage of staff as only 28 dental officers serve the total population of 581,000 people under the Primary Oral Health Care Scheme. There is also a low number of local graduates as well as foreign dentists with suitable qualifications for the post of Dental Officer.

(Edited by Daniel Zimmermann, DTI)

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> Subgingival application of the Original AIR-FLOW® method reduces periodontal pocket depth, removes biofilm, prevents periimplantitis
China imports caries detection from Europe

Daniel Zimmermann
DTI

LONDON, UK/LEIPZIG, Germany: Beijing Focus, one of China’s largest dental dealers, has signed an exclusive distribution agreement with 3-D Diagnostic Imaging, the UK developer of the CarieScan PRO device, through its subsidiary Wisdom International Ltd.

The company, which is based in Dundee in the UK, is already distributing the device in North America and all German-speaking markets through distribution agreements. Beijing Focus currently represents a number of Western dental companies, including Straumann, Bien-Air (both Switzerland) and SciCan (Canada).

Manufactured in Scotland, CarieScan PRO is an award-winning diagnostic device that utilises alternating current impedance spectroscopy technology for the early detection of dental caries. It is claimed to be more than 92% accurate in detecting sound and carious teeth. Regulatory approval for CarieScan PRO by Chinese officials is anticipated in the last quarter of 2011, a company spokesperson told Dental Tribune Asia Pacific. She said that the device will be displayed earliest at the DenTech exhibition in Shanghai in late October.

5-J’s stocks climbed by 0.25 points on the London Stock Exchange after the agreement had been announced.

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Yvonne Bachmann
DTI

LEIPZIG, Germany: Oliver P. Kuhrt, Executive Vice-President of Koelnmesse GmbH in Germany and responsible for marketing, has announced that he will be resigning in order to pursue a new professional challenge. Mr Kuhrt, who has overseen the marketing of five editions of the International Dental Exhibition & Meeting in Singapore and many other exhibitions, formally informed the Chairperson of the group’s Supervisory Board, Jürgen Roters, of his desire to resign at the Supervisory Board meeting in April.

The responsibilities of Kuhrt’s management division will provisionally be taken over by Gerald Böse, CEO of Koelnmesse. “Gerald Böse has a lot of experience in the organisation and marketing of trade shows,” Guido Gudat, Koelnmesse spokesperson, told Dental Tribune Asia Pacific. According to Mr Gudat, the company is looking for a new executive vice-president who, among other duties, will take over the marketing for the next IDEM in 2012.

Mr Kuhrt, who has worked for Koelnmesse since 2000, has not yet disclosed the details of his future plans. During his time at the company, he established Koelnmesse’s subsidiary Koelnmesse Service GmbH and was appointed Executive Vice-President of the parent company Koelnmesse GmbH. He managed more than 20 international trade fairs, including the world’s largest dental show IDS. “I am looking back at ten years of very interesting and multifaceted work at Koelnmesse, for which I am profoundly grateful. I wish the group, its management and all of its employees continued professional success and all the best for the future,” Mr Kuhrt stated.

Gerald Böse added: “In recent years, Mr Kuhrt has generated strong momentum for our trade fair portfolio and continuously refined the leading global trade fairs for which he was responsible. I would like to thank him for his extraordinary dedication and wish him every success for his new challenges.”

IDEM Executive resigns

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A Vedic Smile approach to dentistry

Dentist Dr Sushil Koirala talks about the Minimally Invasive Cosmetic Dentistry concept and why it matters to dental professionals

Jasmin M. de Pousin
DT Latin America

MIAMI, USA: An extremely skilled clinician with over 17 years of experience in Cosmetic Dentistry, Dr Sushil Koirala says that technology should work to improve health, never to compromise it. His Minimally Invasive Cosmetic Dentistry (MiCD) treatment protocol is based on consciousness, nature and evidence-based technology that really respects the patient’s long-term health and needs.

Koirala, who is the founder and president of the Nepalese Academy of Cosmetic Dentistry and of the South Asian Academy of Aesthetic Dentistry, combines in his MiCD protocol philosophy and ethics, scientific research, and what can be described as a Vedic Smile or holistic approach to dentistry.

Concerned by the rapid advance in aesthetic procedures, Koirala began to question if the aim of many dental techniques was to have a healthier or prettier person, or whether a patient a quick makeover, regardless of their long-term consequences. Years of practice led him to develop his guidelines for MiCD, a set of principles that stress early diagnosis, disease intervention, selection of minimally invasive treatment procedures, and use of evidence-based materials, taking into account as well the psychological aspects, ethnic background, and actual health needs of the patient.

A Pioneer Paper

In a groundbreaking article entitled “Minimally Invasive Cosmetic Dentistry: Concept and Treatment Protocol,” Dr Koirala offered a much-needed guide to minimally invasive cosmetic dentistry, a discipline that up to now has more been concerned with appearances than with clinical evidence. The article, published in the Cosmetic Dentistry magazine, was translated into many languages and attracted many followers eager to at last have a clinical protocol for many dental cosmetic procedures that stressed something that while obvious was not widely followed —preserving as much natural tissue as possible.

The ability to differentiate between what a patient wants and what he or she actually needs is a large ethical question in cosmetic dentistry. In order to address this issue, Dr Koirala has developed what he calls a simple self-consciousness pre-treatment test, “whereby I ask myself four simple yet honest questions”:

• How would I treat my own family members?
• Will the treatment plan remain the same regardless of who the patient is?
• Am I competent and happy enough to take up the case?
• Is the patient happy with the Biological, Financial, and Time (BFT) cost estimation of the treatment?

Dr Koirala explains that “what the patient wants and what a patient needs are two different things. The needs are the basic treatments a dentist can provide. But the wants are of a different variety, like choosing clothes in a store: you choose the color of the teeth, the texture of the teeth, the shape of the smile.”

What is Beauty?

Since the definition of beauty is different in each culture, it also affects cosmetic procedures.

“For Western-style contemporary smile aesthetics, beauty is white long teeth and a straight smile, but the same parameters don’t apply in Asia,” he explains. “In fact, Asian patients don’t mind having a little bit of overlap- ping teeth, which they see as natural. So we cannot use the same formula globally in cosmetic dentistry.”

Studies have shown that the dental pulp of Asian patients is generally wider, in comparison with European or American patients, and Dr Koirala points out that “preparations with wide shoulders could be a hazard to the pulps in Asian patients.” Even so, many dental technicians follow Western standards for non-Western patients with different facial features.

Dr Koirala warns that “you need to constantly choose the right technology for your practice, as technology may not always be health-oriented.” As a sample, he thinks that CAD/CAM restoration technology still has to be refined in order to be adopted fully in restorative dentistry. “CAD/CAM presently demands extension for insertion, Strength and Aesthetics,” thus, “we are compromising health for technology.”

“Clinicians still believe that articulating paper mark gives them ideal force component in occlusal adjustment,” he continues. “The ‘big mark big force, small mark small force’ concept has no scientific evidence, but most cosmetic dentists rely on articulating paper marks to do occlusal force adjustment. Computerized Occlusal Analysis System, which can objectively measure occlusal forces of each tooth with the time sequences of occlusal contact, was developed almost 5 years ago. Big hard to understand why clinicians neglect scientific facts about articulating paper marks and still believe in it for balancing the force component in smile design. This is why I advocate consciousness in dentistry, because technological information is not enough; you need consciousness to rightly use it for mankind.”

This is the background against which Dr Koirala developed and led him to develop the MiCD treatment protocol, which he summarizes as “bringing consciousness, nature and technology together.” Rather than inflicting one’s own definition of beauty on the patient, the dentist must listen to and understand the personal and cultural desires of the individual undergoing the dental work, he says. Dr Koirala stresses to preserve the definition of beauty set forth in the cultural tradition of the patient rather than following the status quo of a broad, one-size-fits-all plan.

Regarding teeth whitening for instance, Dr Koirala says that while some people may need it, “more often than not the coloring of the teeth is a perfect balance designed by nature. The eyes, teeth and skin tone should be in harmony. If the teeth are too white, it may look awkward and unnatural.”

Changing the Mindset

“We don’t say, ‘Don’t cut the tooth this way,’ we say, ‘Cut less,’” explains Dr Koirala. In fact, the MiCD protocol does not reject any cosmetic procedures, but using them in a conscious way.

“Do no harm,” select treatment procedures that maximize preservation of healthy tissue.

“Evidence-Based Approach” — selection of materials and equipment must be based on evidence.

“Keep in Touch” — focus more on regular maintenance, timely repair and strict evaluation, which should be understood by the patient.

As Dr Koirala says, they are simply setting dates every treatment in a way that science constantly changes.

“Good protocol should incorporate changes based on scientific evidence,” he continues. “The philosophical part may be the most difficult because it’s subjective, which is why we give a questionnaire to patients whereby they decide what he wants. We give him the science and inform him about...”
Dr Koirala is now conducting long-term clinical trials using various dental materials, with a focus on the MiCD protocol and its acceptance as a way to accomplish clinical results.

He believes he has developed a concept that is good for the patient, good for the dentist, and good for society. The MiCD protocol is in its preliminary stage worldwide, but the conferences he gave in South East Asia and South Africa have been widely accepted. "This is the right time to come out with this new philosophy," he explains, "so that in four or five years a new generation can start talking about the preservation of health in the long run."

Non-Invasive Health

The medical sciences are moving towards non-invasive procedures, and adequate ways of health promotion to avoid oral diseases. In dentistry, however, minimally invasive procedures are being used routinely only in carries management.

"In the medical sciences it is in herent not to cut tissue," Dr Koirala continues. "If patients knew that to place a crown you need to cut the tooth’s enamel, they probably would not accept the treatment. You need to start at an early age, like 6 or 7, in order to detect serious smile defects like orthodontic problems, everything that can affect oral health, including cosmetics, should be thought at an early age."

"Dentists may use MiCD or not," he adds, "but they all agree it’s the right approach. I want to encourage everybody to join the MiCD mission. Our MiCD Global Network (a web-based organization) is a group of dedicated professionals who wish to improve the knowledge of the clinician and the patient. Information technology can help promote these ideas through networks of dentists, people, and like-minded companies. We need to change our mindset."

Dr Koirala plans to change the mindset through more international lectures, collaborating with like-minded clinicians and academicians, creating study clubs to exchange knowledge, and providing internet-based educational seminars.

"We are changing protocols for the health of the patient, and ultimately, dentists will win too, because it saves time on procedures and provides aesthetics and function. The type of material used is secondary to me, as long as it preserves health, a harmonious function (the force component), and promotes aesthetics. We are not promoting a company here, but promoting health. And that is our first responsibility as clinicians. It is something that can be the pride of the profession."

Features Speakers:

- Dennis Tarnow: Clinical Professor of Periodontology and Director of Implant Education, Columbia School of Dental Medicine, New York
- Michel Magne: Associate Professor of Clinical Dentistry and Director of Dental Technology, University of Southern California, Los Angeles
- Pascal Magne: Associate Professor, Chair of Aesthetic Dentistry, University of Southern California, Los Angeles
- Robert Boyd: Professor & Chairman of Orthodontics, School of Dentistry, University of California San Francisco

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Reconstructing an anterior dentition with composite resin

A clinical case using IPS Empress Direct from Ivoclar Vivadent

A young female patient was dissatisfied with the appearance of her upper teeth, which resulted from an accident-related injury to tooth #11 a few years prior. After the dental trauma, the tooth was restored with composite resin but the patient wished to have corrective work done. Compared with the adjacent teeth, the remaining natural part of tooth #11 appeared yellowish, while the composite build-up appeared greyish and translucent. The clinical examination revealed that the tooth did not show any signs of decay and were in good condition overall in relation to the patient’s age. In addition, the patient also practised excellent oral hygiene (Fig. 1). With the exception of tooth #11, all teeth reacted to the sensitivity test. The probing depth of the gingival sulcus measured less than 5 mm. Tooth #11 also showed minimal percussion sensitivity. The peri-apical X-ray revealed traces of an apical lesion (Fig. 2). The root canal appeared to be extensively calcified.

After discussions with the patient, root-canal treatment was planned for tooth #11. Subsequent internal bleeding was proposed in preparation for a new composite build-up. The oral cavity was isolated with a rubber dam before the root canal was opened. The canal was difficult to locate, despite using operating microscopes. It was finally found at a depth of 15 mm. The root canal was prepared and a calcium-hydroxide medicated filling placed for a period of two weeks. Subsequently, the root canal was filled with thermoplastic gutta-percha points and sealed. The cervical structure of tooth #11 was internally bleached with sodium perborate until the tooth structure matched the shade of the adjacent tooth. The restoration was initially polymerized from the lingual aspect. Then, the silicone matrix, together with the enamel materials, was placed on the anter ior tooth from the palatal aspect and checked for correct fit. If the enamel material in the silicone matrix has been properly placed, it will reach the cervical margin of the defect. The flexible material on the tooth is then displaced and fills out possible voids. Furthermore, it ensures good marginal adaptation.

The restoration was initially polymerized from the labial aspect. Then, the silicone matrix was carefully removed and the build-up composite resin was polished from the palatal aspect. Small amounts of excess in the palatal and proximal areas were removed with a scalpel (size 12). The palatal surface prepared to this was produced with the desired width in the incisal area. Nevertheless, the proximal part of the tooth was not polished to allow a full view of the operating area. Ligatures were tied to isolate the anterior teeth requiring treatment and to displace the rubber dam towards the gingival margin. A three-step syringe system of etching (e.g., Syntac Classic) was used for the adhesive pre-treatment. A Palitra matrica technique was used to make the two anterior teeth appear symmetrical and to close the diastema. Then, the mesial and distal portions of tooth #21 had to be widened a bit with enamel material.

The main aim of the anatomical layering technique is to create an artificial “enamel shell”, which establishes the palatal and proximal contour of the original tooth. In this case, a small amount of transparent enamel material (A2 Enamel) was placed in the trimmed silicone matrix and thinly distributed with a spatula. The defect had to be covered as far as possible. Some flowable Tetric Koolow was applied to the palatal defect margin of the prepared tooth #11. Then, the silicone matrix was trimmed to the biotype of the left central incisor, and the enamel material was placed on the anterior tooth at this stage. The chosen matrix technique establishes the palatal and proximal contour of the tooth, as well as the proximal and distal portions of tooth #21. Therefore, only small adjustments were needed for the building up composite resin restorations. A mock-up was prepared for the fabrication of a silicone matrix. The shape and contour of the existing restoration were largely copied to the neighbouring tooth #12. Therefore, only small adjustments to the shape were necessary, such as a slight lengthening of the incisal edge in the distal region. Silicone putty was used to register the information provided by the mock-up. Since only the palatal part and the incisal edge of the silicone matrix were needed for the building up tooth #11, the matrix was correspondingly trimmed with a scalpel.

Preparation, adhesive pre-treatment and adjustments to the adjacent tooth

The old composite resin restoration was removed with rotating instruments and the enamel margins were bevilled. A wide area was prepared in the labial region (approximately 2 mm) to ensure the invisibility of the final restoration margin (Fig. 4). A rubber dam was placed over the anterior teeth (up to the first premolar) to allow a full view of the operating area. Ligatures were tied to isolate the anterior teeth requiring treatment and to displace the rubber dam towards the gingival margin. A three-step syringe system of etching (e.g., Syntac Classic) was used for the adhesive pre-treatment. A Palitra matrica technique was used to make the two anterior teeth appear symmetrical and to close the diastema.

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thin composite layer significantly enhanced the appearance of the incisal, palatal and proximal contours of the tooth (Fig. 3).

Build-up of the dentine core

The subsequent layers were placed with opaque dentine material (IPS Empress Direct Dentin, A3) and the dentine core was built up (Fig. 4). Compared with natural teeth, this part of the tooth was larger. As a result, the space available for the enamel coating was very limited, so it made sense to cover the enamel level with dentine material as well. This measure prevents the restoration margin from becoming visible as a grey line. Towards the incisal part, the dimensions and the morphology of the dentine core were determined by the neighbouring and contralateral teeth. In this case, mamelon structures were created. In the incisal area, enough space was provided for the translucent enamel materials (Fig. 7). Each increment was cured for 20 seconds using a bluephase LED light.

The incisal part between the mamelons was filled with a composite resin material (IPS Empress Direct Opal). A natural opalescent appearance was created with this technique. In addition, a white staining material (Tetric Color white) was selectively applied in order to re-create the whitish opaque areas of the enamel.

The restoration was completed by applying a final thin enamel layer (IPS Empress Direct Enamel A2) on the labial side (Fig. 8). While the resin composite was still soft, the final surface texture of the restoration was created with a brush. The tooth shape was modelled such that it would help to reduce the subsequent finishing work to a minimum.

Finishing and polishing

Excess material was removed with a scalpel (size 12). Suitable finishers and polishers were used to adjust the surface gloss and micro-morphology of the tooth to that of the adjacent teeth. Restorative margins were finished and adjusted to the proximal and incisal areas were made with flexible discs. It must be noted that in labial areas these instruments have to be used with great care to prevent the destruction of the morphology and the accidental removal of enamel material. Concave areas in the buccal surface were deepened with silicone polishers. High-gloss polishing was performed with silicon-carbide-impregnated brushes (Astrobrush; Fig. 9).

Four weeks after treatment, the clinical situation looked healthy. The restoration in tooth #11 was virtually invisible and symmetry was restored in the anterior dentition (Fig. 10). The radiological follow-up exam did not show any irregularities (Fig. 11). The patient was free from complaints and highly satisfied with the overall result (Fig. 12).

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Small diameter implants are beneficial in daily practice but they have limits based on the choice of implant material or surface. In order to increase confidence and enhance the treatment options for narrow diameter implants, an alloy composed of titanium and zirconium (Roxolid) has been developed by Straumann. This material shows better tensile and fatigue strength as compared to pure titanium and possesses excellent osseointegration properties in combination with the SLActive surface.

Based on the results of previous studies, a clinical multi-centre study was initiated with the aim of a direct comparison between pure titanium and Roxolid implants (Fig. 1).

Materials and methods
A randomized, controlled, double-blind, split-mouth study was started in the beginning of 2008 in eight centres. Indication: Fully edentulous mandible. Test: BL implant Ø 3.3 mm SLActive Roxolid. Control: BL implant Ø 3.3 mm SLActive Ti. Solution: Removable denture on 2 LOCATOR abutments. Specific: Double-blind study for the first year. Each patient was treated with two implants (one test implant and one control implant), which were placed intraforaminally. Abutment and prosthesis placement was performed 8–10 weeks after surgery (Fig. 2). Twelve months after surgery, the following parameters were analysed:
- Crestal bone loss (standardized X-rays)
- Bleeding on probing
- Plaque index

After full analysis of all parameters the data was unblinded.

Results
One year after surgery, the study was un-blinded and the data of 89 patients or 178 implants were evaluated respectively. Three early implant failures were recorded. The implant failures occurred in both implant material groups (one test implant and two control implants) and in three different study centres.

Crestal bone change
Implant surgery was the baseline for the crestal bone loss evaluation. The evaluation was made for the per protocol population. No statistically significant differences were found between the two groups (Table I).

Plaque index and sulcus bleeding
The plaque index and sulcus bleeding data was taken from the intent-to-treat population. No differences were found between study implant and control implant (Figs. 4a & b).

Conclusions
This study did not show any statistically significant differences (bone change, sulcus bleeding, plaque) between Roxolid and titanium implants. Very low bone loss (0.3 mm control and study group) was observed one year after surgery. Higher mechanical strength and uneventful one-year follow-up indicate that small diameter Roxolid implants are a valid alternative to pure titanium implants and may offer a wider spectrum of clinical applications.
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