Indian dental clinic chain aims for expansion

HYDERABAD, India: India’s rising dental health-care sector is expected to receive another significant investment, as Alliance Dental Care has announced that it will triple its number of dental clinics by mid-2013. The expansion is intended to serve different market segments, including dental spas, regular dental clinics, as well as express cleaning and whitening spots located in public places like airports and shopping malls.

Alliance Dental Care was founded in 2002 as a subsidiary of Alliance Medcorp, a joint venture between Apollo Hospitals and medical equipment provider Trivitron. Both companies have been reported to seek private investors in order to raise Rs 0.5 trillion (US$10 million) for the first phase of the expansion in 2012. The new clinics, as well as the existing ones, have been re-branded as White Dental Clinics, they said.

Alliance Dental Care currently maintains over 20 dental clinics in major Indian cities like Chennai, Bangalore and Hyderabad. In addition to its Indian business, the joint venture is also eyeing potential markets overseas, including South-East and West Asia, Africa and Eastern Europe.

According to the latest financial reports, Apollo boasted revenues of Rs 2.5 trillion (US$460.4 million) in 2010/2011. Once the expansion has been completed, the company will hold a 70 per cent share in Alliance Dental Care.

Contact allergies owing to gloves: A growing problem in dentistry

Ben Adriaanse, DT Netherlands.

HOUTEN, Netherlands: In recent years, researchers have noted a significant increase in contact allergies to rubber additives among health care professionals. Although the cause of this cannot be stated with certainty, experts believe that nitrite gloves do.

In the 1980s, the use of medical gloves made of natural rubber latex was introduced into dentistry. Owing to an alarming number of allergic reactions caused by certain proteins contained in latex, synthetic alternatives like nitrite and vinyl gloves emerged shortly afterwards. While they, like other alternatives, score significantly lower in comfort and elasticity, nitrite gloves are most commonly used by dentists.

According to Michiel Paping, director of Budev, a Dutch research and development company focused on natural rubber latex allergens, type IV allergic reactions, which are immediate contact eczema but the excipients added during the manufacturing process, such as vulcanization accelerators, plasticizers, fillers, antioxidants and colorants. Excipients are present in both natural and synthetic rubber gloves,” said Prof. An Goossens, a contact allergy expert at KU Leuven’s Department of Dermatology in Belgium.

The production lines were shortened and the vulcanization was performed at lower temperatures to save costs and energy. However, concerns have been raised about the thinner gloves.

“Producing thinner gloves and thereby being able to fit more gloves in a shipment, saves costs for raw materials and transport. However, the production of such a thin product and vulcanization at lower temperatures inevitably requires extra and new chemicals. In addition, it is unavoidable that thinner gloves will score worse in strength and permeability,” said Paping after his company had tested various gloves with regard to these properties.

Alongside the growing number of contact allergies in recent years that are likely caused by added chemicals or antimicrobial agents, Paping and his team have observed an increase in allergic reactions in daily practice. “Recently, we have seen that the professional body is becoming alarmed. Despite this, I am concerned that the average dentist is not aware of this matter,” he said.

“Experts believe that nitrite gloves cause contact allergies.

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Experts believe that nitrite gloves cause contact allergies.

Contact allergies caused by gloves are a growing problem and should not be underestimated, the experts concluded. “With an annual global use of more than 150 billion pieces, the medical glove is something that requires serious attention,” said Paping. “It is a condition that can threaten your career and you can develop it suddenly,” he warned.

(Edited by Claudia Duschek, DT)
HELP YOUR PATIENTS

ROOT OUT THE PAIN.

Pfizer
Working together for a healthier world™
Dental occlusion/temporomandibular joint and general body health

Clinical evidence and mechanism of an underestimated relationship

Dental occlusion is associated with reduced lower extremity strength, agility and balance in elderly people.3 It is considered to be essential for maintaining the entire stomatognathic system, the position and head posture.4,5 As the treatment of dental diseases aims to achieve harmony within the entire stomatognathic system, the position and head posture could be literally considered to be a part of a chain of balance, while the upper and lower jaws are attached to each other through the TMJ.3

The causes of TMJ disorders can be divided into five categories: dental, trauma, lifestyle habits, stressful social situations, and emotional factors.6,7 Trauma can be in the form of whiplash, traction appliances, and blows to the head, face, or jaw.8 Evidence of significant trauma to the TMJ has also been found following hyperextension of the cervical spine.9 With regard to habits, bad posture, bad ergonomics at work, oral and childhood habits, as well as poor diet and strenuous activities such as heavy lifting, have been cited.1

Myofascial pain, deriving from the hyperalgic trigger points located in skeletal muscle and fascia, is considered to be an important aspect of the TMJ.10 Myofascial pain may occur throughout the entire body.11 Pain in the neck muscles may be induced by the unbalanced activity of the neck muscles.12

Fluctuation in the centre of gravity causes the TMJ to be moved in an asymmetric way, which may cause dysfunctions.13 The position of the head affects the centre of gravity, resulting in an increased risk of falling when abnormal.14 Pain induced by TMJ occlusion may affect proprioception in the area, interfering with the proper stability of the head posture.15 It is thought that tooth loss and head formula may influence postural instability.16 Physiologically, mechanoreceptors in the periodontal membrane, craniofacial muscles, and coordinate masticatory function,17 and as this is related to the motility of the neck muscles.18

The biomechanical impact on the vertical vertebrae during mastication has been calculated, which confirmed that the vertical occlusal alteration can influence stress distribution in the vertical column.19 Possible associations between trunk and cervical asymmetry and facial symmetry have been reported.20 For example, it has been found that visual perception control is most important in orienting the body in the frontal plane.21 A relationship between dental occlusion and postural control has also been postulated.22

3) TMJ and physical performance

TMJ conditions can influence physical performance.23 Trainees often advise athletes to wear occlusal splints or mouth guards during competitions in order to increase motor performance.24 It has also been reported that proper teeth clenching plays an effective role in the enhancement of physical performance.25

The relationship between the presence of occlusal support in edentulous subjects and their capacity for physical exercise has been investigated, and it was concluded that occlusal support also holds significance not only for the restoration of masticatory function but also for the maintenance of physical exercise.26

Mechanism of relationship between the TMJ and general body health based on the myofascial aspect

It is the first hypothesis of this article that the TMJ and other parts of the body are connected through fasciae, which is a connective element between various anatomical structures.27 It is supposed that there exists a two-dimensional network extending throughout the entire body.28 This network can be stretched by the contraction of individual muscles, which may influence the transmission over a distance.29,30

The fascial tissues are arranged vertically, from head to toe, and four interconnected transverse fascial planes criss-cross the body. Therefore, should an injury occur in one part of the body, dysfunction may occur throughout the body.31

Mechanism based on qi and the meridian aspect

The second hypothesis is that the TMJ and other parts of the body are connected through the meridian system, which is constituted of the fasciae.

“...lesions in the masticatory muscles or dento-alveolar ligaments can perturb visual stability.”

head, face, or jaw. Evidence of significant trauma to the TMJ has also been found following hyperextension of the cervical spine. With regard to habits, bad posture, bad ergonomics at work, oral and childhood habits, as well as poor diet and strenuous activities such as heavy lifting, have been cited. Myofascial pain, deriving from the hyperalgic trigger points located in skeletal muscle and fascia, is considered to be an important aspect of the TMJ. Myofascial pain may occur throughout the entire body. Pain in the neck muscles may be induced by the unbalanced activity of the neck muscles. The biomechanical impact on the vertical vertebrae during mastication has been calculated, which confirmed that the vertical occlusal alteration can influence stress distribution in the vertical column. Possible associations between trunk and cervical asymmetry and facial symmetry have been reported. For example, it has been found that visual perception control is most important in orienting the body in the frontal plane. A relationship between dental occlusion and postural control has also been postulated.

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Mechanism based on qi and the meridian aspect

The second hypothesis is that the TMJ and other parts of the body are connected through the meridian system, which is constituted of the fasciae.
Traditionally, acupuncture meridians are believed to form a network throughout the body, connecting peripheral tissues to each other. Studies that seek to understand the acupuncture point/meridian systems from a Western perspective have mainly focused on identifying distinct histological features that differentiate acupuncture points from surrounding tissue. One of the histological and anatomical associations with the meridians is the muscular or intramuscular loose connective tissue fascia.

Ancient acupuncture texts contain several references to “fat, grey membranes, fasciae and systems of connecting membranes” through which the qi is believed to flow. In terms of connective tissue associations, several authors have suggested that a connection may exist between the acupuncture meridians, which tend to be located along the fascial planes between muscles or between a muscle and bone or tendon, and the connective tissue. In view of experimental evidence, it has been hypothesized that the network of the meridians can be visualized as a representation of a network of interstitial connective tissues. These findings are supported by ultrasound images showing connective tissue cleavage planes at the acupuncture points in human beings. Rather than viewing acupuncture points as discrete entities, it has been proposed that these points might correspond to sites of convergence in a network of connective tissue permeating the entire body, similar to highway intersections in a network of primary and secondary roads.

Correlation between trigger points and acupuncture points Although separated by two millenia, the traditions of acupuncture and myofascial pain therapies share fundamental similarities. In terms of connective tissue through which the qi is believed to flow, 35 in analogy to the fascial system, the traditions of acupuncture and myofascial pain therapies share fundamental similarities in the treatment of pain disorders.

Recent reports have suggested substantial anatomic, clinical and physiologic overlap of the myofascial trigger points and acupuncture points. The analogy between the trigger points and acupuncture points has been discussed since 1977, when 100% anatomic and 71% clinical pain correspondences for the myofascial trigger points and acupuncture points in the treatment of pain disorders were reported.

A number of similarities between them were also suggested. The two structures have similar locations and needles are used at either point to treat pain. The pain associated with the local twitch response at trigger points is similar to the de qi sensation, and the referred pain generated by needling trigger points is similar to the propagated sensation along the meridians.

It was pointed out, however, that the acupuncture points located at the trigger points are not frequently used by acupuncturists, and do not share the same clinical indications as trigger point therapy. It was further argued that the claim of 71% correspondence between the acupuncture points and trigger points is conceptually impossible. Furthermore, even putting this conceptual problem aside, no more than 40% of the acupuncture points corresponded to the treatment for pain and, more likely, only approximately 18% to 19% of the points are actually correlated. The correlation between the trigger points and the acupuncture points clearly need to be further investigated in the future.

The fascial connection theory we propose can explain the functional connection between dental occlusion/ TMJ and other parts of the body based on the hypothesis that these are built up and maintained in a normal natural condition, while causes for deterioration of the TMJ status should be treated in an effort to restore the natural condition.

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3Shape releases its new Dental System™ 2013

3Shape’s Dental System™ 2013 introduces new major indications, a variety of powerful design tools, optimized order-creation, stronger scan productivity and range of services labs can offer digitally, we believe that we have significantly increased the productivity and range of services labs can offer at competitive prices.”

New features in Dental System 2013 include:

• New user interface for maximum ease-of-use and simplified design workflows

A new intuitive workflow progress bar guides users through each design step. The new interface introduces an impressive full Screen design window that maximizes 3D design space.

• Advanced implant bridges with gingiva (“Prezent style”)

Design advanced bridges - complete with gingiva, teeth, and implant interfaces in a single smooth workflow. Designs can be milled directly in Zirconia, titanium, PMMA, or other materials.

• New Post and Core design software

Completely new Post and Core solution with unique scanning and design workflows. Specially designed scan-posts capture post positions and depth from the model. All layers are designed in a single workflow, starting with the anatomy layer first. Uses scans from both TRIO® and 3Shape desktop scanners.

• New Abutment Designer™ workflow for screw-retained crowns and anatomical abutments

3Shape introduces a new workflow for designing screw-retained restorations in Abutment Designer™. All types of abutments – Standard customized abutments, screw-retained Crowns and anatomical abutments – are selected directly in the order form, followed by the “Anatomy/Post” workflow.

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• TRIO® Inbox - labs can connect to any open TRIO® digital impression system in the world

The new TRIO® Inbox enables labs to receive scans from TRIO® Digital Impression Systems in dental clinics and discuss cases with dentists online. Incoming cases are accepted or rejected with a single click and a notification is immediately sent back to the dentist.

• Get Dental System 2013 as a part of your 3Shape LABcare™

All Dental System™ subscriptions include 3Shape LABcare™ - 3Shape’s customer-centric business model that gives users new technologies through and advances in the Dental System™ 2013 software. In addition to upgrades, 3Shape LABcare™ gives labs access to an efficient support network with multiple language assistance, and access to training and learning channels such as webinars, videos, etc.

Dental System™ 2013 will be available through 3Shape resellers. Actual availability to end-users will depend on the specific system configuration. Please contact your local 3Shape supplier, or visit www.3shape.com regarding reseller information.

About 3Shape

3Shape is a Danish company specializing in the development and marketing of 3D scanners and CAD/CAM software solutions designed for the creation, processing, analysis and management of high-quality 3D data for application in complex manufacturing processes. 3Shape embodies the age of the “full digital dental lab,” and its more than 140 developers provide superior innovation power directly to dentists. 3Shape’s flexible solutions empower dental professionals through automation of real workflows, and its systems are applied in thousands of labs in more than 90 countries worldwide, putting 3Shape technologies at the peak of the market in relation to units produced by dental technicians. With TRIO®, 3Shape now brings its vast expertise and innovation power directly to dentists. 3Shape’s first-line distributor support network with a second-line support force of over 30 in-house experts placed in support and service centers strategically located around the globe.

3Shape is a privately-held company headquartered in Copenhagen, with over 300 employees worldwide, distributed between scanner and software development for the dental segment based in Denmark and Ukraine, production facilities in Poland, and Business Development & Support Offices at several locations in Europe, in North and South America and in Asia. For further information regarding 3Shape, please refer to www.3shapedental.com. Visit us on www.facebook.com/3shape.
The potential for embezzlement and theft is a problem no business is immune to. And research shows that smaller businesses are more likely to experience problems than larger ones. For dental practice owners, it’s not just being small that increases risk. The typical dental office management structure is inherently vulnerable to fraud. Adding to the challenge, detection can be trickier in a dental practice compared with other small businesses. And the bad news continues. David Harris, who has 20 years of experience in dental-practice fraud investigation, puts little stock in deterrence. In his view, fraud is not a crime of opportunity or where thieves can find an easy pick. Interestingly, the desperate thieves have their moral compass altered by circumstances. The other group I would characterize as “desperate.” These people struggle to meet basic needs. There might be an addiction, an uninsured medical condition, a divorce or an unemployed spouse. In contrast to the dishonest fraudsters, these people have their moral compass altered by desperation. Many initially plan to repay what they “borrowed” but a continuing deficit frustrates this. Interestingly, the desperate thieves have normally worked for more than eight years at their office.

**What are the strongest deterrents?**

Deterrence is effective with crimes of opportunity where thieves can choose their target. Embezzlement is not a crime of opportunity; it is carefully planned with complete awareness of the control systems in place, and it is crafted to bypass these controls. Adding more controls simply increases the circumvention challenge. Most of the thieves we see can easily adapt.

**Are there any effective deterrents?**

My suggestion is that deterrence strategies that provide no collateral benefit (i.e., are done only to discourage fraud) are a waste of resources; instead, dentists should focus on early detection of fraud.

I will again disagree with much of the collective “wisdom” that exists on dental embezzlement when I say that for a dentist or advisors to try to confirm fraud by some form of audit or analysis is unproductive and possibly dangerous. Because there are many possible ways to steal from a dentist, without considerable knowledge and some specialized software, this activity is looking for a needle in a field of haystacks. Fortunately for dentists, even though there are myriad ways to steal, the behaviour of embezzlers is remarkably consistent. With the right knowledge, identifying embezzlement through behavioural analysis is painless and reliable.

The potential for embezzlement and theft is a problem no business is immune to. And research shows that smaller businesses are more likely to experience problems than larger ones. For dental practice owners, it’s not just being small that increases risk. The typical dental office management structure is inherently vulnerable to fraud. Adding to the challenge, detection can be trickier in a dental practice compared with other small businesses. And the bad news continues. David Harris, who has 20 years of experience in dental-practice fraud investigation, puts little stock in deterrence. In his view, fraud is not a crime of opportunity or where thieves can find an easy pick. Interestingly, the desperate thieves have their moral compass altered by circumstances. The other group I would characterize as “desperate.” These people struggle to meet basic needs. There might be an addiction, an uninsured medical condition, a divorce or an unemployed spouse. In contrast to the dishonest fraudsters, these people have their moral compass altered by desperation. Many initially plan to repay what they “borrowed” but a continuing deficit frustrates this. Interestingly, the desperate thieves have normally worked for more than eight years at their office.

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**Is there a difference in potential for fraud in a three- or four-person office compared with a practice with 20 or more?**

Intuitively, one would think that a larger practice should be able to have tighter controls through increased separation of duties. But many group practices are essentially several solo practices sharing space, thus offering no particular administrative synergy. When a group practice is run as a single unit, the dentists owning the clinic tend to delegate oversight of the administrative functions to a single dentist. Given that there are many thefts perpetrated against a solo dentist, imagine the fraud possibilities when one dentist is overseeing a much larger business activity.

**Do you have statistics for average or median losses to fraud based on various sized dental practices?**

Unfortunately, there isn’t any published data specific to practice size. Bill Hitz, who heads our investigation department, has a hypothesis that frauds typically range between 4 and 7 percent of monthly revenue while the fraud is going on. In its 2007 Survey of Current Issues in Dentistry, the ADA surveyed dentists who had been fraud victims. The average estimated loss was US$18,174. Based on our own experience, this number is tremendously low. That’s not surprising because in the same survey only 51.3 percent of the dentists who had fraud victims completed a fraud investigation, raising questions on how the remainder determined their losses. We normally find that the amount of fraud that dentists are able to identify without the benefit of professional assistance is far less than the true fraud.

We surveyed our own files several years ago and found an average theft of more than US$150,000. This is superfluously consistent with the Association of Certified Fraud Examiners’ numbers of US$200,000 for the average small business loss, but many of its “small businesses” are much bigger than most dental practices. We have seen a number of dental frauds of more than US$500,000 and a few exceeding US$1 million.

**What are the most typical types of fraud cases seen in dental practices?**

Most of the fraud that we see is “revenue fraud.” Some examples are writing off amounts that were actually collected, deleting treatment that was done so that collections are “off the books” and billing the full amount to two insurance companies when someone has dual coverage.

A second type of fraud that we are seeing involves creation of “phantom” revenue. Insurance companies are billed for work that was never done, with funds either stolen directly or “lapped” (used to pay someone else’s balance to cover a stolen payment). Obviously, if discovered by an insurance company, this type of activity can have serious consequences for the innocent dentist.

Most thieves use more than one method of stealing; very few stick to a single methodology. Also, we are continually seeing new variants. For example, we recently saw a thief take advantage of a server crash to decrease some accounts receivable balances. When patients paid the correct balances, they were being paid more than the “official” balance in the practice management software, with the thief pocketing the difference.

**Is there a type of fraud more prevalent in a dental practice compared with other small or similarly sized businesses?**

Since we investigate only dental embezzlement, my knowledge of fraud patterns in other small businesses is limited to what I read. My perception is that much of the fraud committed against other businesses involves expenses: payroll, paying non-existent suppliers, padding expense claims, etc. The majority of embezzlement that we see in dental practices involves revenue.

While we do see a fair number of thieves who will steal revenue and also manipulate their payroll or create a phony supplier, very few will commit expense fraud while concurrently resisting stealing some of the cash that patients hand them daily.

**What about theft that’s more indirect, such as questionable workers’ compensation claims?**

We have seen an astonishingly wide variety of unconventional thefts, everything from stealing the gold that is recovered from old restorations to misappropriating dental supplies and instruments and selling them online. However, embezzlement typically involves larger amounts and takes place undetected for a longer period.

**What motivates the typical perpetrator?**

We see two types of fraudsters. One type we call “dishonest”—the people typically believe that they should live better than their “official” compensation permits.

I immediately think of one thief who rented a private plane with stolen funds for a New York City shopping trip with girlfriends. Funds from another major theft were used to purchase a yacht and the most expensive BMW available. The other group I would characterize as “desperate.” These people struggle to meet basic needs. There might be an addiction, an uninsured medical condition, a divorce or an unemployed spouse. In contrast to the dishonest fraudsters, these people have their moral compass altered by their desperation. Many initially plan to repay what they “borrowed” but a continuing deficit frustrates this. Interestingly, the desperate thieves have normally worked for more than eight years at their office.

**What are the strongest deterrents?**

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Because shoplifting is a crime of opportunity, control systems such as video cameras and radio-frequency identification tags on merchandise are effective at helping to prevent pillage; however, such deterrence is unlikely to work in a dental practice.

The other point I will make is that fear of punishment seems to be virtually ineffective in deterrence. Embezzlers we see are well aware of the consequences of their actions, which include loss of livelihood and potentially, loss of liberty. Because of the needs of each group, we should not expect punishment to deter either the dishonest or the desperate fraudsters.

Robert Selleck: What is the likeliest of a dental office experiencing fraud?

Robert Selleck: What is the likeliest of a dental office experiencing fraud?

David Harris: There have been several studies by the American Dental Association and others. Collectively they suggest that the probability of a dentist being a fraud victim in his or her career is between 50 and 60 percent. However, such statistics are necessarily low because there is an unquantifiable amount of fraud that is never detected or is detected but not disclosed.

**Are there any reasons why dental practices would be more likely or less likely than other types of small businesses to experience fraud?**

Two main points influence the prevalence of fraud in dentistry. First, the clinical responsibilities carried by dentists effectively reduce them to being absentee owners in their own businesses. Second, the fact that so much of dentistry is paid for by third parties removes one of the most basic controls that businesses depend on.

**Is there a difference in potential for fraud in a three- or four-person office compared with a practice with 20 or more?**

Intuitively, one would think that a larger practice should be able to have tighter controls through increased separation of duties. But many group practices are essentially several solo practices sharing space, thus offering no particular administrative synergy. When a group practice is run as a single unit, the dentists owning the clinic tend to delegate oversight of the administrative functions to a single dentist. Given that there are many thefts perpetrated against a solo dentist, imagine the fraud possibilities when one dentist is overseeing a much larger business activity.
Bad breath gas used to make liver cells from teeth

TOKYO, Japan: A team of Japanese researchers has demonstrated that hydrogen sulphide, one of the main causes of bad breath, could be a key component in developing future dental therapies. In a recent study conducted at the Nippon Dental University in Tokyo, they reported that stem cells isolated from dental pulp transformed into liver cells after being incubated with the characteristically foul-smelling gas for at least three days.

While dental pulp stem cells have been found to have the ability to transform into a number of different cells, including muscle and blood cells, this is the first time that researchers have claimed to have produced a huge number of cells that were able to store glycogen and collect urea—the two main functions of the liver. They said that although more research might be needed on the possible carcinogenic effects of the method, results indicate that it produced cells with little potential to differentiate, hence limiting the risk of developing tumours after transplantation.

“Hydrogen sulphide did not cause apoptotic changes in the cells,” they stated in the report.

Common methods of producing hepatic cells for human transplantation include the use of foetal bovine serum, which is heavily regulated and difficult to obtain. Researchers therefore extracted stem cells for their study from patients undergoing regular tooth extractions. These were then divided into two groups, of which one was incubated with hydrogen sulphide and the other with a different medium.

Commonly associated with the smell of rotten eggs, hydrogen sulphide is produced in small amounts by the human body for signalling and other biological functions. In the oral cavity, where it is considered highly toxic to tissue, it is produced by forms of bacteria that do not require oxygen to grow.

It is estimated that between 20 and 50 percent of people in developed countries suffer from halitosis, the main side-effect of this process.

By placing a magnet inside one of our lab computers, we could replicate the crush quite easily.

It certainly happens. We see a fair amount of identity theft from people trying to make use of someone else’s insurance coverage or to obtain prescription medication. However, the financial and other damage that this type of activity normally causes pales in comparison to the damage caused by embezzlement.

Thank you very much for this interview. ■

Dental Tribune Independent Edition - April 2013

Bad breath gas used to make liver cells from teeth

Microscope picture of normal human liver (DUI/Photo Coverit)

Traditional imaging will not disappear with CBCT

An interview with Prof. Stefan Haßfeld, Germany

We have a behavioural assessment questionnaire requiring less than five minutes to complete, which dentists can request from our website.

How does an economic downturn affect dental-practice fraud?

Difficult economic times create more of these desperate people I mentioned earlier, which creates more fraud. We did notice a much larger incidence of fraud in the Detroit area after the auto industry downsizing a few years ago.

What are the first critical steps a dental practice owner should take if he or she suspects internal fraud is occurring?

Unfortunately, intuitive steps are not always the right ones at this point. Dentists try to conduct their own investigation, bring their CPA into the office, or call the police. Doing any of these will likely alert a perceptive thief to your suspicions.

The overarching objective is not to telegraph your suspicion to the suspect. When fraudsters think they are about to be discovered, their strong urge is to destroy evidence. This invariably causes collateral damage. Destruction might consist of wiping the computer’s hard drive and destroying all backup media.

In one spectacular case, the victims did not engage us but began their own (clumsy) investigation. The thief, once alerted, burned down the office!

This is really the point where expert guidance is needed. We have an “immediate action checklist” for dentists who suspect fraud in their office. They can request the checklist from our website.

Our investigative process is completely stealthy. I promise never to send a能看到 looking investigator to your office. This helps ensure that evidence is protected, and also that working relationships are not destroyed in the event that suspicions are groundless.

What is the most unusual fraud case you have encountered?

About once a month we see something innovative. The alteration of receivable balances after the server crash is one I think of—we suspect that the thief caused the server to crash. By placing a magnet inside one of our lab computers, we could replicate the crash quite easily.

Is there specific insurance owners can buy to protect their business against loss to fraud? Is such insurance worth getting?

This insurance is either included in the basic insurance package that offices already have or an “employee dishonesty” rider can be added. I don’t have cost details, but understand that it is quite inexpensive. Based on what I said about the probability of fraud in offices, I think everyone should have this coverage.

How much of a problem is external fraud involving customers, vendors, suppliers or other business relationships compared with internal fraud?

It certainly happens. We see a fair amount of identity theft from people trying to make use of someone else’s insurance coverage or to obtain prescription medication. However, the financial and other damage that this type of activity normally causes pales in comparison to the damage caused by embezzlement.

Thank you very much for this interview. ■

The ability to examine the cranio-maxillofacial anatomy with help of the three-dimensional images obtained through Cone Beam Computed Tomography (CBCT) has been praised as the new gold standard in oral surgery: Dental Tribune recently had the opportunity to speak with Prof. Stefan Haßfeld from the University of Dortmund’s Department of Oral and Cranio-Maxillofacial Surgery in Germany about the technology and its future potential at the FDI Annual World Dental Congress in Hong Kong.

Dental Tribune: Prof. Haßfeld, in your opinion, has CBCT become a standard in dentistry?

A Prof. Stefan Haßfeld: CBCT has been available in dentistry for over a decade and since then has been established as a standard for many indications. Despite this development, I doubt that the technology will make traditional imaging obsolete any time soon. Instead, it will be used as an aid in more complex treatments.

One of the areas in which CBCT is already used is implant treatment planning. What are the other main areas of application?

Nowadays, the technology is widely used in complex oral and maxillofacial surgery procedures. For example, we regularly examine large cysts and deeply impacted third molars with CBCT.

Its use can also be of benefit for the diagnosis of maxillary sinus diseases, as well as in traumatology or the correction of anomalies and dysgnathias.

What potential does the technology offer regarding the improvement of treatment outcomes?

In contrast to traditional imaging, CBCT allows the human autonomy and pathology to be assessed in detail in 3D space. This can be extremely helpful for treatment planning and the assessment of regions that present a surgical risk, like adjacent nerves, teeth or blood vessels. In many cases, we expect a significant reduction in operative risks and an improvement in surgical planning.

According to the industry, the radiation dose for patients is significantly lower with CBCT. Do you agree with this statement?

I would have to disagree, since compared with traditional imaging, CBCT usually has a higher radiation dose. However, it also yields completely different information. By taking a high number of single images from different angles, CBCT can provide lower radiation doses only in a few exceptional cases.

Is this the only drawback compared with traditional imaging techniques?

As CBCT has another field of indications, comparison with traditional imaging techniques is not appropriate. However, there are indeed some shortcomings, like higher radiation doses and costs, as well as a lower resolution compared with dental film.

What role will CBCT play in dental practices in the future?

CBCT will take root in dental practices, particularly in those with emphasis on surgery, when it comes to certain complex treatment issues. For all the mentioned reasons, traditional imaging methods will not disappear.

A panoramic X-ray image, for example, provides an excellent overview of the entire jaw arch for clinically oriented examinations, with only little effort and at a small radiation dose. Dental film still offers the highest resolution for viewing details. Rather, the establishment of CBCT for dental imaging offers us additional options for daily practice.

Thank you very much for this interview. ■
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8

World News

Dutch supplier acquired by SomnoMed

SYDNEY, Australia/ZURICH, Switzerland: SomnoMed has expanded its own distribution network in Europe through a new acquisition.

According to the terms of an agreement closed between the Australian-based company and Goedegebuure Slaaptechniek B.V. (GS) in Lommen aan de Vecht near Amsterdam, GS will market and distribute SomnoMed’s range of dental solutions for the treatment of sleep breathing disorders exclusively in the Netherlands.

Currently, GS is one of the leading Dutch suppliers of mandibular repositioning appliances. With the takeover, SomnoMed intends to boost its presence and business development in Europe, particularly in important Central European markets, CEO Ralf Barschow said. He told Dental Tribune Asia Pacific that sales have jumped-started in the Netherlands because devices for the treatment of conditions like obstructive sleep apnoea syndrome have been reimbursed by the country’s health insurance companies since 2010.

The acquisition will be paid half in cash and half in shares and is expected to be completed by 2019. SomnoMed stocks listed on the Australian Securities Exchange reacted positively to the announcement.

According to Barschow, sales in Europe contribute approximately 25 per cent to SomnoMed’s global business results. Last year, revenues in the region grew by over 30 percent.

He confirmed that the company is also in talks with other suppliers in Europe. Since 2008, the company has been operating actively in Europe through its subsidiary in Zurich in Switzerland.

US study suggests dentists cause implant failure

LOMA LINDA, Calif., USA: The indications and versatility of dental implants have increased, and so have complications. Researchers from the Loma Linda University School of Dentistry in the US have suggested that, regardless of patient risk factors like bruxism, successful long-term outcomes significantly depend on the experience of the clinician performing the procedure.

By reviewing the records of edentulous patients who had received full-arch maxillary and/or mandibular supported fixed complete dentures over a period of ten years, the researchers found that 12 percent of implants failed when clinicians had less than five years of experience in the field. Implants were also twice as likely to fail if the surgeon had performed less than 50 implantations in his career, they report.

Other contributors to implant failure were identified as being related to the patient rather than the implant. Almost every third patient with diabetes or a history of bruxism had experienced implant failure.

Other risk factors commonly associated with implant failure like the type of prosthesis used, smoking or implant location were found to have less impact on long-term success, according to the researchers. They stated that the absolute rate of success was found to be 90 percent.

Overall, the records of 50 patients treated with 297 implants at the school were reviewed.

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* The Dental Advisor, Vol. 28, No. 01 Jan/Feb 2011, Pg. 9
**REALITY now, Oct 2011, No. 228, Pg. 1

Luxatemp Star is sold in the USA as “Luxatemp Ultra” and was also tested under this name.

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The SomnoDent MSA device has seen increasing sales in the Netherlands.
(DTI/Photo SomnoMed, Switzerland)

Dentists with little experience contribute to failures of the device.

(DTI/Photo SomnoMed, Switzerland)
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At last year’s IDEM, Dr Nigel Pitts from the UK presented a lecture focusing on dental caries as a public-health issue, as well as the epidemiology and importance of understanding the science behind primary and secondary caries prevention. Dental Tribune Asia Pacific spoke with him about evidence-based approaches to planning care that can be utilised in dental practice.

Dental Tribune Asia Pacific: Caries is increasingly considered a serious public-health issue. Has the perception of the disease changed during the last few years and if so, what are the indications of this development? Dr Nigel Pitts: Yes, the perception has changed, but in what way, very much depends on which country one is considering. There is a growing awareness in many “developed” countries, where caries has been declining dramatically for decades, but there are still vulnerable groups, particularly young children, with a very high burden of preventable disease.

In other countries, caries in young children is thought to be increasing. In yet other traditionally low-caries “developing” countries, there are real concerns that changes in diet and lifestyle may be accompanied by an increasing caries problem for society and for individuals.

You are one of the developers of a caries classification and management system endorsed by dental organisations like the FDI World Dental Federation. What is the concept behind it and what is its potential for decreasing the burden of tooth decay in the world today?

ICDAS (International Caries De-tection and Assessment System) is a simple, logical, evidence-based, detection and assessment system that classifies the stages of the caries process. It is designed for use in dental education, clinical practice, research and public health. It provides a common language for all stakeholders to communicate about caries, and facilitates valid, consistent comparisons of lesions at single and multiple time points.

ICDAS has evolved to comprise a number of approved, compatible formats for different needs and applications, including simplified forms for those wanting to work with fewer stages of caries. The potential for decreasing the burden of caries ranges from helping the transition to a more preventive approach to caries, helping in assessing health needs more realistically for populations and individuals, helping evaluate preventive programmes and helping to deliver more preventive care control and better future products through research.

Apart from classification, what other advantages does such a system offer? ICDAS leads to better quality information, derived from the assessment of caries severity and activity, to support decisions about diagnosis, prognosis and clinical management at both the individual and public-health levels. As we know more about the complexities of the caries process, informing sound clinical decisions is increasingly important for providing appropriate and high-quality care.

How can these concepts be applied to dental practices? ICDAS has created the International Caries Classification and Management System (ICCMS), an open system developed specifically to meet the needs of those seeking a preventively orientated framework to support and enable comprehensive clinical caries management in the dental practice situation. This framework will help the dental team secure improved long-term outcomes for their patients.

There are improved means of detecting and assessing risks for early carious lesions. Has technology advanced how we look at them? The clinical visual detection and assessment of early lesions (using ICDAS-style approaches) is the foundation for planning care, but there is a continuing need for detection aids to help identify lesions that are difficult to detect visually and for effective risk assessment tools.

Examples of some of the newer approaches on the market for detection are enhanced electrical, optical and radiographic detection aids. These should be considered prudently as aids to preventive caries care, not just finding more cavities to fill.

There are also developments in risk assessment systems, such as CAMBRA, to accompany older established systems, such as cariogram. All of the information derived from these useful detection and risk assessment tools needs to be integrated into a holistic and personalised preventive treatment plan for each patient.

Concerning the management of early carious lesions, you promoted a study in 2010 on the best way to manage decay in children’s teeth called FICTION (Filling Children’s Teeth, Indicated or Not?). The study to be finished in 2018 is examining the different approaches (conventional restoration, preventive method and the Hall technique) to children of ages three to seven. Is there a tendency towards any of these approaches so far? As you indicated, this exciting study will not be completed for some years. The feasibility stage is finished and the much-needed back-to-back comparison is getting underway—it is too soon to see results yet. The mounting evidence we do have (from multi-year randomised controlled trials in general practice) is that the approach of biological, preventive management with reduced surgical intervention (such as with the Hall technique) is showing results that are better than those achieved by the more conventional methods.

“What approaches to primary and secondary caries prevention are the most promising and what evidence do we have with regard to their clinical effectiveness?” The strongest evidence on caries prevention comes from high-quality systematic reviews of fluoride, whether in water, salt, toothpaste, varnish or other forms. In addition, there is strong evidence of the efficacy of sealants.

There are also some promising new developments with remineralisation, but it will inevitably take time to accrue further evidence of clinical effectiveness. There is evidence that a purely restorative approach is not efficient but preventive caries control has been adopted rather slowly in many countries. Do you see a move from an operative towards a more preventive approach? I do see this move from a purely operative towards a more preventive-based approach gathering pace. It has been a very slow change in some countries, despite the profession talking about it for decades. However, there are a number of countries that have been controlling caries in this way for years and an increasing number of countries that are in transition. Reform of payment systems and changes in patient expectations are important components of this change.

Thank you very much for this interview.”
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Are you ready to reduce your dependence on porcelain restorations?

Dr Michael Zuk
Canada

While there are some occasional references to concern about the overuse of porcelain, many articles in dental trade publications show off before and after dental makeovers that from my perspective were quite satisfactory prior to expensive intervention. I will not argue that there are people who truly have displeasing smiles and they can benefit greatly from cosmetic dentistry, but all too often people with body-image issues related to a distorted perception of their teeth seem to be easy victims.

“Smilorexia” is the fanciful term I coined for this disorder, which appears to affect attractive young women more than others. If you open the pages of any journal published by the American Association of Cosmetic Dentistry, you will no doubt find at least one or two of these patients having extensive veneer treatments that could easily have been avoided with unbiased professional advice. The problem is that too many dentists have dedicated their lives to pure cosmetic dentistry, which is often based on using porcelain as a cure-all.

Sadly, many of the cosmetic dentists recognised as the top tier appeared to use their standing as a licence to drill. It is time to adopt a significant change in philosophy if the dental profession wishes to maintain any level of integrity. Lip service to conservative cosmetic dentistry means nothing. To truly practise “un-cosmetic dentistry”, a dentist must back away from ceramics and make use of composite to restore worn edges in combination with orthodontics to correct alignment.

This style of treatment does not have to be unprofitable. It does not have to be only for the simplest of cases either; actually, very complex cases can be treated to a high standard when multiple disciplines are employed together. The collaboration of specialists can be one alternative, but for patients on a budget or in areas with lower access, a general dentist trained in advanced therapies can offer comparable results for a fraction of the fee.

As hugely popular as these STO courses are, there is however some potential for abuse by dentists who simply have a weekend course and no other training in orthodontics. While I would rather see a dentist do more orthodontics than veneerising, orthodontists are partially justified for their concerns about GP orthodontics.

Taking courses alongside orthodontists and reading their journals, it is apparent that there is negative sentiment directed towards general practitioners who dare to bracket teeth. I do feel that a united profession wishes to maintain their uncomfortable braces off.

Orthognathic surgery may be vastly underutilised in some cases and overused in others. The use of TADs with a recommendation for long-term data, but the device has been used for 100 years already. Mandibles are not stimulated to grow after all, and patients may be holding their jaw forward in a Sunday bite simply to get their uncomfortable braces off.

An article recently used the term “soft science” to describe orthodontics, and I would certainly agree that it is difficult to claim that orthodontists know the “right way to straighten teeth”, since few of them agree on anything. The reality is that the schools of thought in orthodontics are as polarised as the holy war between the myo-centric doctors and the centric relation believers.

Even these trend-setters, and offer my own system before I had heard of any others so I have some different ideas. Frankly, levelling and aligning simple orthodontic cases is easy and can be learned through just a short course, which these dentists (Drs Swain, Barr or DePaul) appear to teach very well. I would rather remain on the fringe of even these trend-setters, and offer my twisted perspective with less corporatist influence.

As an example, the use of the Herbert appliance forces the TMJ forward, in an attempt to correct a deficient mandible. This is like someone standing on the balls of her feet to be taller. While the practice appears to be commonplace, there are orthodontists who would never use this technique on their own children or grandchildren.

The studies always seem to conclude that orthodontists are often too slow or they do not give the dentist enough control of tooth movement.

There are a number of dentists who promote STO, but I developed my own system before I had heard of any others! I have some different ideas. Frankly, levelling and aligning simple orthodontic cases is easy and can be learned through just a short course, which these dentists (Drs Swain, Barr or DePaul) appear to teach very well. I would rather remain on the fringe of even these trend-setters, and offer my twisted perspective with less corporatist influence.

Are you ready to reduce your dependence on porcelain restorations?
Cold plasma ‘a blast’ for teeth

Dental Tribune Indian Edition - April 2013 Trends & Applications

“...the market is shifting towards dentists who are ready to mix up their training”

Dr Michael Zuk is the author of the book Con- fessions of a Former Cosmetic Dentist. As a consultant to several marketing programmes, including HighSpeedBraces.com and KillerToothache.com, the dentist has cultivated unique niches as alternatives to the veneer-based practice model. He can be contacted at drz@boredental.com.

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Intraoral device manoeuvres wheelchair

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ATLANTA, GA, USA: Researchers at the Georgia Institute of Technology have developed the latest version of the intraoral Tongue Drive System, which is embedded into a dental retainer and is worn inside the mouth. The system, which only requires free movement of the tongue, allows people with high-level spinal cord injury to control a powered wheelchair.

The user receives a clinical tongue piercing, with which he can control the magnetic field sensors mounted on the device’s four corners. The sensors track the relative location of the magnetic piercing and transmit the data wirelessly to an iPod or iPhone. Software installed on this computer device interprets the user’s tongue position and moves the wheelchair accordingly.

In earlier versions, the sensors were attached to an externally worn headgear. “One of the problems we encountered with this earlier version was that it could shift on a user’s head and would need to be recalibrated,” said Maysum Ghoravanlou, associate professor at the institute. The new device sits tightly against the roof of the mouth because it is moulded from dental impressions. It is covered with an insulating, water-resistant material and vacuum moulded inside standard dental acrylic.

The researchers also created a multifunctional interface, which holds the iPod, receives and delivers the sensor data, charges the iPod and is fitted with a holder for charging the dental retainer at night. The system can be hooked up to any standard electric wheelchair.

Ghoravanlou and his team plan to begin testing the usability of the system by able-bodied individuals soon and then move onto clinical trials.

Waiting times accumulate

People living in Morley, Western Australia, should better take their dental hygiene seriously. Latest statistics by the Government of Western Australia Department of Health have revealed that getting an appointment for a non-emergency dental procedure in the small suburb near the city of Perth can toll up to three years.

According to figures of the latest Western Australia Health Performance report, similar waiting times have recently been observed throughout the state ranging between one and a half and two years on average. Besides Morley, patients from Ama­dale and Fremantle also had to wait 18 months for a dental appointment. Overall, more than 24,000 patients are waiting for treatment in public dental clinics.

Health officials said that the latest increase in dental appointments was due to rising awareness of people that are eligible for sub­sidised dental treatment including low-income families and pensioners. More than 400,000 people or one fifth of the population are currently estimated to fall into that category.
As patients have become more aware of the benefits of implant therapy, they have begun to demand more immediate restoration of their teeth.

The provision of a fixed prosthesis has always been the goal in dentistry; however, the cost of such treatment is pricing the vast majority of patients out of the implant market. Immediate loading, avoiding conventional grafting techniques by placing implants at various angulations (All-on-4, Nobel Biocare; Columbus Bridge, BIOMET 3i), has resulted in a significant uptake of treatment by edentulous patients and those with a failing denture. This is mainly because a fixed bridge is provided and treatment times are reduced from months to hours, avoiding a conventional denture.

Most edentulous patients can tolerate a complete maxillary denture with few problems. The vast majority of problems arise in the mandible, where the underlying supporting tissue is not designed to function under this type of occlusal loading. Even a properly constructed complete lower denture can move as much as 10 mm in function. This continuous movement of the prosthesis results in loss of the supporting bone (or remodelling), further destabilising the denture. Poor ridge form increases denture instability and this produces more remodelling. Edentulism fulfils the WHO definition of a physical impairment.

Treatment protocol

A simple treatment protocol was devised to treat this problem. According to this protocol, two dental implants are placed in the inter- foramina area of the mandible, to which either a bar or stud attachments are connected to retain the lower denture. This treatment greatly improves both masticatory efficiency and function in patients. Over the last two decades, attempts have been made to render the implant-retained overdenture the standard treatment for edentulism, as demonstrated most recently by the McGrath consensus.7

Prosthetic failure, usually loss of retention or support, is a technical difficulty encountered when replacing or changing stud attachments proved to be major negative factors in dentists’ attitudes towards this treatment modality. Several attempts were made to redesign and improve the attachments; however, owing to previous negative experiences, most dentists became reluctant to adopt implant-retained overdentures as a routine treatment option. The push to place more implants in an attempt to improve the situation led to the bar- and clip-retained overdenture scenario. This technique was more successful but still encountered similar issues to the stud-attachment overdentures.3

Poor stress transmission from the prosthesis to the supporting implants results in bone loss around the implants (especially the most distal implants in the multiple bar scenario), in addition to prosthetic and surgical complications.4 This resulted in implant companies and clinicians moving away from the two implant-retained overdenture treatment option in favour of fixed solutions, such as round-house bridges fixed on four or more implants. As a result, the vast majority of patients cannot access implant therapy owing to financial constraints. The McGrath consensus brought the implant-retained overdenture back into the spotlight as a way of increasing access to implant dentistry and improving patients’ quality of life. Improved component manufacturing techniques, and greater care and attention to both surgical and restorative treatment planning have significantly improved treatment outcomes using overdentures.5

Recently Cendres+Métaux introduced the Dust free Implant Bar, or SFI-Bar, to the dental community. This unique, implant-platform-independent restorative bar overdenture solution allows the fabrication of a true passive-fit bar and clip system on two or more implants (Fig. 1). Finite element studies and clinical evaluation of the system have shown minimal stress transmission from the prosthesis to the implants under loading (Figs. 2a–c), with most stresses being evenly distributed between the supporting implants. Vertical loads are transmitted effectively to the supporting implants, while undesirable lateral stresses are largely eliminated. More recent clinical studies have also shown it to be a viable immediate-loading treatment solution. The technique is in its infancy, so long-term (five years or more) data is not available. The SFI-Bar is a modular system that connects multiple dental implants with no solde red or laser-welded joints.

The minimum inter-implant distance is 8 mm and the maximum is 26 mm. This is an expandable bar system, in which add-on kits (Fig. 3) can be used to incorporate multiple implants to create a round-house bar. Implant adapter abutments are first torqued onto the implants (Figs. 4a & b). They form one half of a universal ball joint—the other half being incorporated into the bar element. The bar itself is formed by a hollow tube that fits onto the end of each ball joint (Fig. 5). This tube bar is cut to the correct length using a specialised jig and cutting disc (Figs. 6a–f). The jig is designed to mimic a ball joint connection, ensuring a perfect section each time. The jig slides along the tube bar until it reaches the implant adapter, accurately sizing the bar. The tube bar is then locked in place and cut to size with a cutting disc (Fig. 6c). This process can be carried out either chair side (two-implant bar) or in the laboratory (four-implant bar or larger). An implant-level master cast will be required for cutting in the laboratory. The cutting of the tube bar must always be carried out extra-orally.

Once the tube bar has been cut, the ball joints are inserted into each end of the tube bar prior to seating on the implant adapters (Figs. 7a–d) and torqued into place. The SFI-Bar is now complete and the patient is ready for the retentive element to be housed in the denture. The ball joints can accommodate non-parallel implant pla cement up to a maximum of 15° angulation correction. The absence of any soldered or welded joints means that a greater length of the bar can be enga ged by the retentive clip. In conventional techniques, the presence of a weld increases the bar thickness, at that point preventing any restrictive clip engagement in that area. In the SFI-Bar, the clip engages the full length of the bar between the ball joints (Fig. 8). The bar assembly must be parallel with the occlusal plane; therefore, a selection of implant adapters of varying lengths should be available.

Most of the major implant compa-
Unfortunately, the patient revisited her dentist complaining of discomfort after an attempted intra-oral relining procedure. On examination, it was determined that the ball abutments were damaged, which led to further treatment. The female patient was then followed by a full wax try-in to outline the bar assembly (Fig. 10). Impregum (3M ESPE), after blocking the definitive denture was being fabricated. The bar assembly was then hollowed out so that it could be torqued into place. Unfortunately, the patient would not be able to use the bar system because the ball joints can be mended for the chairside technique. In the laboratory method, the denture was processed and a window was cut to allow for access to the retentive element of the E clip. The denture with the transfer jig was removed from the stone and acrylic is trimmed. Polymerisation of the acrylic resin in the patient's mouth required 120 minutes. The tube bar was then inserted into the cutting tool and cut around the bar when the denture is placed, as they were no longer seated properly on the bar abutments.

The patient was then given the option of having either another ball-abutment-retained overdenture or a bar- and clip-retained overdenture instead. The patient opted for the bar and clip overdenture. The first step was to remove the damaged ball abutments and replace them in part T integrated into the denture. This is relevant for treatment planning, as ridge reduction may be indicated to achieve a more stable integration of the E clip and is effective if the bar abutment can be used if a large volume of acrylic has been used to house the E clip. The denture with the transfer jig seated in the E clip and the E clip seated is 4.3 mm (Fig. 12). A transfer jig that fits into the E clip should be used. Multiple implants are more difficult to place parallel to each other, but the bar joints can accommodate up to 15° of implant divergences. Surgical compounding of the E clip has been seen more commonly in bar and clip overdentures than stud-attachment overdentures. Clinically, the whole procedure took six minutes, from removing the ball abutments to torquing the bar assembly into place.

The ball-abutment retained denture was then hollowed out so that it could be seated over the bar assembly and used as a provisional while the new definitive denture was being fabricated. A custom tray was used to make a border-moulded impression with Impregum (3M ESPE). The impression was then poured and a stone cast was made. The impression was then poured on an E clip and the stone cast was made. This was followed by a wax try-in to ensure that all the aesthetic, phonetic and occlusal parameters were correct. At this point, the denture was ready to be processed. The denture is processed in one of two ways:

• In the laboratory technique, the functional part T is milled from a titanium, Grade 4 (Fig. 13m). This is then fitted to the E clip and the acrylic resin is placed on the E clip. A transfer jig that fits into the E clip is used. The E clip is then seated to the denture with small increments of resin (Fig. 11b). The resin is allowed to cure fully before the denture is seated on the bar. The occlusion was checked and adjusted after verifying that the denture had been properly seated, using pressure-indicating paste. The bar assembly is required to retain the denture in the two-implant scenario. Support is derived from the conventional hard- and soft-tissue load, bearing areas like the residual ridge and the buccal shelf. The patient was then instructed on appropriate care of the implants and the prostheses, and a routine recall and maintenance programme was instituted.

• In the chairside technique, the denture is processed and a window is cut in the denture, through which the dentist can pick up the female part E (made from Elite—68.6 per cent gold alloy), using self-curing acrylic resin in the patient's mouth after seating the spacer and blocking out all undercuts (Fig. 10).

The total width of the bar with the E clip seated is 4.5 mm (Fig. 12) and 3.6 mm with the T clip seated (Fig. 11a). This is relevant for treatment planning, as ridge reduction may be indicated to provide space for the denture.

In the laboratory method, the denture is completed with the female part T integrated into the denture. The dentist then chooses the level of retention required by selecting the appropriate plastic inserts and seating them in part T (Fig. 11b). The plastic inserts are designed to compensate for transfer inaccuracies during the impression, master cast fabrication and post-processing stages. The presence of a laboratory technician is recommended for this chairside technique. A spacer is placed on the tube bar prior to seating the E clip to ensure vertical resilience. The spacer ensures a slight gap between the E clip and tube bar so that the patient can bite down, the E clip does not over-load or distort the bar as the denture beds into the supporting mucosa. All undercuts around the bar assembly, especially between the bar clip and tissues, were blocked out with a silicon material (Fig. 10). A window was then cut into the lingual aspect of the denture to expose the E clip (Fig. 13a). A small bead of cold-cure acrylic resin was then placed on the E clip, covering the retentive element of the clip. The E clip was then attached to the denture with small increments of resin (Fig. 11b). The resin was allowed to cure fully before the denture was removed from the mouth. The remainder of the void was then filled with cold-cure resin and allowed to cure outside the mouth (Figs. 11c & d). Ideally, this process should take place in a pressure pot.

A transfer jig that fits into the E clip and is effectively a tube bar, can be utilised if a large volume of acrylic has been used to house the E clip. The denture with the transfer jig seated in the E clip and the E clip seated is 4.3 mm. A transfer jig that fits into the E clip must be clear of resin. Once the stone has set, the denture is placed in a pressure pot with warm water and the self-curing resin is allowed to polymerise. Once the acrylic has fully cured, it is separated from the stone base and the transfer jig and all excess acrylic is trimmed. At least 50 percent of the lamellae of the E clip must be clear of resin. Only the superior part of the E clip with the attachment portion and shoulder section is locked into acrylic (Fig. 13c). The lamellae must be free to flex over the tube bar during insertion and removal of the denture. If the resin is in direct contact with the lamellae, the denture may not seat, as the E clip cannot flex. Finally, the definitive prosthesis was seated (Figs. 11a & b).

The level of retention of the E clip was adjusted using the activation and deactivation tools provided in the retention kit. The occlusion was checked and adjusted after verifying that the denture had been properly seated, using pressure-indicating paste. The bar assembly is required to retain the denture in the two-implant scenario. Support is derived from the conventional hard- and soft-tissue load, bearing areas like the residual ridge and the buccal shelf. The patient was then instructed on appropriate care of the implants and the prostheses, and a routine recall and maintenance programme was instituted.

Discussion

Case report

The patient was then given the option of having either another ball-abutment-retained overdenture or a bar- and clip-retained overdenture instead. The patient opted for the bar and clip overdenture. The first step was to remove the damaged ball abutments and replace them in part T integrated into the denture. This is relevant for treatment planning, as ridge reduction may be indicated to achieve a more stable integration of the E clip and is effective if the bar abutment can be used if a large volume of acrylic has been used to house the E clip. The denture with the transfer jig seated in the E clip and the E clip seated is 4.3 mm (Fig. 12). A transfer jig that fits into the E clip is used. The E clip is then seated to the denture with small increments of resin (Fig. 11b). The resin is allowed to cure fully before the denture is seated on the bar. The occlusion was checked and adjusted after verifying that the denture had been properly seated, using pressure-indicating paste. The bar assembly is required to retain the denture in the two-implant scenario. Support is derived from the conventional hard- and soft-tissue load, bearing areas like the residual ridge and the buccal shelf. The patient was then instructed on appropriate care of the implants and the prostheses, and a routine recall and maintenance programme was instituted.

Discussion

The SFI-Bar is generally cheaper compared with conventional gold castings and CAD/CAM options. The overall cost of the prosthesis and treatment time are significantly reduced compared with conventional and CAD/CAM techniques. Precision-milled components provide an improved quality of fit. The physical and mechanical properties of the component materials can be controlled accurately, which is difficult to achieve by conventional casting methods. The SFI-Bar can be connected to two or more implants to create a full-arch bar if needed, while the SFI-Bar system produces a bar assembly that seats passively as demonstrated by finite element analysis. The passive-fit bar assembly can result in greatly reduced stress transmission to the supporting implants. Studies have demonstrated that this is also a viable treatment option for immediate-loading situations in the mandible, provided that the implants achieved insertion torques exceeding 50 Ncm approximately.

Conclusion

Several studies have shown that conventional bar- and clip-retained overdentures transfer significant stress to the supporting peri-implant tissues (mainly bone) 8,9 The key to the SFI-Bar system is that the bar is assembled in the patient's mouth without the use of soldering, laser welding or conventional bonding techniques, thus reducing stress transmission to and bone loss around the implants. Studies have demonstrated that any laboratory-based technique that requires a master cast made from a dental impression will result in a bar that is not truly passive.8,9 As a result, several authors have suggested that the only way to achieve a passive fit would be to assemble the framework intra-orally and then bond the bridge posterior to the bar.9,10 This is the method employed with this system.

There is no casting, soldering, laser welding or conventional bonding techniques when fabricating the definitive bar. This, combined with the universal ball-joint nature of the components, ensures a true passive fit when the bar is assembled. The finite element analysis clearly shows the stress-free nature of the bar when being assembled and when the prostheses experiences loading (Figs. 2a–c).

No laboratory time is required to fabricate the bar and there are no costly implant components or gold-alloy charges. Clinically, there is no need for the bar sections to be soldered in an attempt to achieve passive fit—a step that may need repeating—as with the conventional method.

There are no soldered or laser-welded joints, so the bar assembly has no inherent weak points that may fracture or corrode. The bar is assembled by the clinician with the use of a two-implant bar intra- or extra-arch. The reduced number of clinical appointments, laboratory time and component costs result in reduced treatment cost for the patient. In the present study, for example, the bar assembly was completed in only six minutes. This is approximately the same time for construction of a conventional impression material (like Impressig) to set.

Conclusion

The SFI-Bar is generally cheaper compared with conventional gold castings and CAD/CAM options. The overall cost of the prosthesis and treatment time are significantly reduced compared with conventional and CAD/CAM techniques. Precision-milled components provide an improved quality of fit. The physical and mechanical properties of the component materials can be controlled accurately, which is difficult to achieve by conventional casting methods. The SFI-Bar can be connected to two or more implants to create a full-arch bar if needed, while the SFI-Bar system produces a bar assembly that seats passively as demonstrated by finite element analysis. The passive-fit bar assembly can result in greatly reduced stress transmission to the supporting implants. Studies have demonstrated that this is also a viable treatment option for immediate-loading situations in the mandible, provided that the implants achieved insertion torques exceeding 50 Ncm approximately.

The finite element data and images were kindly provided by Dr Leander Keilig, Endowed Chair of Oral Technologies, University of Bonn, Germany.

Disclaimer: The SFI-Bar, implant adapters and E-clips were provided by Convergent Dental. The author did not receive any financial inducements to write this article or payment towards laboratory charges, nor was any other kind of financial inducement received.

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Natural-looking dentures have always been a great challenge for the dental technician or prosthetist. With so many different brands of acrylic tooth systems on the market, it can be easy to overlook the basics of tooth shape and its relation to the physiology of the face.

In this article, I consider the morphology of the anterior teeth in particular. Tooth shapes vary enormously between individuals and to the untrained eye, a system of defining these shapes probably seems remote. However, if you look at the face as a whole, you will very quickly understand how nature constitutes the relationship between tooth shape and facial physiology through human genetic development (Figs. 1–3). This article will help you to identify the corresponding characteristics of tooth shape through a systematic approach suitable for each case.

First of all, it may help to peruse the illustrations in order to understand the system and the connections between the illustrations. Consider general anterior tooth morphology and you will recognise, in addition to the obvious characteristics, further specific individual features, like the difference between a central incisor and a canine. Although the variety of different shapes of the anterior teeth appears to be immense, this can be quite deceiving. If one leaves aside the tooth positions and the colour of the tooth, the general morphology consists of two factors (Figs. 4–6):

1. The basic shape of the tooth, i.e. definite width and
2. The marginal ridges or line angles of the tooth, which defines the optical width.

This correlation of optical width and definitive width leads to the different shapes of teeth. This morphological variety can be subdivided into three basic principles. These three fundamental archetype shapes are square (athletic), tapering (leptosome) or ovoid (pyknic). All other tooth shapes are considered to be hybrid shapes.

In 1914, Leon Williams suggested a now famous classification system of tooth shape, theorising that these three fundamental shape types are reflected in the “Kerrschmerian Construction Types” (facial outline types).

The shape of the tooth is equal to the horizontally flipped shape of the face (Figs. 7–10). For example, an athletically built person with an angular face (square) resembles the reversed shape of the face (Fig. 1). Even from the incisal aspect, the respective shape characteristics are visible. — (Fig. 11 & 12): Person with a rounded (round) form of the face (plump) and the ovoid tooth shape with the individual characteristics of the marginal ridges. — (Fig. 13): Even from the incisal aspect, the respective shape characteristics are visible. — (Fig. 14): The triangular tooth shape (anterior) of an introverted labial surface. — (Fig. 15): The ovoid tooth shape (anterior) with an introverted labial surface.

Today, this classification of the tooth shapes based on the shape of the face is considered to be antiquated. Hence, it only serves as a very rough general guide when selecting a set of anterior acrylic teeth for a patient case. In the fifties, the “dentogenic concept” by Frush and Fisher spread across the US and then to other parts of the world. According to this concept, a “personality spectrum” can also be added to help obtain the shape of the tooth. Next to clinical, intraoral and facial relation considerations, the age, sex, and other characteristics of the patient are also considered. Today, taking all of these factors into account, one will most likely derive some sort of hybrid shape based on one of the three original basic shapes.

The concept of the three basic shapes with regard to the labial effect of the triangular tooth shape (Figs. 4–6): When looking at the marginal ridges or line angles, the square tooth shape is recognisable. - Fig. 5: When looking at the marginal ridges or line angles, the triangular tooth shape is recognisable. - Fig. 6: When looking at the marginal ridges or line angles, the oval tooth shape is recognisable.

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Another decisive aspect of a successful natural reproduction is the design of the marginal ridges or line angles, which has an effect on the 3D appearance of the tooth.

Besides the shape and the width of the tooth crown, the width of the root is also a decisive factor. Up to now, I have restricted the consideration of the tooth to the labial and incisal view. In order to be able to replicate the 3D appearance of the tooth, we must also consider the labial curvature of the tooth (Figs. 16–18). From this point of view, the incisal triangular features can also be divided into the three basic components. For each individual case, it is then necessary to derive the respective hybrid shape.

After this has been considered, the following types can be derived from the mesial view:

- The oval anatomy type
  - The two well-developed labial marginal ridges are the key characteristic feature of this anatomy type.
  - A strong labial depression and a wide labial transitional surface are present. The difference between the mesial- and the disto-approximal surface is noticeable. The distal face is wider than the mesial.
  - The growth lobes are generally not very prominent with this tooth shape.

- The three-angled anatomy type
  - The mesial and distal marginal ridges are again distinct but not as strong as with the oval anatomy type.
  - The labial surfaces are relatively wide, without a noticeable difference in width between the mesial and the distal.
  - The labial and proximal growth lobes are prominent.

- The square anatomy type
  - The characteristic feature of this anatomy type is the indistinct marginal ridges, which can sometimes cause a rather plain look.
  - A well-developed central marginal ridge is present, which appears quite prominent when viewed from the incisal edge.
  - The labial and approximal depressions are somewhat strongly developed, although not as strongly as with the triangular type.

The marginal ridges or line angles develop in the sulcus and run parallel to the basic outer shape of the tooth towards the incisal edge. At the incisal aspect, the progression of the marginal ridges differs between una-braded juvenile teeth and worn aged teeth (Figs. 19–24). These different morphological characteristics are evident in the case of adjacent teeth, which makes the reconstruction of a single tooth quite difficult. A great deal of information is needed in order to rebuild the shape of a tooth and to recreate a natural, harmonious look. It becomes more complicated when it is necessary to replace the whole anterior segment or the dentition in an entire jaw. For this reason, the knowledge of the anatomical features of the single tooth is very important.

A further aid for determining the definitive width of the teeth is the width of the nose base, which agrees in most cases with the width of the front teeth (Figs. 25–27).

In his theory, Gerber suggests, amongst other things, that from an embryogenetic view the proportion of the nose base and the width of the nose root can be determined (Figs. 28–31).

When it comes to determining the length of the anteriors, some clues can be derived from the age of the patient. The lip type is of great importance here. In vertical perspective, we distinguish between a full and thin lip and/or between a long and short upper lip (Figs. 32–34). Patients with short upper lips expose more of their teeth than patients with longer upper lips. The lips outline the space that is sub-divided by the arrangement of the teeth, which typically determines certain aesthetic key factors. One can achieve harmony with the remaining parts of the oral region by weakening or intensifying the visible tooth areas.

Conclusion

In this article, I have only paid attention to the upper anteriors. The main reason for this is that the upper anteriors are aesthetically much more significant than the lower anteriors. The different shapes of teeth can be observed on both the upper and lower anteriors from the facial, mesial and distal aspects.

This method for achieving aesthetic harmony can be summarised as:

1. analysis of the facial parts, i.e., face shape type;
2. analysis of the dento-facial parts, i.e., lip–nose type; and
3. analysis of the intra-oral area, i.e., bite situation and remaining dentition.

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<table>
<thead>
<tr>
<th>Procedure</th>
<th>Success Rate</th>
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<tbody>
<tr>
<td>Dental abscess</td>
<td>98.5%</td>
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<tr>
<td>C cellulitis</td>
<td>97.3%</td>
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<tr>
<td>Gingivitis</td>
<td>96.8%</td>
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<tr>
<td>Gingivectomy</td>
<td>98.1%</td>
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<tr>
<td>Injury to wisdom tooth</td>
<td>99.7%</td>
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<tr>
<td>Extraction of impacted tooth</td>
<td>99%</td>
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