Vitamin D intake may halt periodontal disease progression

BOSTON, Mass., USA: Vitamin D has become a controversial nutrition issue, as studies have shown that it has potential benefit for physical and oral health. Now, new research from the US has suggested that the anti-inflammatory mediator is associated with periodontal health, especially in older men.

The study included 562 male participants in the Department of Veterans Affairs Dental Longitudinal Study (mean age 62.9), who were examined one to four times between 1986 and 1998. In order to determine the link between total vitamin D intake and periodontal health, a calibrated examiner measured probing pocket depth and attachment loss around each tooth. In addition, alveolar bone loss was determined from radiographs.

The researchers observed that total vitamin D intake (≥800 IU) was associated with a lower risk of severe periodontal disease and moderate to severe alveolar bone loss. They concluded that vitamin D may help protect against the progression of periodontal disease.

Vitamin D has previously been linked to several cardiovascular risk factors, including hypertension, abnormal lipids, and obesity. Its role in preventing bone diseases, such as osteoporosis, is well documented. Moreover, recent studies have suggested that increased intake of vitamin D may reduce the risk of dental caries, various cancers, and diabetes.

The present study was conducted at Boston University’s Henry M. Goldman School of Dental Medicine. Vitamin D intake may halt periodontal disease progression

Synthetic membrane could accelerate healing after dental implants

JERUSALEM, Israel: REGENECURE, an Israeli specialist in bone reconstruction, has developed a new membrane as a bone-stimulating aid for patients requiring dental implants. As preliminary studies have shown promising results, the membrane will go into clinical trials now. The company hopes that the new technology will help improve and accelerate healing in a variety of medical procedures.

Over a period of six months, researchers at the Hadassah Medical Center in Jerusalem and the Rambam Health Care Campus in Haifa will compare the amount of lateral bone fill generated by REGENECURE’s membrane with that generated by collagen membranes, the company announced. The study will include 32 smokers and non-smokers with insufficient bone volume, a common problem in tooth replacement. In half of the participants, the newly developed synthetic membrane will be used, while the other half will receive collagen membranes, which is considered the gold standard in treatment today.

According to REGENECURE, the innovative AMCA (ammonio methacrylate copolymer type A) guided bone regeneration dental membrane has advantages over collagen membranes regarding quality and safety. It degrades slowly over time, giving the natural bone more time to properly regenerate, is entirely synthetic, and eliminates the risk of contamination by pathogens present in membranes derived from animal tissue.

In addition, the membrane accelerates healing by enabling cell adherence, proliferation, and differentiation of stem cells in the bone tissue, while preventing connective tissue from infiltrating the healing space. The company emphasised that the membrane is easy to use in orthopaedic surgery and requires no special surgical knowledge of preparation.

According to a recently published report by Research and Markets, a publisher of international market research and market data, the global dental implants market is projected to exceed US$6.5 billion (€5 billion) by 2018. Synthetic membrane could accelerate healing after dental implants
HELP YOUR PATIENTS

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Digital dentistry in dental prosthetics is growing rapidly in the US

by Dr. Kameas Zamanian and Katheryn Masherick, iData Research

Despite recovering from a formerly recessed US market, many patients continue to opt away from expensive, elective dental procedures. The market for dental prosthetics, encompassing crowns, bridges, inlays/ onlays, veneers, and dentures has remained relatively stable over the past couple of years. However, eco-
nomy products such as monolithic restorations produced with CAD/CAM technology are driving unit sales.

Digital manufacturing allows laboratories to increase output while decreasing labor costs, permitting them to lower the cost of the final restoration and gain a competitiv-

### How significant is the trend toward all-ceramic and monolithic resto-

Crowns and bridges total nearly 80 percent of the market of all dental prosthetics in the US Since 2010, the unit share of all ceramic restorations of crowns and bridges has increased by 20 percent. The most popular cera-

### What is new and exciting?

In response to the demand for mono-

### Conclusion

Ceramic and monolithic restorations will significantly drive the CAD/CAM market over the long term as patients choose more affordable op-

### Additional information

The information contained in this article is taken from a detailed and comprehensive global report series published by iData Research, titled “U.S. Markets for Dental Prosthetics and CAD/CAM Devices.” The Research is an international market re-

### International Imprint

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Study finds no differences in children treated with composites or amalgam

PARIS, France: New research from France has suggested that bisphenol A (BPA), a chemical widely used in plastics and dental resins, is a potential causative agent of molar incisor hypomineralisation (MIH). Damage similar to this mineralisation disorder, which occurs selectively in permanent incisors and first molars, was observed in rodent teeth after treatment with BPA.

Researchers from the National Institute of Health and Medical Research treated the incisors of rats daily with low doses of BPA (5 μg/kg/day) from birth to 30 or 100 days. At day 30 already, the erupting tooth enamel exhibited signs of hypomineralisation similar to human MIH. The researchers suggested that BPA disrupts normal protein removal from the enamel matrix and leads to mineral depletion, making the teeth more fragile.

However, no such effect was observed in 100-day-old rats. As their erupting incisor enamel was normal, the scientists suggested that enamel formation is only sensitive to MIH-causing agents during a specific time window in early development.

As it is strongly suspected that BPA has the same effects on humans as on laboratory animals, it could be a causal agent of MIH, concluded Dr Sylvie Babajko, a research director at the institute.

The condition is found in roughly 18 percent of children aged between 6 and 8. The permanent maxillary central incisors and first molars are affected most often, and the permanent mandibular incisors less frequently. Usually, the teeth show a yellowish-white to brown discoloration, which may affect only certain areas of the tooth or the whole tooth. The teeth of MIH children are commonly hypersensitive to pain and more susceptible to cavities.

Endocrine-disrupting chemicals, including BPA, are ubiquitous environmental pollutants and increasingly associated with health concerns. Prior studies have associated it with adverse effects on reproduction, neurological development, and metabolism. The manufacture and marketing of babies’ bottles containing BPA were banned in Europe in 2011. The prohibition will be extended to all food containers in France from July 2015.

The study, titled “Enamel defects reflect perinatal exposure to bisphenol A,” was published online on 10 June in the American Journal of Pathology ahead of print.

Early BPA exposure may adversely affect formation of tooth enamel

WATERTOWN, Mass., USA: In contrast to prior studies, which had demonstrated that resin-bonded composite dental restoration materials may impact children’s physical growth by releasing bisphenol A, an endocrine-disrupting chemical, an analysis of the same data has found no significant differences in physical development of children treated with either composites or amalgam.

Researchers at the New England Research Institutes tested whether dental restoration materials affect children’s growth using a secondary analysis of a study that was conducted as a part of the New England Children's Amalgam Trial, one of only two randomized clinical safety trials in the U.S. to address the potential impact of mercury exposure from amalgam restorations on neuro-psychological and renal function in children.

The researchers investigated data from 218 boys and 256 girls aged 6 to 10 with two or more decayed posterior teeth that were randomly treated with amalgam or composite.

“Overall, there were no significant differences in physical development over five years in children treated with composites or amalgam,” the researchers said. For instance, the results showed no significant differences between treatment assignment and changes in physical development in boys with regard to body mass index, body fat percentage and height velocity.

However, they found that girls treated with composites had a lower risk of menarche during follow-up. Additional studies examining these restoration materials in relation to age at menarche are warranted, the researchers said.

The study was published online on Sept. 12 in the Journal of Dental Research ahead of print.

1st Place for DMG’s LuxaCore Z

The June issue of the American trade publication “The Dental Advisor” focused on composites for core build-up. Fourteen materials were clinically tested and evaluated. First place went once again to a material that has already been the recipient of many awards: LuxaCore Z-Dual.

DMG’s dual-cure composite for core build-up and root post cementation attained a top rating of 98%. The assessment reflects the verdict of 32 testers from the field, who used the material in 450 clinical cases. LuxaCore Z-Dual was also highlighted as a preferred product in “The Dental Advisor Recommends”.

The most outstanding feature of LuxaCore Z-Dual is that its mechanical properties virtually match the natural tooth; the material cuts like dentine. Thanks to specialized nanotechnology and zirconium dioxide, the compressive strength, and cutability values of its award-winning predecessor, LuxaCore-Dual, have been improved even further.

Detailed information on LuxaCore Z can be found at www.dmg-dental.com

*The Dental Advisor, June 2012, Volume 29, No. 05.

DMG Elbgaustraße 248 22547 Hamburg Telephone: +49 (0) 40 84 006-0 info@dmg-dental.com www.dmg-dental.com

*The Dental Advisor, June 2012, Volume 29, No. 05.
The filter principle: Is every patient a finals patient?

Simon Hocken
UK

“Your work is going to fill a large part of your life, and the only way to truly be satisfied is to do what you believe is great work. And the only way to do great work is to love what you do. If you haven’t found it yet, keep looking. Don’t settle.”

Steve Jobs, CEO of Apple Inc. in 2005

You remember finals, don’t you? Of course you do. Your examiners carefully selected a patient(s) for you to examine and diagnose for whom to present a treatment plan. The finals patients were unlucky enough to have more than one dental problem and you were marking on finding all of them and your ability to determine a set of solutions for the patient.

Afterwards, most of us headed off into practice, where a series of finals patients are paraded in front of us on a daily basis. Now these patients willingly pay us to make our professional judgements, offer our best solutions and suggest a fee for doing the dentistry.

However, that’s not always what happens, is it?

There’s something that happens in general dental practice (be it public like the National Health Service (NHS) here in the UK, mixed or private practice) that is rarely spoken about in dental magazines, online forums or even at the bar at dental conferences. And it’s this: many dentists consult with, examine, diagnose, and treatment plan their patients, not in the way that they did for their finals patient, but by applying some sort of screening.

The filter may have some or all of these components:

1. Will the patient like me if I tell him about all this?
2. Will the patient come back if I tell him about all this?
3. Will the patient think I am overprescribing?
4. (For returning patients) If I tell the patient about all of this, will he wonder why on earth I haven’t mentioned it before?
5. Will the patient be willing to pay for all of this?
6. If I persuade the patient to have the treatment plan, what happens if it goes wrong?
7. As long as I make a note on the records, I am keeping myself within the legal rules.

The enemy within here is fear, and not the patient’s but the clinician’s. And so the filter is applied and the patient is offered the treatment plan that the clinician believes is absolutely necessary or the one he feels the patient needs. Presumably, he leaves the rest until such treatment becomes (as he deems it) necessary or needed. An additional filter, of course, is the one that pushes the dentist towards offering treatments that are well paid or earn the most number of units of dental activity.

Let me run this analogy past you.

Imagine taking your three-year-old, £25,000 car for a 30,000-mile service. During the course of this, the technician discovers that as well as the regular service items needed, your car also has two sets of worn brake pads. In addition, the front brake discs are warped, the rear dampers are leaking and two tyres are nearly at their worn-tread marks.

As a customer, which of these phone calls would you like the garage to make?

1. The call that lists the faults, your options and the costs for having everything put right?
2. The call that tells you about the faults they think you will want to hear?
3. The call that tells you about the faults that you will be able to see?
4. The call that tells you about the faults they think you will be willing to have fixed?
5. The call that tells you about the faults that will earn them the biggest margin?
6. The call that tells you about the faults don’t tell you about? Perhaps, put a ‘watch’ on their records and text them about your next visit?

Duty of care

I know that some of you will be wining already at my comparison between a clinician and a mechanic but there’s more mileage in this analogy still to come. After paying for just the service, you drive off from the garage with the faults left unreported. A child runs out in front of your car and you fail to stop in time because of the worn tyres/brake pads/discs/dampers. In the investigation that follows, these things come to light and spark a witch-hunt.

A good garage owner dare not risk this and the inevitable damage to the garage’s reputation. He takes his duty of care seriously and must tell you exactly what the garage has found wrong with your car. So how’s that really going wrong when a patient leaves a dental surgery with half a treatment plan? In my opinion, this happens because we’ve lost the simple, straightforward, trusting relationship between patient and clinician that we had as a final-year student. External circumstances, such as insurance companies, the economy, the practice finances and, probably most importantly, our lack of confidence and self-esteem have filtered our behaviour so that we agree to compromise our professional skill set and integrity in order to be liked, keep the patient or stay within our comfort zone.

So, how does that sound? Not so great from where I’m sitting and let’s not tell the national newspapers. When I left the NHS in 1992, I decided to get rid of all the filters I had acquired, and simply show and tell my patients what I could do for them as if they were one of my family and money and time weren’t an issue. I’ve used exactly the same approach in my coaching practice. I was lucky enough to be mentored by some great coaches on the idea that you often do your best coaching just before you get fired (for telling it like it is). And that’s what I do for our clients.

In my view, you have to decide what sort of dentist you want to be: either an anxious single-unit, one-tooth-at-a-time dentist, forever de- bited to your professional record, or a two-weeks per month, 2000-hour-a-year dentist, merely trying to earn a living, or the happy middle ground, where you do what you think is best for your patient, and walk away from the practice at the end of each day, knowing you’ve done your best.

Teeth equally perceived by dentists

DTI
BERLIN, Germany: Several morphometric studies have proven sexual dimorphisms in human teeth, for phometric studies have proven sexual dimorphisms in human teeth. For this reason, the researchers at the Institute of Clinical Dentistry at German University in Berlin, the researchers explored whether the shape of an individual could be identified if only the front teeth were considered. This was tested by having participants evaluate 50 images of the anterior oral region of men and women aged between 18 and 75. The lip area was not shown.

The participants included dentists, dental technicians, dental students and dental professionals, as well as 50 people who had no professional dental background.

The results overall demonstrated that sex could be detected in only about 30 percent of the images. Although there are anthropological studies that claim to prove measurable morphometric differences, the study proved that those are not even visible to experts’ eyes.

While some tooth positions were correctly assigned by 70 percent of the participants, others were wrongly assigned by the same number of participants. The assumption that women tend to have rounded teeth and men rather angular ones could not be confirmed by the study. Furthermore, contrary to what was expected by many of the participants, shape, size, and colour of the canines were not meaningful indicators of sex.

“In everyday practice, it is relevant whether the restoration fits the patient’s face but not whether the patient is male or female,” Radlanski said. “Recognisable typical male teeth or female teeth do not exist.”

The way forward

The increase in the use of dental implants is also partly due to the developments in the design of the implants themselves and of the components available to complete the restoration.

All of these advances, however, would be of little use without well-defined decision-making criteria when considering treatment in the context of either damaged or missing teeth. Accurate diagnosis is essen- tial, and the clinicians involved must always have the aesthetic aspects of the treatment foremost in mind when dealing with sites located within the appearance zone.

Contact Info

Simon Hocken is Director of Coaching at Breathe Business, a business-coaching consultancy based in Kingsbridge in the UK. He can be contacted at info@breathe- the-coach.com.

Contact Info

Prof. Urs Belser is professor at the University of Geneva’s School of Dental Medicine. He can be contacted at urs.belser@medicine.unige.ch.

Prof. Urs Belser
Switzerland

General dentistry has undergone major changes during the last 20 years, not just in the way clinicians treat their patients, but particularly in the way patients request treatment and their increased expectations of outcomes. In particular, the practice of restoring patients’ compromised teeth has become less complex in some ways, yet more challenging in others. Tooth replacement is increasingly being performed by using restorations supported by dental implants, and numerous elegant and predictable clinical approaches to this have been developed.

“We agree to compromise our professional skill set and integrity in order to be liked.”

Contact Info

at urs.belser@medicine.unige.ch.

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World News
Thriving on all-ceramics, Ivoclar Vivadent prepares for the future

Dental Tribune International recently visited the company’s headquarters in Liechtenstein

SCHAAN, Liechtenstein: Walled off by the majestic elevations of the Rätikon mountain range and the Appenzell Alps, several industrial hydraulic mixers are continuously at work. Every now and then, a worker brings new barrels filled with raw materials that are turned into a new compound that forms the base for IPS e.max blocks from Ivoclar Vivadent.

Launched on dental markets for the first time seven years ago, the game-changing dental restorative system has earned Ivoclar Vivadent from the small European principality of Liechtenstein wide international acclaim as a provider of materials for highly aesthetic all-ceramic dental restorations. According to some industry sources, it has also defined the new gold standard in the field.

Comprising lithium disilicate glass-ceramic, zirconium oxide materials, and veneering ceramics for the press and CAD/CAM techniques, it has an impressive clinical track record and has won the company a number of acknowledgments, including a Celebration of Excellence Award for Outstanding Innovation in Cosmetic Dentistry at the recent annual meeting of the American Academy of Cosmetic Dentistry in Seattle in the U.S. in June.

With double-digit growth last year, the materials, whose composition remains a well-kept secret, have also become one of the company’s most important drivers of economic success. Ivoclar Vivadent held an international expert symposium last year in Germany for the first time that was focused entirely on the system and the treatment results dentists are able to achieve with it in daily practice. According to Chief Sales Officer Josef Richter, the system still has much potential.

“With IPS e.max, it is fair to say that we started a revolution in the field of fixed prosthetics, as it provides a highly aesthetic and durable solution not only for single-tooth restorations but also for far more complex indications, like three-unit bridges,” he recently told Dental Tribune Asia Pacific.

In addition to the high market acceptance of its poster child product, Richter said that his company performed above the market average last year with its entire portfolio, including removable prosthetics and filling materials. Sales of clinical equipment and luting cements like Multilink Automix and Variolink II increased by over 10 percent, he said, despite unfavourable conditions that make it more difficult for the company to operate in regions affected by the economic crisis, such as Southern Europe.

“Market reports from most of our offices show that fewer patients are currently visiting a dentist than potentially should, which is a matter of concern. As a result, we expect 2013 to be a difficult business year for the industry. However, expansion is still possible, if the market is growing slightly or at all,” he predicted.

“The increase in solutions available on the market has led to confusion among many customers of what is right for them,” he continued. “Therefore, we want our customers to understand the fundamental advantages that come with buying a product from us. In this respect, we see an opportunity to provide them with confidence and peace of mind.”

Among the recent developments, Ivoclar Vivadent launched this year is Tetric Evoceram Bulk Fill, a further development of its nano-hybrid composite line, which the company says was designed with a powerful initiator for use with the bulk-fill technique and for tooth restorations in the posterior regions that are difficult to reach. It also introduced BioUniversal KFG, a golden, high-expansion universal casting for milling and the telescopic crown technique suited to veneering low-melting special ceramics, for example. The IPS e.max CAD range has been expanded and now covers all possible indications, from light veneers to hybrid abutments and bridges with three or more units. To make it easier for customers to navigate their way through Ivoclar Vivadent’s extensive product offering, the entire portfolio was redesigned into three main categories: direct restoratives, and fixed and removable prosthetics.

The company has invested heavily in its infrastructure recently, with €16 million reported to have been spent on a new building expanding its headquarters in Liechtenstein, which is intended to increase storage capacity and hosts high-end dental facilities where the latest developments are regularly put to the test under clinical conditions. Moreover, the manufacturing plants in nearby Biur in Austria, where Ivoclar Vivadent produces dental equipment, such as its Bluephase curing light, and in Amherst near Buffalo in the US have been expanded too. New sales offices and subsidiary offices are planned in Russia and Ukraine, among other countries, a step that will expand the company’s already large reach in 120 countries.

“A few years back, we decided to specifically target emerging markets, which now helps us to compensate for moderate growth in established regions like Europe or North America,” Global Region Head Asia/Pacific Christian Bruter explained. “In India, for example, we have grown from only 10 people in 2009 to more than 80.”

According to Bruter, the emphasis on increased local presence has not only facilitated growth in most of these regions, but also dramatically changed the way the company is perceived there. Education according to its own standards is considered a key factor for long-term development, a concept that has found its way into customer relationships through the establishment of International Centres for Dental Education, which are intended to offer training to existing and future customers through lectures and practical courses. Currently, the company maintains 25 of these centres worldwide, with the largest one in Schaan itself, where training laboratories are occupied almost around the clock by dentists and technicians from all over the globe.

“All of our subsidiaries or sales offices currently provide some form of training. No other company in the market invests so much in education,” Richter said.

“No other company in the market invests so much in education.”

Richter is confident his company can grow in 2013.
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Researchers investigate neuro-behavioral effects of dental amalgam fillings

**SEATTLE, USA:** Researchers have discovered that common genetic variants of metallothionein (MT), a protein that has the capacity to bind heavy metals, increase susceptibility of children to mercury toxicity from dental amalgam and other sources. In a study of 330 children, they found that boys carrying the variants were more prone to neuro-behavioral deficits associated with mercury.

The study included 164 boys and 166 girls aged 8 to 12 who participated in the Casa Pia Study of the Health Effects of Dental Amalgam in Children, a study investigating the health effects of low-level mercury exposure conducted between 1996 and 2006 among students of the Casa Pia school system in Lisbon, Portugal.

Scientists at the University of Washington evaluated whether MT1M and MT2A gene status, genes that have been reported to alter mercury toxicokinetics in adults, affected the relationship between urinary mercury concentration and neurobehavioral functions in children. They evaluated the urinary mercury levels and neurobehavioral performance of the children annually from baseline through seven years of follow-up after initial placement of dental amalgam or composite resin tooth fillings. Eighty-one boys and 74 girls received composite fillings, while 83 boys and 92 girls received amalgam fillings.

Among boys, numerous significant interaction effects between the genetic variants of MT1M and MT2A and mercury exposure were observed, spanning multiple domains of neurobehavioral function, the researchers said. Impaired performance was noticed primarily within the domains of visual spatial acuity and learning and memory, with some additional impacts on attention and motor function. However, all associations were restricted to boys with MT1M and MT2A variants in particular, although mercury exposure from dental amalgam was comparable among boys and girls.

The authors said that the findings may have important public health implications for future strategies aimed at protecting children and adolescents from the potential health risks associated with mercury exposure.

The study population had an average IQ score of 86 and relatively higher urinary mercury at baseline, implying higher perinatal mercury exposure. The researchers suspected that exposures associated with fossil fuel combustion for multiple uses within the local urban environment were possible sources of mercury. In addition, fish consumption, a source of inorganic mercury, could have contributed to elevated urinary mercury levels among the children. According to the researchers, Portugal has the highest fish consumption per capita in Europe. More than 60 percent of parents or caregivers of the children in the study reported that their children consumed fish on a weekly basis.

The study, titled “Modification of Neurobehavioral Effects of Mercury by Genetic Polymorphisms of Metallothionein in children,” was published online on July 1 in the Neurotoxicology and Teratology journal.

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* Source: GfK and SDM market data 2010 for LuxaCore.
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The surveillance of patients is a dentist’s duty
An interview with Prof. Newell Johnson, Australia

Oral cancer poses a continuing challenge for dental practitioners worldwide. At the FDI Annual World Dental Congress in Hong Kong, Dental Tribune’s Group Editor Daniel Zimmermann had the opportunity to speak with Prof. Newell Johnson from Griffith University’s School of Dentistry and Oral Health in Southport, Australia, about the disease and new methods of identification and treatment.

Daniel Zimmermann: Oral cancer figures seem to be increasing worldwide, despite awareness campaigns run by dental organisations like the FDI. Are we in danger of losing the battle against the disease?
Prof. Newell Johnson: There is some good news. In countries that have long had the reputation of having very high rates of oral cancer, such as parts of France, India, and Sri Lanka, the rates of alcohol and tobacco-related oral cancer are indeed falling. The same is true of the U.S., much of Western Europe, and Australia. Here rates are falling from a lower base.

In those countries or populations with traditionally very high rates, however, hundreds of thousands still die of oral cancer every year. In parts of Eastern Europe and the former Soviet republics, rates of these cancers are rising, we think, because of still high tobacco use, abuse of alcohol and a poor diet.

The other piece of bad news is that the incidence of cancers of the oro-pharynx (as opposed to the lip and in the mouth itself) is also increasing worldwide.

On the other hand, the prevalence of potentially malignant disorders, and certainly of overt oral cancer, is low in many countries, so maintaining a high level of awareness and interest among general practitioners is difficult. Some are discouraged because cancer screening may not be a remunerable activity.

Prof. Newell Johnson: There is some good news. In countries that have long had the reputation of having very high rates of oral cancer, such as parts of France, India, and Sri Lanka, the rates of alcohol and tobacco-related oral cancer are indeed falling. The same is true of the U.S., much of Western Europe, and Australia. Here rates are falling from a lower base.

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The other piece of bad news is that the incidence of cancers of the oro-pharynx (as opposed to the lip and in the mouth itself) is also increasing worldwide.

Oral health. In a study of almost 70 researchers from India suggests that milk and milk-based products may help prevent cavities.

A new study has suggested that milk and milk-based products may help reduce the incidence of dental caries. (Photo: Jenny Starrs/Shutterstock)

Consumption of certain dairy products may prevent cavities

MORADABAD/ELURU, India: New research from India suggests that dairy products may positively affect oral health. In a study of almost 70 teenagers, the researchers observed that cheese in particular raised the plaque pH in the participants’ mouths. As high pH levels are associated with a lower risk of developing cavities, they believe that dairy products may help protect against cavities.

The study involved 68 participants aged 12-15 who were assigned randomly to three groups. The first group was instructed to consume 10 g of cheddar cheese, the second group drank 15 ml of milk containing 3.5 percent fat, and the third group was given 10 g of sugar-free yogurt. After a baseline oral health analysis, all participants chewed or swished their respective product around their mouth for 3 minutes and then rinsed with water. Afterwards, the plaque pH level was assessed at different time intervals.

According to the study, the mean plaque pH in the cheese group rose rapidly after 10 minutes and decreased slightly after 20 and 30 minutes, while the plaque pH at 30 minutes was still slightly higher than at baseline. No such development was observed in the other groups. After 30 minutes, the plaque pH in the milk group was similar to that of the baseline pH, while it was slightly lower in the yogurt group. However, none of the dairy products lowered the plaque pH below the critical pH of 5.5, which is associated with enamel demineralisation and dissolution, the researchers said.

They attributed the anticariogenic activity of these products to the direct chemical effects of casein, phosphates, and calcium, and other lactose. Another explanation is that the action of chewing increased saliva production, which led to a rising pH level.

Although additional studies are needed, the findings of this study suggest that dairy products may have a low-ca, rigenic potential with cheese having the highest anticariogenic property, the researchers concluded.

The study was conducted at the Kothari Dental College and Research Centre in Uttar Pradesh, India, in collaboration with the St Joseph Dental College of Ayurveda and Panchkarma. It was published in the May/June issue of the General Dentistry journal.
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The only thing that matters
your patient
It spreads should be
cent’s smile
Changing grey–white back to red–white

Author: Jost P. Prestin, Germany

When meeting someone for the first time, a dental technician or dentist automatically glances at the person’s mouth and teeth. Generally, the unnatural grey- or purple-coloured gingiva attracts more attention than the quality of the crowns. As detailed in the following case report, anterior porcelain-fused-to-metal (PFM) crowns or bridges are the main reason for this unsightly gingiva.

Case report
A female patient came to our office in February 2012 complaining about pain in the region of teeth 22 and 23. In addition, she was unhappy about the grey colour of her maxillary gingiva and enquired whether it could be addressed. Teeth 13–23 had been restored with PFM single crowns 15 years before (Figs. 1–3).

After a detailed discussion of the state of the art in anterior aesthetics, we decided to renew all six PFM crowns and replace them with IPS e.max crowns (Voccal Vivadent). For all anterior cases, IPS e.max is our first choice of material. Not even all ceramic is all ceramic. Zirconium has nearly the same light transmission as PFM—almost nothing. Of course development goes on, and the first translucent zirconia products have been made available. It is first necessary to understand what causes a grey-coloured ridge in patients provided with PFM crowns.

There are two principal reasons. The first is the umbrella effect. This appears only with PFM and sometimes with zirconium crowns. The opaque copings block the light (Figs. 4a & b) so the root is not able to transmit the light and brighten up the papilla from the inside. Lithium disilicate glass-ceramic (except for the MO and H0 ingots) is able to mimic the natural tooth. Owing to the mineral (crystal-line) structure of the tooth substance and the natural light transmission of the IPS e.max restoration, the light is scattered in all directions inside the tooth, lighting up the gingiva from the inside (Figs. 4c & d). The second reason for grey gingiva underneath PFM crowns is metal oxides diffusing into the soft tissue. The possibility of dark gingiva is increased by crowns with a higher ignoble metal content.

Treatment plan
After preparing all the necessary paraphernalia and discussing the treatment plan again, we began removing the old crowns and finished the supra-gingival preparation in the middle of April. The stump shade of all six teeth was the same, allowing us to press the copings all at once in the same shade (IPS e.max Press LT A2; Figs. 5 & 6). The provisional was directly prepared in the office. It is important to leave enough space for the papillae so that they are not pushed away (Figs. 7 & 8).

After taking the impressions using Aquasil Ultra (DENTSPLY; Fig. 9), the model work was performed (Figs. 10 & 11) and the IPS e.max copings were prepared (Fig. 12). For the pressing process, we used Vario Press 300e (Zahler). The extremely short pressing time results in a very thin reaction layer. There is therefore no need to etch the item in hydrofluoric acid. The advantage is the perfect fit achieved because the thin margins of the copings are not rounded by

Figure 1: Old PFM crowns in situ with surrounding grey-coloured gingiva.

Figure 2: Old PFM crowns, slightly exposed tooth necks of teeth 12–22 and an open margin on the crown on tooth 22.

Figure 3: View of the grey-coloured occlusal soft tissue around the anterior PFM crowns and around the PFM molars.

Figure 4a–d: Schematic diagram of the incidence of light. The cross-section of a tooth with a PFM crown shows that the light passes through the ceramic and is blocked by the more opaque surface of the metal coping and scattered back into the ceramic (a & b). The cross-section of a natural tooth shows that the light passes into the tooth and the mineral tooth structure scatters it in all directions (c & d). Owing to the thin alveolar bone and the thin soft tissue, the entire area around the tooth is lit up from the inside.
Implant failure may be related to bisphosphonate use

NEW YORK CITY, NY, USA: The results of a study conducted at the New York University College of Dentistry seem to confirm the hypothesis that the use of oral bisphosphonate is connected to dental implant failure. In the case-control study, more than 300 middle-aged female patients with failed dental implants were compared with women from the same age group whose implants were still intact.

Clinical evaluations at the Department of Periodontology and Implant Dentistry were conducted between 1997 and late 2004. According to the researchers, the clinical data gathered from these examinations showed that in women whose implants had failed the odds of having taken bisphosphonate orally were almost three times higher. Dental implant failure related to the use of oral bisphosphonate also seemed to be more likely to occur in the maxilla.

Neither the quantity nor the duration of bisphosphonate use was evaluated.

Although the risk of implant failure is low, the researchers concluded that oral bisphosphonate could pose a risk to the success of dental implant therapy and should be prescribed with caution.

Earlier research on the association remains ambiguous, as results from Sweden and Australia have not found increased risks for implant failure when bisphosphonate was taken by patients before or after implant placement.

However, the majority of clinical organisations still recommend that long-term users stop taking bisphosphonate before undergoing dental implant procedures to avoid complications.
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Ceramics: Rationale for material selection

Introduction
Many types of ceramic materials and processing techniques have been in- troduced throughout the years. As early as 1903, Charles Land patented all-ceramic restorations, using fi- red porcelains for inlays, onlays and crowns.1,2 Insufficient understanding of material requirements for survival in the oral environment, poor ceramic processing techniques, and the ina- bility of adhesive cementation led to early catastrophic failure. Since then, all imaginable varieties of materials and techniques, from very conserva- tive ceramic restorations to very complex porcelain veneered of either metal or high-strength crystalline ceramics, have been introduced and tried with varying levels of success.3 The authors have previously publi- shed detailed descriptions of a classification systems for, ceramics used in dentistry, one based on the microstructure of the material and the second, which essentially is in which the mate- rial is processed.3

There is considerable misin- formation in the dental literature concerning the lack of rational treatment planning guidelines publi- shed regarding the use of different ceramics in dentistry. The literature is replete with insufficiencies of clinical success and failures of all types of dental treatments. Sadovyj4 published a review of the literature covering treatment considerations using aesthetic materials, for example whether to use amalgam or composite and the success rates of different treat- ments. No recent literature could be found presenting a thorough discus- sion of when to use the various cera- mics, for example when feldspathic porcelains should be used, when ei- ther pressed or machined glass-cera- mics are appropriate, when different types of glass-ceramics should be employed, when a high-strength all- ceramic crown system of either alu- mina or zirconia is ideal, and when metal ceramics are suitable.

This article provides a systema- tic stepwise process for treatment planning with ceramic materials and presents specific guidelines for the appropriate clinical conditions for ap- plications of the various systems.

Treatment philosophy
A treatment philosophy based on cur- rent standards of care that consider the patient’s aesthetic, restorative, and biological requirements is a prerequisite to making any deci- sion regarding the use of a material or technique. More importantly, this philosophy should be aimed at main- taining the long-term biological and structural health of the patient in the least destructive way.

Restorative or aesthetic dentistry should be practiced as conservati- vely as possible. The use of adhesi- ve materials (i.e., those that bond to substrate tissues) to preserve as much tooth structure as feasible while satisfying the patient’s restorative needs and aesthetic desir- es.1 The philosophy today is not to

Figure 1: Image of prepared tooth. Stylis- tic design is exposed along the pro- pected length, flexure and tensile stress risk volume of about 0.3 mm. and the restoration therefore would be at least 0.9 mm. This was noted in the chart.

Glass-ceramics have the same space requirements as porcelain for effective shade change; however, the authors find it difficult to work with this category and produce the best aesthetic results when the material is less than 0.8 mm in thickness. High- strength all-ceramic crowns require a thickness of 1.2-1.5 mm, depending on the substrate colour, and metal ce- ramics need a thickness of at least 1.5 mm to create lifelike aesthetics.4 With that in mind, a diagnosis based on tooth position and colour change will direct treatment planning, as well as the final decision regarding tooth pre- paration design (t.e., total tooth surface reduc- tion, restorations covering treatment consider- ation, and whether to use amalgam or composite and much more predictable for bonding, it is the ideal substrate for bonded porcelain resto- rations.

Flexure risk assessment
Next is the flexure risk assessment. Each tooth and existing restorations are evaluated for signs of past overt tooth flexure. Signs of excessive tooth flexure can be excessive enamel crazing in the area of the restoration, tooth and tooth fracture, microleakage at restoration margins, recession, and abrasion lesions. Often, the easiest way to determine the damage and controversy. However, if sev- eral of these conditions exist, there is an increased risk of flexure on the restorations that are placed, which may overload weaker materials. Evaluation of this possibility is also based on the amount of remaining tooth structure. The more intact the enamel is, the less potential there is for flexure.

The amount of tooth preparation can directly affect tooth flexure and stress concentration. There is much potential subjectivity in any obser- vational assessment of clinical condi- tions; however, an assessment of flexure potential for each tooth to be restored is needed. A subjective assis- tance of low, medium, or high risk for flexure is based on the evaluated parameters, as outlined below:

Low risk for clinical situations in which there is wear; minimal to no fractures or lesions in the mouth; and the patient’s oral condition is rea- sonably healthy.

Medium risk when signs of occlusal trauma are present, mild to modera- te gingival recession exists, with inflammation; bonding mostly to enamel is still possible; and there are no excessive fractures.

High risk when there is evidence of occlusal trauma from parafunction; more than 50% of dentine exposure exists; there is significant loss of ena- mal due to wear of 50% or more; and porcelain must be built up by more than 2 mm.

Excessive shear and tensile stress risk assessment
The third parameter is the risk (or amount) of ongoing shear and ten- sile stresses that the restoration will undergo, as well as being more guarded for specific materials. All types of ceramics (especially porce- lain) are weak in tensile and shear stresses, as well as being much less stable under compressive stress. If the stresses can be controlled, then wea- ker ceramics can be used, for example bonded porcelain to the tooth. The same parameters are evaluated, simi- lar to flexure risk, for example deep overbites and potentially large areas where the ceramic would be cantille- ved (Fig. 3).

If a high-stress field is anticipated, stronger and tougher ceramics are needed; if porcelain is used as the aesthetic material, the restoration de- sign should be engineered with such stress in mind (i.e., basically a metal core system) that it will redirect shear and tensile stress patterns to com- pression. In order to achieve that, then, the operator must be the veneering porcelain by utilising the reinforced-porcelain system tech- nique, which is generally accepted in the literature as the use of a metal ceramic concept.15 The practitioner can assess and categorise low, medium, or high risk for tensile and shear stresses ba- sed on the materials and symptoms mentioned above.

Bond/deal maintenance risk assess- ment
The fourth parameter is the risk of losing the bond or seal of the resto- ration to the tooth over time. Glass- matrix materials, which consist of the weaker powder/liquid porcelains, and the tougher pressed or machined glass-ceramics, require maintenance of the bond and seal for clinical du- rability.16–18 Owing to the nature of the glass-matrix materials and the absen- ce of a core material, the veneering porcelains are much more suscepti- ble to fracture under mechanical stresses and, therefore, a good bond in combination with a stiffer tooth substrate (e.g., enamel) is essential for reinforcing the restoration. If the bond and seal cannot be maintained, then high-strength ceramics or metal ceramics are the most suitable, since these materials can be placed using conventional cementation techniques.

Clinical situations in which the bond factor is higher are:
• Moisture control problems;
• Variable bonding interfaces on bonded interfaces;
• Variable bonding interfaces (e.g. different types of dentine);
• Material and technique selection of bonding agents (i.e., as dictated by such clinical situations as inability to achieve proper isolation for moi- sture control or proper adhesive technology); and
• The experience of the operator (Fig. 4).

An assignment of low, medium, or

Figure 2: Image demonstrating deep over- bite in which shear and tensile stresses would be at least medium. Bonded porce- lain would require maintenance of enamel and use of a strategy to reduce sheare ver- ge on the tooth.

Figure 3: Image demonstrating deep over- bite, with which shear and tensile stresses would be at least medium. Bonded porcelain would require maintenance of enamel and use of a strategy to reduce stress on the tooth.

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Category 1: Powder/liquid porcelains
Guidelines
Bonded pure-porcelain restorations are ideal as the most-conservative choice but are the weakest material and require specific clinical parameters to be successful. Many good materials and techniques are available for bonded porcelains (e.g., Creative, Jeneric Densply; Ceramco 3, Dentsply, EX3, Noritake). However, VITA VM13 (VITA Zahnfabrik) is recommended by the authors when 3D-Master shade tabs are taken, and Vintage Halo (SHOFU) when classic shades are used.

When following clinical parameters and guidelines at the University of California, Los Angeles’s Center for Esthetic Dentistry (UCLA Center for Esthetic Dentistry), these materials have been used with similar success rates compared with porcelain fused to metal (i.e., less than a 1% fracture rate if all parameters are followed, unpublished data, Figs. 5 & 6).

Aesthetic factors
Space requirements for shade change: 0.2–0.3 mm is required for each shade change.

Environmental factors
1. Substrate condition: There is less than 50% of remaining enamel on the tooth, 50% or more of the bonded substrate is enamel, 70% or more of the margin is in enamel. It is important to note that these percentages are subjective assessments based on an overall evaluation of all parameters affecting the tooth to be restored and which may influence material selection. If bonding to some dentine substrate, the dentine should be mostly unaffected and superficial, since sclerotic dentine exhibits a very poor bond strength.
2. Flexure risk assessment: There is a higher risk and a more guarded prognosis when bonding to dentine. Owing to dentine’s flexible nature, it is recommended that restorations with low fracture resistance materials be avoided and, therefore, the presence of a higher percentage (i.e., at least 70% in high-stress area as such as the margins of enamel) is recommended when restoring using powder/liquid porcelains and (Category 1) materials. By increasing the presence of enamel, the prognosis is improved and, therefore, the dentine substrate can be assessed as low to moderate.
3. Tensile and shear stress risk assessment: There is a low to low/moderate risk. Large areas of unsupported porcelain, deep overbite or overlap of tooth, bonding to more-flexible substrates (e.g., dentine and composite), bruxing, and more die-styled placed restorations increase the risk of exposure to shear and tensile stresses.
4. Bond/seal maintenance risk assessment: There is an absolute low risk of bond/seal failure.

Summary
Porcelains are generally indicated for anterior teeth. Occasional bisupcus use and rare molar use would be acceptable only with all parameters at the least risk level.

Category 2: Glass-based pressed or machinable materials
Guidelines
Glass-based pressed/pressable porcelains, for example IPS Empress (Ivoclar Vivadent) and Authentic (Jeneric Densply) and the higher-strength IPS e.max materials (Vita, Vivadent), can be used in any of the same clinical situations as Category 1 materials. Machinable versions of glass-ceramic material, for example VITABLOCS Mark II (VITA Zahnfabrik), IPS Empress CAD (Vitadent Vivadent), and IPS e.max CAD, can be used interchangeably with the pressed versions. Monolithic IPS e.max, owing to its high strength and fracture toughness, has shown promise as a full-contour, full-crown alternative, even on molars. Glass-ceramics can also be used in clinical situations when higher flexure risk factors are involved. Other than certain risk factors (see below) that would limit their use, these materials can be difficult to use when there is less than 0.8 mm in thickness, except at marginal areas. They can gradually thin to a margin of approximately 0.3 mm.

All things being equal, if the restoration is still a Category 1 clinical situation and there is more than 0.8 mm of working space, glass-ceramics should be considered owing to their increased strength and toughness, and the presence of sufficient room to achieve the desired aesthetics.

Aesthetic factors
Space requirements for workability and shade change: A minimum working thickness of 0.8 mm and 0.2–0.3 mm for each shade change is required.

Environmental factors
1. Substrate condition: There is less than 50% of the enamel on the tooth, less than 50% of the bonded substrate is enamel, and 30% or more of the margin is in dentine.
2. Flexure risk assessment: The risk is medium for Empress, VITABLOCS Mark II and Authentic-like glass-ceramics, and layered IPS e.max. In cases in which flexural risk is medium to high (full-contour preparation is not desirable) and some of the substrate would be dentine, the authors have found in their clinical trials that monolithic IPS e.max has been 100% successful for as long as 30 months in service.
3. Tensile and shear stress risk assessment: The risk is medium for Empress, VITABLOCS Mark II and Authentic-like glass-ceramics, and layered IPS e.max. It is medium to high for bonded monolithic IPS e.max.
4. Bond/seal maintenance risk assessment: There is a low risk of bond/seal failure for Empress, VITABLOCS Mark II and Authentic-like glass-ceramics, and layered IPS e.max. It is medium for monolithic IPS e.max.

Summary
Pressed or machined glass-ceramic materials, such as Empress, VITABLOCS Mark II, and Authentic are indicated for thicker veneers, anterior crowns, and posterior inlay and onlays (Figs. 7 & 8) in which medium or less flexure, and shear and tensile stress risk is documented (Figs. 9 & 10). Also, they are only indicated in clinical situations in which long-term bond and seal can be maintained. IPS e.max (Figs. 11 & 12), which is a different type of glass-ceramic that has higher toughness, is also indicated for the same clinical situations as the other glass-ceramics, but can be extended for single-tooth use in higher-stress situations (as in molar crowns). This is provided it is used in a full-contour monolithic form and cemented with a resin cement.

Category 3: High-strength crystalline ceramics
Guidelines
Mostly (e.g., VITA In-Ceram, VITA Zahnfabrik) all-crystalline materials are used for core systems to replace metal that would then be veneered with porcelain. Alumina-based systems, for example In-Ceram and NobelProcera (Nobel Biocare), were on the market but are now generally being replaced with zirconia systems. Alumina systems have shown to be very clinically successful for single units, with a slightly increased risk in the molar region. They can be recommended for any single-unit anterior or bicuspids crowns (Figs. 13 & 14). The authors have observed a slight increase in failure with conventional cements. For example, after using alumina restorations for many years at the UCLA Center for Esthetic Dentistry, the authors observed that at between eight and ten years, the failure rate doubled to approximately 2%, with those failures being core fractures necessitating replacement (unpublished data). Their suggestion for alumina-core restorations is either a re-modified glass ionomer luting cement (e.g., RelinX, 3M ESPE) or a resin cement. For zirconia-core systems (e.g., LAVA, 3M ESPE), the authors have not experienced core fracture but have seen problems with chipping of porcelain. White and McLaren found that a special slow-cure thermal cycle minimizes the stress in the porcelain and at the porcelain/zirconia interface. Clinically, since the authors of this current article have been using the altered firing schedules, their replacement rate for chipping has been reduced by less than 1%.

Aesthetic factors
Space requirements for workability and maximum aesthetics: A minimum working thickness of 1.2 mm is required, and 1.5 mm is ideal if masking.

Summary
A high-strength ceramic (specifically zirconia) is indicated when significant tooth structure is missing, unfavourable risk for flexure and stress distribution.
bution is present, and it is impossible to obtain and maintain bond and seal (e.g., most posterior full-crown situations with subgingival margins, Figs. 15 & 16).

Category 4: Metal ceramics

Guidelines

For almost half a century, metal ceramics have been the standard for aesthetic full-crown restorations. Generally, they have the same indications as Category 3 zirconia-based restorations. With metal ceramics, manufacturers have eliminated the complications throughout the years; these materials do not have the same thermal coefficients as zirconia. However, anterior teeth metal ceramics need to be approximately 0.3 mm thicker to have the same aesthetics as properly designed zirconia/porcelain crowns. When porcelain-fused to metal restorations are indicated, the CAPTEK (Precious Chemicals USA) system has been the material of choice at the UCLA Center for Esthetic Dentistry owing to its superior aesthetic properties.

Aesthetic factors

1. Space requirements for workability: 1.5–1.7 mm is required for maximum aesthetics.
2. Substrate condition: The substrate is not as critical, since the metal core supports the veneering material.

A laser beam and reconstructed on a computer, allowing different levels in the skin to be visualised features of allergic contact dermatitis using open-access publisher InTech. These include patch testing, which has to be conducted over several days and is considered inaccurate because it is subject to the experience and knowledge of the examining person. In a comparison test conducted by several members of the research team in 2010, RCLM demonstrated advantages over patch testing for visualising features of allergic contact dermatitis due to nickel and cobalt, two substances that have been found to cause the highest incidence of allergies in dental patients in addition to chrome, palladium, gold, and silver.

In this article, we present a systematic process of clinical evaluation and rationale for material selection.

PHILADELPHIA, Pa., USA: New research from the U.S. has suggested that two proteins involved in taste detection play a crucial role in sperm development too. The scientists found that blocking the proteins led to malformed and fewer sperm in mice. They believe that the findings may hold important implications for infertile men.

The researchers found a connection between the taste system and male reproduction while breeding mice for research from the U.S. has suggested that they affect sperm development and maturation. (Photo: FCG/Shutterstock)

Some taste receptors have been found in testes and sperm as well. However, their function was unknown. Now, researchers have suggested that a better understanding of the mechanism between the taste system and male fertility, an increasing problem worldwide. They suggested that a better understanding of the mechanism of these extracellular proteins could help infertile men or aid the development of a nonhormonal contraceptive for men.

The study, titled “Genetic Loss or Pharmacological Blockade of Testes-Expressed Taste Genes Cause Male Sterility,” was published online on July 1 in the Proceedings of the National Academy of Sciences of the United States of America. It was conducted at the Monell Chemical Senses Centre.

Editorial note: A complete list of references is available from the publisher.

Contact Info

Prof. Edward A. McLaren, DDS, MDC, is the founder and director of UCLA postgraduate aesthetics, and Director of the UCLA Center for Esthetic Dentistry in Los Angeles, California.

Yair Y. Whitman, DMD, is a full-time faculty member at the UCLA Center for Esthetic Dentistry.

Some taste receptors have been found in testes and sperm as well. However, their function was unknown. Now, researchers have suggested that they affect sperm development and maturation. (Photo: FCG/Shutterstock)

Blocked taste genes may cause male sterility

KYOTO & TOKYO, Japan: Despite the increasing use of non-metal materials in dental treatment, contact allergies to different metals remain a problem in five dental patients worldwide, according to the latest figures from health organisations. Clinicians from universities in Tokyo and Kyoto in Japan have recommended reflectance confocal laser microscopy (RCLM) for evaluating allergic contact dermatitis owing to dental materials such as alloys.

The imaging method has already been used in dermatology since the 1980s for detecting early signs of different kinds of cancers, among other skin conditions. Instead of capturing a full image, RCLM illuminates only small points of the area under observation, which is scanned using a laser beam and reconstructed on a computer, providing the opportunity to capture images at selected depths of an object, such as human skin.

Owing to this ability to determine and analyse different levels in the skin, RCLM has already been used in dermatology since the 1980s for detecting early signs of different kinds of cancers, among other skin conditions. Instead of capturing a full image, RCLM illuminates only small points of the area under observation, which is scanned using a laser beam and reconstructed on a computer, providing the opportunity to capture images at selected depths of an object, such as human skin.

While it might become a real-time diagnostic or adjunctive tool to identify a suspicious lesion or to delineate tumour margins, RCLM still has limitations, such as the inability to detect deep objects in the dermis of normal skin, the researchers stated in the report. In addition, a thick stratum corneum and vesicle formation can restrict visualisation. In order to distinguish between different cells and determine pathological characteristics better, higher and better contrast is needed for these devices, they recommended.

Laser microscopy considered useful in detecting allergies to dental metals

Editorial note: A complete list of references is available from the publisher.

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Some taste receptors have been found in testes and sperm as well. However, their function was unknown. Now, researchers have suggested that they affect sperm development and maturation. (Photo: FCG/Shutterstock)
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Conical internal connections will fuel future growth in European dental implant market

Dr Kamran Zamanian & Ian van den Dolder
iData Research Inc., Canada

The dental implant and bone graft substitute market is the most rapidly advancing segment of dental technology, and leading competitors in this market must consistently develop new products supported by research from scientific and academic organisations to remain competitive. Recent cases have demonstrated that when companies lose a segment of support from the scientific community, their market shares tend to suffer significantly.

The European dental implant and bone graft substitute market has been further challenged by recent economic instability and the eurozone crisis, which has created a consistent demand for lower-cost dental implant products. As a result, many lower-priced competitors have begun to seize larger market shares in almost every European market. In many segments, these competitors are either regional or sourced from overseas markets, such as Brazil, Korea, and Israel. Generative products and barrier membranes have been particularly affected by consumer austerity, as these products are discretionary in many cases.

However, a growing number of consumers continue to demand high-quality products, guarantees of service and scientific improvements, which only premium manufacturers are equipped to offer. Conical internal connections are one such recent innovation, and currently constitute the fastest-growing connection type in the dental implant industry.

Many dental implant and bone graft substitute companies have looked to expand their product portfolio or create new markets while they create package deals to offset competition from rapidly emerging lower-priced competitors. Significantly, many European and U.S. companies involved in this market have begun to invest in rapidly emerging periiphery markets such as Turkey.

Increasing prevalence of conical internal connections

Dental implants are connected to final abutments in one of three ways: internal connections, external connections, or single-unit devices in which the implant and abutment are already attached. Furthermore, internal connections have two subsegments: butt-joint internal connections and conical internal connections.

Research has shown that a lack of intimate fit of the implant in the abutment or movement of the implant can provide an area for bacterial growth. Conventional butt-joint connections provide a connection that can result in micromovement between the implant and the abutment, creating a pump effect for bacteria into the connection area. When bacteria are present in the microgap, they can cause inflammation, tissue recession and bone loss. Recent clinical studies have demonstrated that, on average, conical connections offer a smaller microgap than butt-joint connections, in addition to a greater mechanical level of stability. As a result, conical connection types have become hugely successful in the dental implant market, and the majority of leading dental implant manufacturers have introduced conical internal connections rapidly, as most of the major players in the European market moved quickly to gain a strong market share in Turkey. Additionally, this market benefits from low labour costs, which adds to the incentive for implant companies to establish domestic subsidiaries or local distribution partners, fuelling options for consumers. Turkey is also a popular destination for dental tourism, especially among patients from more expensive European markets.

EU medical tourism to strongly impact dental implant market

The EU directive on cross-border healthcare that comes into force in 2013 will have a strong impact on the European dental implant market. This directive will target the medical tourism market, which is significant, as dental treatment procedures account for nearly half of medical tourism in most major markets. The directive gives patients the right to be reimbursed for treatment they receive in other EU countries. This could lead to more Western Europeans traveling to Eastern Europe, including Poland and Bulgaria, which are rapidly developing the quality of the medical services they offer.

The UK features one of the highest rates of outbound dental tourism, as patients are unaccustomed to large out-of-pocket costs for procedures, owing to the legacy of the National Health Service. Whereas rich patients from developing countries used to come to prestigious hospitals in the UK and elsewhere for treatment, outbound medical travel from the UK has been growing far faster than inbound over the past decade, as UK patients are increasingly traveling abroad for lower-cost care. Figures suggest more than 50,000 citizens of the UK go abroad for treatment annually. The number of outbound medical tourists from the UK rose by 170 percent from 2002 to 2009.

Dental implant companies follow success of conical internal connection

Internal connection types as a whole are becoming increasingly dominant in the dental implant market. Conical internal connections and butt-joint internal connections represented 83.4 percent of implants with an internal connection in 2011. Conical internal connections is the fastest-growing segment of the market and expected to increase at a compound annual growth rate of 10.1 percent by 2018.

NobelActive (Nobel Biocare) was one of the foremost early successes of conical connection types, and was rapidly adopted by consumers owing to clinical results demonstrating its greater stability and smaller microgap between implant and abutment. The majority of large companies now offer a conical connection, as this market is expected to overshadow butt-joint internal connections increasing owing to the greater stability and perceived smaller-diameter microgap offered by conical internal connections. Many companies are combining these connection types with tapered shape and surface treatments as the current generation of premium products.

The information contained in this article was taken from two detailed and comprehensive reports published by iData Research (www.idataresearch.net), entitled “European Markets for Dental Implants; Final Abutments and Computer Guided Surgery” and “European Markets for Dental Bone Graft Substitutes, Dental Membranes and Tissue Engineering.”

(iData Research is an international market research and consulting firm focused on providing market intelligence for the medical device, dental and pharmaceutical industries. For more information and a free synopsis of the above report, please contact iData Research at dental@idataresearch.net)


**Dalacin C**

Clindamycin hydrochloride 150 & 300mg capsules, Clindamycin phosphate 300 & 600mg ampoules

*Leaves nothing to chance in dental infections*

**Good activity**

against Gram +ve, anaerobes and β-lactamase producing pathogens

**Reaches high concentrations**

in bone, saliva and gingival crevicular fluid

Sanford Guide recommends CLINDAMYCIN as THE DRUG OF CHOICE

<table>
<thead>
<tr>
<th>Condition</th>
<th>Success Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental abscess</td>
<td>98.5%</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>97.3%</td>
</tr>
<tr>
<td>Gingivitis</td>
<td>96.8%</td>
</tr>
<tr>
<td>Gingivectomy</td>
<td>98.1%</td>
</tr>
<tr>
<td>Injury to wisdom tooth</td>
<td>99.7%</td>
</tr>
<tr>
<td>Extraction of impacted tooth</td>
<td>98.1%</td>
</tr>
</tbody>
</table>

*Overall success rate of 98.1%*

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When pain begins to overpower your patients, give them

**Dolonat™**

Tramadol HCl 37.5 mg + Paracetamol 325 mg Tablets

**Synergistic analgesia with central and peripheral action**

**Acts rapidly within 17 minutes**

**Potent combination for reducing heat pain threshold**

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**Summary of providing information:**

**CONTRAINDICATIONS:** Avoid prolonged treatment. Do not use in patients with chronic liver disease. May cause death.

**WARNINGS AND PRECAUTIONS:** The recommended dose of DOLONAT should not be exceeded. Do not use in patients with severe liver disease.

**Adverse effects:** Common adverse effects include nausea, vomiting, diarrhea, constipation, headache, dizziness, drowsiness, and dizziness. In rare cases, Stevens-Johnson syndrome and toxic epidermal necrolysis have been reported. Patients should be monitored for these effects. It is important to follow the dosage instructions carefully. In case of overdose, seek medical attention immediately.

**PATIENT INFORMATION:** This leaflet does not take the place of professional advice. It is intended for use by healthcare professionals. It should not be used in the absence of appropriate medical advice. Always consult your healthcare provider for medical advice specific to your situation. This information is not intended to replace professional medical advice, diagnosis, or treatment.

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**Benzene Properties:**

- flammable
- toxic
- hazardous to the environment

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**Prescribing Information:**

- The information provided is intended for healthcare professionals and is not for use by the general public.
- Patients should be advised to consult a healthcare professional before taking any medication.
- It is important to follow the dosage instructions carefully. In case of overdose, seek medical attention immediately.
- Always consult your healthcare provider for medical advice specific to your situation.
- This information is not intended to replace professional medical advice, diagnosis, or treatment.

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**FURTHER INFORMATION:**

- For more information, please visit the manufacturer’s website or contact your healthcare provider.
- It is important to follow the dosage instructions carefully. In case of overdose, seek medical attention immediately.
- Always consult your healthcare provider for medical advice specific to your situation.
- This information is not intended to replace professional medical advice, diagnosis, or treatment.
TO KEEP SMILES HEALTHY, CALL FOR THE HEALTH SPECIALIST!

1. Aids in wound healing
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6. Helps collagen synthesis
7. Helps proper calcium absorption
8. Helps eliminate bad breath
9. Helps promote healthy gums

BecoSpecial
Essential minerals, amino acids and natural extracts with vitamins
THE HEALTH SPECIALIST

For full prescribing information, contact Pfizer Limited, Pfizer Centre, Civic Estate, CRP S Road, Jogeshwari East, Mumbai - 400 045.