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Implant restoration
A case of reconstructing
central incisors

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Extra

The latest news from the FDI head office

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Philippines gov't urged to look into HIV/Aids threat

National Aids Council says foreign works are to blame for rise in new infections

Daniel Zimmermann

DTI

HONG KONG/LEIPZIG, Germany: HIV/Aids is increasingly threatening health workers in the Philippines. Figures released by the Philippine National Aids Council suggest that infections have almost doubled over the last year. Members of the House of Representatives are now urging law-makers to review existing HIV/Aids regulations in order to contain the ongoing spread of the virus throughout the country.

The Philippine AIDS Prevention and Control Act, which prescribes precautionary guidelines with regard to preventing HIV transmission during medical procedures and surgery, was promulgated in 1998. Since then, the number of infections has skyrocketed from a few hundred to an estimated 6,000 by end of this year.

Representatives of the National Aids Council have said that the rise of infections is mainly due to Filipino workers infecting



Red light district in Bangkok in Thailand. Many HIV infections in the Phillipines are transmitted through oversea workers. (DTI/Photo Imants Urtans)

themselves through unprotected sexual contact abroad and transmitting the virus when they return home. According to figures from the Trade Union Congress of the Philippines, one out of every four Filipinos diagnosed HIV positive is working abroad. The Department of Health has announced that it will look into the problem to decide whether workers abroad should undergo

HIV testing before they leave the country.

"We have to ascertain whether existing policies and measures under the Philippine AIDS Prevention and Control Act are adequate to suppress the epidemic and improve the conditions of Filipinos living with the destructive disease," Liquefied Petroleum Gas Manufacturers

Association party-list representative Arnel Ty said in a press release. "We also have to find out if the mandates of the law are being fulfilled fast enough, and enforced rigorously."

Experts estimate that under the current regulations the number of new HIV infections could increase to $20,\!000$ within the next five years. \blacksquare

Fluoride get uncovered by new test

A new test method developed by chemists from the Florida State University in Tallahassee in the US is showing potential to detect dangerous levels of fluoride in drinking water. The technology is said to use a aromatic compound called naphthalene diimide that changes into different shades of colour after interacting with fluoride ions.

According to the researchers, the test is able to find about 1,000 of a milligram of the mineral in a litre of water which makes it one of the most sensitive fluoride sensors known to date.

In an effort to contain tooth decay, large quantities of fluoride are currently added to drinking water in a number of countries including Australia, Malaysia or Brunei. However, the intake of higher levels can lead to fluorosis, a condition that significantly weakens teeth and bones. Research has also shown that it contributes to the development of several types of cancer.



An Indian woman smiling. Cheap implants could fight the growing edentulism among the elderly. (DTI/Photo Roving I) *ASIA NEWS page 3

HKIDEAS 2011 announced

The Hong Kong Dental Association in partnership with the MCI Group is organising another HKIDEAS dental event in Hong Kong in 2011. Held in June 2010, the first HKIDEAS saw attendance by over 2,000 dental professionals, 40 international expert speakers and 50 trade exhibitors.

Mercury under scrutiny in the US

The US Food and Drug Administration is reviewing its 2009 pronouncement that mercury in dental fillings is safe. Dental activist have critised the regulatory agency for its decision which they say ignores evidence that the mineral contributes to neurological disorders and other health problems.

Children in Brunei have worst teeth

A new report on oral health in Brunei is showing that the country's children suffer from severe levels of tooth decay. According to figures released by the Department of Health in December, dental caries between 6-to 12-year-old children currently ranks lowest among all members of the Association of Southeast Asian Nations.

While nine out of ten 6-yearold Bruneain children have already experienced decay, 12year-old children have to live with cavities in at least five of their permanent teeth.

The country has been desperately trying to improve the accessibility of oral health services to children through its 2008 Oral Health Agenda that includes dental hygiene education and other preventative measures in schools.



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IDS 2011: another record breaker for dentistry

Daniel Zimmermann

COLOGNE & LEIPZIG/Germany: Visitors of next year's IDS in Germany should probably schedule more time to get hands on the latest advancements in dentistry. After the record breaking show in 2009, the number of exhibitors has increased again due to more foreign companies showing interest in becoming a part of the world's largest dental trade fair, the organiser Koelnmesse told Dental Tribune Asia Pacific.

The company expects over 1,800 dental companies from 56 countries to attend the exhibition. Due to the high demand, Hall 2 will be opened for companies and visitors for the first time, they said.

The additional requests for trade fair attendance mainly

comes from companies active within the fields of implant restorations and digitalisation. The number of companies exhibiting CAD/CAM system, for example, has increased by over 40 per cent compared to IDS 2009.

"The great level of participation from all over the world is attributable to the fact that the International Dental Show is the leading trade fair for the entire international dental world," Oliver P. Kuhrt, Executive Vice-President of Koelnmesse GmbH, summarised the exhibition concept.

According to Kuhrt, online business services will enable IDS visitors and exhibitors to get in touch with each other before the start of the show in March 2010. The product catalogue will be also revamped and presented with a new layout and improved



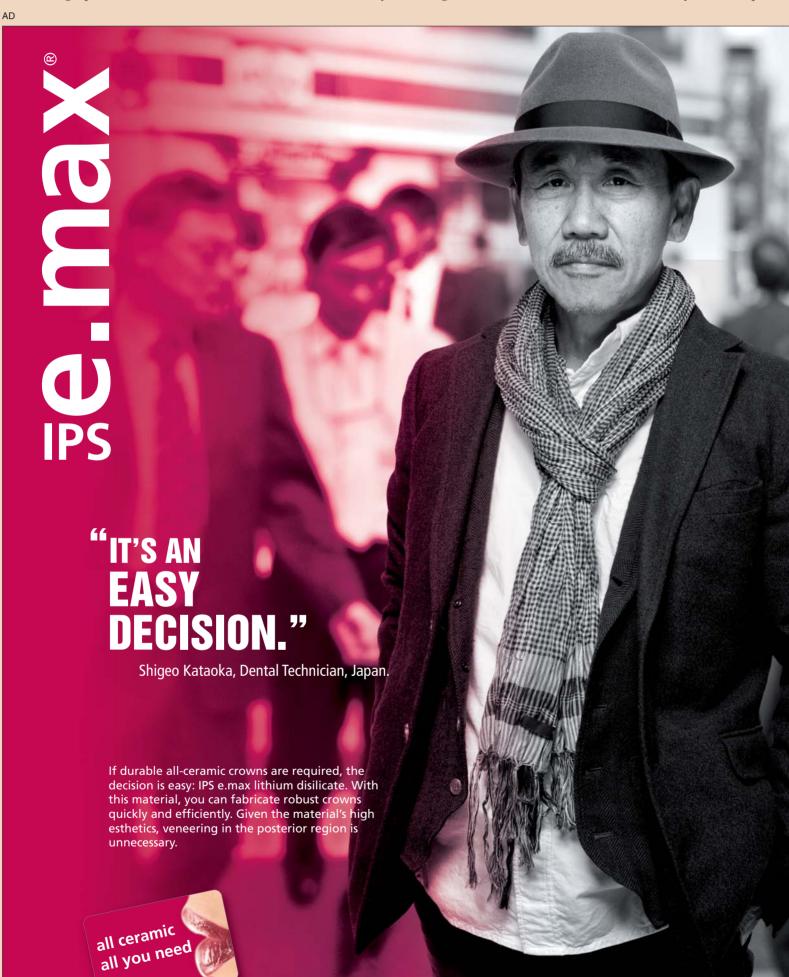
(DTI/Photo courtesy of Koelnmesse, Germany)

search options. Owing to the growing popularity of mobile services, a free IDS app will be offered for iPhone, Blackberry and other mobile operating systems.

The 34th International Dental Show will be taking place at the Cologne exhibition center in Cologne, Germany, from 22 to 26 March 2011. In addition to the dental exhibition, there will be a substantial specialists programme supported by manufacturers, the German Dental Association and the Association of German Dental Technicians' Guilds.

Advance sales tickets are still available online on the Koelnmesse website (www.koelnmesse.de).

Dental Tribune welcomes comments, suggestions and complaints at feedback@dental-tribune.com



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Asia largest growth market for German dental equipment

Daniel Zimmermann

LEIPZIG, Germany: More and more German dental equipment is exported to Asia, new figures released by the Association of German Dental Manufacturers have revealed. According to the organisation's latest member survey, 40 per cent of all manufacturers reported an increase of sales in that region in 2009. Less growth was observed in Western Europe and

the US, the two main importers of German dental equipment.

India set to launch domestic implant

Daniel Zimmermann

HONG KONG/LEIPZIG, Germany: A government-funded low-cost dental implant from India is said to be close to market release. The new tooth replacement developed by Dehli researchers as part of the country's New Millennium Indian Technology Leadership Initiative is supposed to take on the country's high prevalence of edentulism. According to government statistics, between 12 and 30 per cent of Indians over the age of 60 are suffering from complete tooth loss.

The project, which is said to have cost almost a US\$1 million, took five years to complete and is now undergoing human trials. Previous research on rabbits has shown promising results in regard to strength and susceptibility of the implant, lead researcher Prof. Mahesh Verma from the Maulana Azad Institute of Medical Sciences in New Dehli said. While final costs for commercial release still need to be calculated, they are expected to be significantly less than other tooth replacements currently available in the market.

"It will be kept affordable as that is the primary objective for this development," Dr Verma told *Dental Tribune Asia Pacific.* "It is to serve the Indian masses."

Most dental implants placed in India are imported from overseas and, therefore, only affordable to a small part of the population. Imports are estimated to cost between US\$550–650 while the national average monthly income has only tipped US\$65 in 2009, according to figures of the Central Statistical Organisation.

Dr Verma estimates that 60,000 to 70,000 implants are placed by dentists in India each year which falls short compared to its neighbour China. The country is also competing with other countries in the increasing medical and dental tourism market.

Total German dental exports fell by almost 10 per cent last year due to the ongoing financial economic turmoil in most parts of the world. At the same time, domestic sales increased by 2.5 per cent to over €1.62 billion. Germany currently exports over 50 per cent of its domestically-fabricated dental equipment abroad.

VDDI chairman Dr Martin Rickert commented that the tense situation in the global economy has significantly affected consumer behaviour and willingness to invest in new equipment. Submarkets have also shown mixed results during the course of the year. He added that despite the slow economic recovery, expectations for exports



in 2010 remain positive with the growing interest in aesthetic-driven solutions and increasing standards of living in emerging countries like Brazil, Russia, India or China accelerating demand.

With a total annual turnover of more than €3 billion, Germany is the second largest market for dental and laboratory equipment worldwide, only surpassed by the United States.

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Dear reader,



The year 2010 has been quite a mixed year for dentistry. There remains no doubt that the profession stands on the brink of a revolution with digital technology replacing more and more fields of work. On the other hand, dentists and the industry have been struggling to sustain their businesses due to the worldwide recession. In the US, for example, almost 10 million people lost their dental health insurance recently which

could mean a potential loss of income for dentists of 10 billion US\$ in the years to come. As a consequence, dentists in these regions have been very conservative when it comes to new investments, particularly in the premium sector where amortisation seems unlikely for the time being.

Hope for the dental industry now lies in Asia where a new middle class has formed that is financially able and willing to invest in their once neglected personal health. More and more manufacturers are recognising this potential and have been setting up local businesses. For Asian dentists this will not only mean better service but, up and foremost, a wider range of treatments options that they can offer to their patients. As one of the region's most acknowledged dental publications we will continue to provide you an comprehensive and independent insight look into these all these exciting new techniques and developments.

The Asia Pacific editorial team wishes you a happy and successful year 2011!

Yours sincerely, $Daniel\,Zimmer mann$ Group Editor Dental Tribune International

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WORLDENTAL COMMUNIQUÉ



December 2010

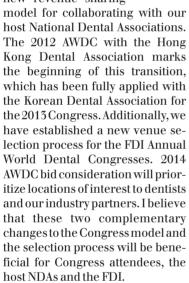


Message of the FDI Interim Executive Director

Dear FDI Members and friends, I would like to take this opportunity to update you on the progress

of the FDI since we last meet in Brazil. We have been busy during the last two months and have some importantaccomplishments to share with you.

Firstly, with regards to the Annual World Dental Congress, I am pleased to announce that we have successfully transitioned to a new revenue sharing



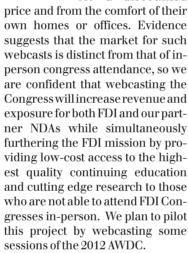
 $MrJ\'er\^ome\,Estignard$

While on the topic of FDI Congresses, I would like to share with you two recent success for the 2011 and 2012 AWDCs in Mexico and Hong Kong, SAR China. For the first time ever, FDI has pre-booked 95%of the 2011 exhibition space before the official opening of sales! This shows the excitement and commitment of our industry partners and provides a strong indication that the Mexican Congress will be a success for everyone involved. The FDI and the HKDA are also pleased by the high level of support shown by the Chinese Stomatological Association and the Chinese Ministry of Health who are both committed to interna-

tional scientific exchange and will help encourage and facilitate the attendance of Chinese dentists at our

> 100th AWDC in Hong Kong, SAR China.

Another exciting development that we are working on here at the Head Office is a plan to webcast the Annual World Dental Congress. This will allow colleagues all around the world to benefit from and participate in the AWDC for a discounted



Another recent achievement I would like to highlight is our new partnership with Wiley-Blackwell to publish the International Dental Journal. Wiley-Blackwell is the premier publisher in scholarly dentistry-journals worldwide and the ideal partner to help FDI grow the IDJ. This new partnership not only offers FDI more financial stability but will also allow us to further our mission of promoting optimal oral health by extending the reach of our flagship publication. The IDJ will be made available electronically via the Wiley Online Library which hosts one of the world's broadest and deepest multidisciplinary collections of online resources. Additionally, starting in 2012, the International Dental Journal will be included in Wiley-Blackwell's consortia collection which is expected to increase the distribution of the by about 3,000 additional libraries worldwide, as well as over 4,000 institutions in developing countries via philanthropic arrangements such as Research4Life (HINARI, AGORA and OARE), INASP and the Chinese Academy of Science.

It is my hope that you have all heard about VOX, our new membership communications platform, which was launched at the AWDC in Brazil. VOX is specifically designed to facilitate communications between FDI and its Members, as well as between Members. I would like to share two examples of how we plan to leverage VOX to improve communications. Firstly, we want to encourage NDAs to use VOX to share information about their projects and upcoming events. The second way we will use VOX is by having FDI elected and staff regularly publish short summarises of the meetings and events they attend. VOX will provide a platform to communicate about these events and keep FDI Members abreast of the current trends in international public health. If you or your Association are not already using VOX, I urge you to sign up today. Please do not hesitate to contact the head office if you need any assistance.

In summary, the FDI is moving forward and innovating despite the global economic crisis and recent staff turnover. We are working hard to improve the AWDC, communication and the reach of FDI so that we can better serve our Members and do more to promote optimal oral health in future. Finally, I wish you all a joyful holiday season and I am looking forward to our continued collaboration in 2011.

Yours sincerely, Jerome Estignard, Interim Executive Director

UN Environmental Programme Inter-Governmental Negotiating Committee

FDI will attend forthcoming second session in Japan

In February 2009, the Governing Council of United Nations **Environmental Programme** (UNEP) agreed on the need to develop a global legally binding instrument on mercury. Provisions for dental amalgam would be included in this instrument http://hqweb.unep.org/hazar doussubstances/Mercury/tabid/ 434/Default.aspx)

The FDI World Dental Federation (FDI) acknowledged its responsibilities with regards to human health and the environment and became pro-actively involved with UNEP, joining the UNEP Global Mercury Partnership (GMP) in 2009.

At the 2009 FDI Annual World Dental Congress in Singapore, the FDI Council moved to form a Dental Amalgam Task Team (DATT) to ensure that the international dental community and the issues regarding dental amalgam were properly and accurately represented in UNEP discussions regarding mercury and would be based on best available science to ensure public health and patient oral health care are not compromised.

The DATT has been very active, participating in the various meetings, including INC 1 (http:// hqweb.unep.org/hazardoussub stances/Mercury/Negotiations/ INC1/tabid/3324/Default.aspx), as well as collaborating and co-operating with FDI member associations and international stakeholders (eg IADR, IDM, IFDEA, ISO, WHO) to compredental restorative materials, in for caries management.

particular dental amalgam. The second session of the INC2 to prepare a global legally binding instrument on Mercury (INC 2) will be held in Chiba, Japan, from 24 to 28 January, 2011. http:// hqweb.unep.org/hazardoussubstances/Mercury/Negotiations/ INC2/tabid/3468/language/en-US/ Default.aspx

The FDI will be well represented at INC 2, with the capability of attending briefings and breakout sessions relevant to dental amalgam. In preparation for INC 2 DATT updated the FDI General Assembly (GA) at the FDI Annual World Dental Congress, Salvador da Bahia, September 2010. The DATT proposed a motion that was passed by GA with 84%, which stated that "amalgam is a safe and highly effective restorative material". The motion went on to call upon governments "to foster and ensure the phase up of effective prevention for dental caries and associated health promotion programmes. This should be linked to preventive disease management, which will result in the phase down of use of current restorative materials, including dental amalgam. These measures will ensure optimal oral health, particularly for those most disadvantaged and in need of treatment."

The shift to a preventive model of oral health care and associated health promotion programmes is goal of the FDI Global Caries Initiative (www.fdiworl dental.org/content/global-cariesinitiative), a profession led initiahensively address the issue of tive to establish a new paradigm

Oral Health Strategy for Africa Workshop on 29th & 30th October 2010

FDI World Dental Federation (FDI) African Regional Organisation (ARO) invited to Durban, South Africa

The FDI World Dental Federation recognises that its global strategy needs to be relevant both at regional and country

In this context, the FDI is looking to work with its regional organisations to translate its global strategy into regionally specific approaches for controlling and preventing oral



Participants at the Oral Health Strategy for Africa Workshop.

disease and promoting health so as to achieve its vision of leading the world to optimal oral

Representatives of FDI Council, FDI elected officers, ARO Executive Committee and regional vice presidents of ARO participated in the two-day workshop, collating and assessing current FDI policy and programmes,

along with those of Inter-Governmental Organisations (IGO's), other NGO 's active in oral health in Africa. ARO assisted in surveying African national dental associations about their needs. The aim of the workshop was to develop of a plan to synergise and focus FDI and ARO activities in Africa.

← FDI page 5

The results of the workshop were very positive; the FDI and ARO are currently preparing a report, as well as drafting a threeyear workplan and actionplan. The goal of proposed FDI ARO oral

health strategy for Africa region is "to improve health promotion, disease prevention and preventive disease management in a multi-professional environment, with a focus on caries, periodontal disease and cancer, which are all noncommunicable diseases."

The FDI would like to thank the South African Dental Association for hosting the workshop.

Further details on the FDI ARO Oral Health Strategy for Africa will be posted on the FDI website shortly.

The French Dental Association (ADF) — 40 years of contribution to oral health



Dr Patrick Hescot, Dr Roberto Vianna,FDI President, and Dr Joël Trouillet

The French Dental Association (ADF) celebrated its 40th birthday during its Annual Congress which was held from 23 to 27 November in Paris, France.

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The cutting age scientific programme and a large exhibition attracted over 25,000 worldwide participants making the ADF the largest European oral health congress. The ADF congress provides a unique opportunity for francophone dentists from Africa, the Americas, Europe, Asia and Middle East to meet.

FDI took the opportunity to meet with key stakeholders from around the world, spreading the word about the FDI mission of promoting optimal oral health, including the Annual World Dental Congresses.

The ADF invited Dr Roberto Vianna, the President of the FDI, to speak at the opening ceremony where, in excellent French, he emphased the important role the ADF and francophone dentists have played throughout the FDI's 100 year history including hosting the first FDI Congress and founding the organisation.

Dr Patrick Hescot and Dr Joël Trouillet who are both the Secretaries General of ADF and also an FDI Councilor and Member of the FDI Education Committee respectively, provide a good example of the synergies between FDI and ADF. 🏧

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Pyramid of the Sun, Teotihuacan, Mexico (DTI/Photo Dmitry Rukhlenko)

About the congress

A strong, international leading scientific programme coupled with the warm hospitality of the Mexican people are the core ingredients that promise to make the 2011 FDI Annual World Dental Congress a unique event. Cutting edge, though provoking sessions will keep you abreast of latest techniques and trends in your field as well as give you an opportunity to better understand where the dental profession is heading to. Not surprisingly, the dental manufacturers and retailers have grasped the great potential of the event by already booking over 95% of the exhibit space at the end of November; a first in the history of the FDI. In the exhibition halls, you will discover the newest technologies and latest products to help you better perform in your profession.

About Mexico

Mexico City's world class infrastructure, as well as its cosmopolitan lifestyle, makes it a unique destination capable of a wide variety of possibilities. One moment you're sampling tequila at a classic cantina and the next you're grooving to world-class DJs on a rooftop terrace or enjoying fusion cuisine by one of Polanco's district acclaimed chefs!

It would truly be a shame to travel to Mexico and not take advantage of the wealth of cultural and leisure opportunities on offer. Mexico's rich history through the legacies of the many cultures, including the Maya and Aztec, provides numerous opportunities to travel through time and discover the lifestyles of these fascinating ethnicities. Not surprising that Mexico City has more museums than any other place in the world! In under an hour, you can leave town and explore the beautifully well-preserved Teotihuacan pyramids. You can even challenge yourself to a steep climb to the top. The "conquistadores" (Spanish conquerors) ruled Mexico for three centuries before independence was proclaimed 16th September 1810. This date, known as "El Grito", is celebrated in a colorful and festive way throughout the country and we are fortunate the congress will be in Mexico on this occasion.

If Yukatan, Cancun or Cabo San Lucas sound familiar, make sure that you extend your stay in Mexico beyond the capital city to further explore the history, beaches and biodiversity of the country. We have in place several proposed pre or post congress excursions to choose from or alternatively our local agency will be happy to create a tailored programme.

Join us in Mexico City, September 14–17 and be part of this leading dental event in 2011.

- International website: www.fdiworldental.org/ congress/introduction-0
- Regional website: http://fdi2010.org
- International contact: congress@fdiworldental.org
- Regional contact: info@fdi2011.org



Fax:

FDI announces 2013 AWDC venue

Following stimulating presentations for the 2013 venue selection, the Council debated the proposals during a special session in Salvador da Bahia. The outcome is the selection of Seoul, Korea, who will host the event from August 29, 2013 to September 1, 2013. More information will be available soon on the FDI congress website.

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Oral health is very important for denture wearers because of potential impact to their systemic health

Lisa Townshend

London, UK: At the FDI's Annual World Dental Congress, held recently in Brazil, GSK-supported a timely symposium dedicated to the importance of denture and oral hygiene in denture wearers and its potential impact on their oral and systemic health.

Key messages from this symposium included that unclean dentures are a chronic source of potentially harmful bacteria and fungi that may be associated with oral and systemic diseases. In addition, dentures need to be cleaned daily with effective antimicrobial and antifungal agents. Finally, dental professionals play an important role in educating patients and helping them improve their oral and overall health

An international panel of experts was chaired by Professor Claudio Fernandes, Prof of Prosthodontics, Fluminese Federal University at Nova Friburgo, Brazil. Prof Fernandes highlighted the growing edentulous population globally, the resultant oral health implications, and the role of dental professionals in dealing with associated issues. The speakers and their key points:

- Dr Zvi Loewy, VP of Dental Care R&D at GSK, and on the faculty of New York Medical College and Drexel University, US, looked at Edentulism: Public Health Impact. Prevalence of denture wearing patients ranges from 12% to 63% globally. Studies show an increased risk of certain systemic diseases in denture wearing patients, which has an impact on the public health system.
- Dr Angus Walls, Professor of Restorative Dentistry and Director of Research, School of Dental Sciences, Newcastle University, UK, discussed Implications of Oral Health and Nutrition on Systemic Health. Dietary changes associated with the loss of teeth can result in an unhealthy diet, low in fruits and vegetables and with increased fats and sugars. Denture stability is key to improving confidence in chewing ability, and is one of the parameters necessary to help patients improve diet and quality of life. The use of denture adhesives may help to stabilize the dentures or help improve masticatory efficiency. Evidence shows that as edentulous patients' nutritional intake declines, the function of the immune system and body repair is suppressed; perfect conditions for the development of oral and systemic diseases.
- Dr Wenyuan Shi, Chairman and Professor of Oral Biology, UCLA School of Dentistry, and Professor of Microbiology and Molecular Genetics, UCLA School of Medicine, US, discussed Microbiology of Denture Patients, and reiterated the deep connection between microbiology and dental diseases. Between 65-80% of denture patients have stomatitis caused by Candida albicans and Candida glabrata, and other

pathogens present on dentures are implicated in respiratory and GI infections. He advocated the elimination of microbial pathogens on dentures as very important.

• Dr Steven Offenbacher, OraPharma Distinguished Professor of Periodontal Medicine, Chairman of the Department of Periodontology, School of Dentistry, University of North Carolina at Chapel Hill, US, presented on Strategic Approaches for Denture Wearers Based on Periodontal and Prosthodontal Research. He detailed the importance of edentulism in systemic diseases; not as a major cause, but more as a risk factor. He reiterated that

dentures carry high levels of many infectious organisms. Denture wearing is associated with increased risk of several systemic diseases including COPD, heart diseases, atherosclerosis, hypertension and diabetes. 'Basically research suggests that patients need to do a better job at cleaning dentures on a daily basis and we as

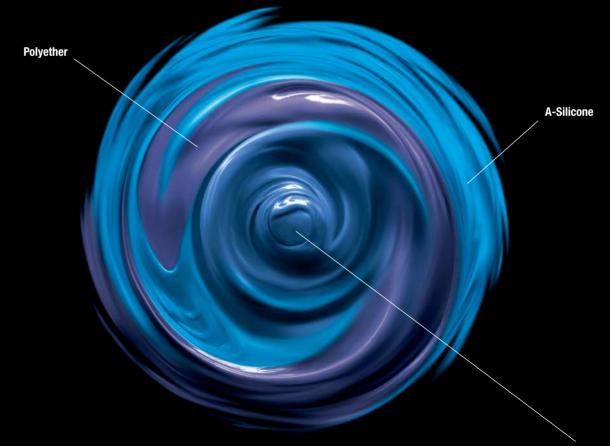
clinicians need to be very careful that we are reducing the source of infection in the mouth.'

(Edited by Daniel Zimmermann,

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The challenge of reconstructing a central incisor with an implant-borne restoration



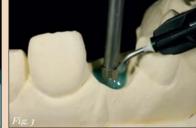
Dr Michael Fischer & Benjamin Votteler Germany

A 28-year-old female patient fractured her right central incisor in a fall. Despite immediate dental treatment, the natural tooth could not be saved and had to be extracted. A removable temporary denture was fabricated and inserted to replace the missing tooth (#11). The patient was referred to us for the placement of the implant and the subsequent prosthodontic work.

Owing to the good condition of the hard and soft tissue, preimplantological augmentation was unnecessary. As Figure 1 clearly demonstrates, the frenulum labii extended into the implant zone. As a result, it was relocated during the implant procedure. This measure was taken to prevent gingival recession around the implant bed at a later stage. After three months of nonsubmerged healing, an impression was taken with a tray that was modified to allow the impression post to project. A master cast was subsequently fabricated in the dental laboratory.

The successful outcome of such a difficult case (high smile



















 $Fig.\ 1: The\ frenulum\ labii\ has\ to\ be\ relocated\ to\ prevent\ recession\ around\ the\ implant\ bed\ at\ a\ later\ stage. \\ -Fig.\ 2: Forming\ of\ the\ emergence\ profile\ on\ the\ basis\ of\ the\ adjacent\ tooth. \\ -Fig.\ 3: Modelling\ of\ the\ customized\ abutment\ with\ light-curing\ resin. \\ -Fig.\ 4: The\ shaded\ and\ sintered\ zirconium\ oxide\ abutment. \\ -Fig.\ 5: The\ fired-on\ ceramic\ shoulder\ (IPS\ e.max\ Ceram). \\ -Fig.\ 6: Optimum\ cementation\ with\ Multilink\ Implant. \\ -Fig.\ 7: An\ impeccable\ joint. \\ -Fig.\ 8: The\ IPS\ e.max\ Press\ lithium\ disilicate\ coping\ after\ foundation\ firing. \\ -Fig.\ 9: Application\ of\ incisal\ materials\ for\ the\ second\ firing. \\ -Fig.\ 10: A\ radiant\ smile. \\ -Fig.\ 11:\ Close-up\ of\ the\ restoration\ three\ months\ after\ placement.$

line, normal-to-pronounced curving of the gingiva, thin soft tissue) depends on two main factors: the proper three-dimensional positioning of the implant, and the material and design of the abutment. We prefer to use zirconium-oxide (ZrO₂) abutments with a titanium base, which ensures excellent fit in the implant owing to the industrially milled titanium base. Furthermore, the ZrO₂ abutment (emergence profile) can be individually customised.

The emergence profile of tooth #11 was established according to the following procedure. On a second model, the contralateral incisor, tooth #21, was ground away at gingival level and the root diameter was marked. A thin piece of paper

was placed over the area and the profile was traced. The profile was cut out, mirrored and then transferred to the master model. This allowed the emergence profile to be cut to the implant shoulder. Progressive opening towards the coronal aspect was of importance. The emergence profile of the abutment could also have been moulded in several stages using provisional restorations; however, we have had much success with the method described (Fig. 2).

Tooth #11 was subsequently waxed up. The wax-up was then used to create a silicone template of the palatal aspect and another one of the vestibular aspect. The abutment base (ST, Astra Tech) was screwed into the laboratory analogue, and the ground emergence profile and the base were isolated (Ceramill Sep) and light-curing resin composite (Ceramill Gel, both from Girrbach) was applied (Fig. 3). Preliminary curing was considered to be necessary at this stage to achieve complete polymerisation of the light-curing material in the depth of the sulcus. Subsequently, the super-gingival part of the abutment was built up and light-cured.

In order to obtain flat surfaces and a defined preparation margin along the abutment, the cervical areas were milled paragingivally. The labial proximal and the palatal surfaces were machined to produce a conical shape with a two-degree gradient.

The gradient and the palatal surface were cut by hand. The available space was checked with the previously fabricated templates.

In our laboratories, the abutments are rendered in $\rm ZrO_2$ using the copy milling technique. Alternatively, this step can be conducted with CAD/CAM systems by using the double scan method or abutment design software.

The green body was smoothed after copy milling. A chamfer was cut at the gingival level for the subsequent creation of a ceramic shoulder. Then the restoration was shaded and sintered (Fig. 4). After the sintering process, only very fine adjustments had to be made in order to ensure the final fit. In this case, the abutment was coated with IPS e.max Ceram ZirLiner (Ivoclar Vivadent). Next, the reduced shoulder made of IPS e.max Ceram was briefly fired on the restoration (Fig. 5). Furthermore, a thin layer of ceramic was placed over the entire ZrO₂ abutment.

The abutment created in this way has three advantages. The glass-ceramic coating allows the abutment to be etched, which is a prerequisite for adhesive bonding of the crown and the abutment. Light transmission in the gingiva increases dramatically owing to the light transmission of 3 mm ZrO₂ layers in the para-gingival areas of the abutment dropping to almost zero. Finally, once IPS e.max Ceram ZirLiner and the layering ceramic have been applied to the restoration, fluorescence increases significantly. Usually, the fluorescence of ZrO₂ is quite low.

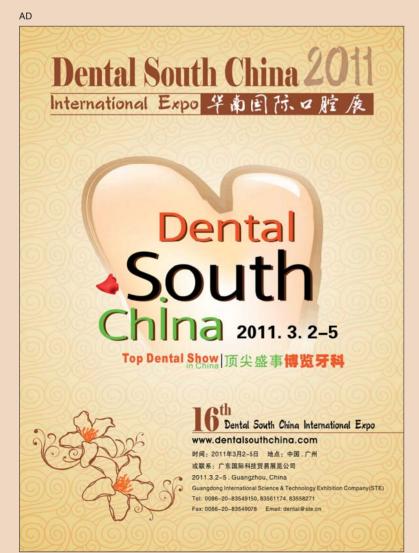
An important aspect of this type of abutment is the bond between the titanium base and the ZrO₂. We advise against the use of popular laboratory luting agents such as Nimetic Cem or AGC Cem. A study conducted by Prowital under the direction of R. Meyer, MDT, has recently shed some light on this frequently neglected working step.

The latest development in this industry segment is Multilink Implant (Ivoclar Vivadent). This material has advanced the standards for the handling and physico-chemical properties of these products. According to the study mentioned above, the bond strength of this self-curing luting composite, which can

also be light-cured, is 45 per cent higher than that of the previous benchmark PANAVIA F2.0 (Kuraray) and about 25 per cent higher than that of RelyX Unicem (3M ESPE). That Multilink Implant quickly cures without exposure to light is an advantage when thick abutments are involved, as in these cases light may not be able to penetrate into all areas of the restoration and may therefore fail to adequately cure the cement.

In the Prowital study, which examined surface-conditioning and curing methods, the highest bonding properties were achieved under the following conditions. The inner surface of the ZrO₂ abutment was cleaned with 110 µm aluminium oxide (Al₂O₃) at 1 bar pressure, and the titanium base was cleaned with 50 μ m Al₂O₅ at 2 bar pressure. Both bonding surfaces were coated with Monobond Plus (Ivoclar Vivadent), which was allowed to react for one minute before it was dried with blown air. Then Multilink Implant was applied to the inner surface of the ZrO₂ abutment and the titanium base was attached to it (Fig. 6). Like all composites, Multilink Implant is susceptible to oxygen inhibition, that is, the uppermost layer (approximately 100 µm) of the material does not completely cure during the polymerisation process because it is exposed to oxygen.

There are several ways to prevent this problem. After the zirconium part has been attached to the bonding surface, excess composite can be completely removed and a glycerine gel (for example, AIRBLOCK, DENTSPLY) applied to prevent the formation of an inhibited layer. The excess cement, on the other hand, can be also left in place. The cement joint was not cleaned after the two had been joined and the excess cement was rather chipped away with a sharp instrument after polymerisation. It is important to





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