CBCT and CAD/CAM allow for one-day restoration of Tooth #9

By Robert Pauley, USA

Case Overview
Our office received a frantic phone call from the mother of one of our twelve-year-old patients, who stated that her daughter fell while in P.E. class and broke a front tooth. We advised her to bring her daughter to the office as soon as possible. Immediately after her arrival a periapical radiograph, CBCT and extraoral photographs were obtained (Fig. 1). Upon clinical examination and review of the digital radiograph, I saw tooth #9 was horizontally fractured at the middle third. There was no pulp exposure evident, but the tooth did have a pinkish tint on the lingual. No mobility was noted and no periapical changes or root fractures were obvious at this time. The new American Association of Endodontists guidelines recommend taking one occlusal and two periapical radiographs with different lateral angulations for all dental injuries, including crown fractures. If cone beam-computed tomography is available, it should be considered to reveal the extension and direction of the fracture.1 Dr. Edward Mills in his presentation on Site Development and Implant Protocol Based on Etiology of Tooth Loss refers to a similar traumatic injury in which CT images revealed not only a root fracture within the bone but a fracture of the lingual plate.2 A limited field 3D scan 5cm x 5cm at 500 voxels was taken with the CS 8100 3D to rule out buccal or palatal plate fractures (Fig. 2). None were evident on the scan. While her parents were upset that she had been injured, the ability to view a 3D image reassured them that the damage appeared to be limited to the tooth’s coronal structure.

Treatment Plan
The patient’s treatment options were: 1) do nothing; 2) restore with a composite restoration, realizing that this would have a questionable long-term prognosis due to size of fracture; 3) restore with a CAD/CAM milled crown. The patient and her parents were advised that cases where teeth have been injured traumatically such as in this case, one might experience a post traumatic irreversible pulpitis at a period of time beyond the initial trauma. In some cases, this condition may be treated by endodontic treatment and crown restorations but in other cases root resorption may take place precipitating the loss of the teeth. These teeth will be monitored every 6 months over several years with periapical radiographs. Every appropriate effort to maintain the tooth in place and avoid the need of an implant until the patient reaches maturity. Dental implants in adolescent patients may affect vertical growth and development of the alveolar ridge because the osseointegrated implant acts as an ankylosed tooth. At a focus conference on Advanced Dental Implant Studies, Dr. Mills summarized that jaw growth in a young adolescent patient may compromise the outcome of the oral rehabilitation using an implant supported prosthesis even if implants successfully integrated. After presentation of the treatment plan and discussion of risks, benefits, options, and alternatives; the parents and patient elected to restore tooth #9 with a CAD/CAM crown.

The parents understand this crown will likely need to be replaced once she reaches adulthood for the best cosmetic appearance, as her teeth and face will change with further growth and development.

Tooth #9 was anesthetized and prepared for a ceramic crown. I utilized the CS 5000 intraoral scanner to scan the prepared maxillary anterior quadrant and the opposing mandibular anterior quadrant as well as obtain a bite registration (Figs. 3, 4). CS Restore software was then utilized to design the anterior crown (Figs. 5-7). The CS 5000 milled the crown from an Ivoclar Vivadent’s IPS e.max CAD/Dental Casting System, which was mounted to the prepared tooth using a temporary cement. The crown was placed once the provisional cement was set, and the occlusion was checked. The provisional crown was then removed and the permanent IPS e.max crown was cemented.

Figure 1

Figure 2
Porcelain laminate veneers – avoiding complications

By DCDM

Dental Veneering is the process of covering the facial surfaces of teeth by using various types of dental materials. Most commonly used are porcelain veneers which are thin shells of porcelain that are shaped like the outer layer of the teeth and are used to cover the teeth, aiming to enhance their appearance.

Many celebrities opt for this esthetic treatment to achieve what may seem like a picture-perfect smile. This may lead people to a false expectation that everyone is a good candidate for veneers. However, from a dentist’s perspective preparing and planning for veneers is very challenging, and if improper analyses of the patient and proper techniques in preparing the teeth are not used, multiple complications may occur. These include gingival inflammation, chipping and breaking or even complete de-bonding of the veneers.

To decide whether a patient is a good candidate for veneers many factors should first be assessed; the condition of the patient’s teeth, habits, periodontal condition and most importantly the patient's expectations and willingness to maintain their veneers after they are placed.

We should start by analysis of the teeth. This involves assessing their shape and proportion; diastemas, and analysis of the occlusion. Regarding shape and dimension, there should be sufficient tooth structure to retain the veneer, otherwise the longevity can be severely affected. In teeth with small surface areas such as lower incisors, or teeth with multiple cavities and fillings which decrease the available surface for bonding, there is an increased chance of the early displacement of the veneer. In such cases full crowns may offer a better long term option (H.Serdar Cotert et al. 2009).

In terms of diastemas, if these are too large veneers can only partly reduce the space, otherwise gingival inflammation and recession can occur due to the bulkiness of the veneer (Weissgold and Cohen, 1981). Additionally, a tooth which is unnaturally wide for its height looks unattractive. Orthodontics may be more appropriate for closure than veneers. When assessing a diastema the clinician must establish if it is stable or increasing since the latter may indicate periodontal bone loss or a harmful habit.

Finally in tooth analysis the occlusion must be considered. For veneers to have a longer survival rate they should not have excessive biting forces on their edges as is common in patients with an edge-to-edge occlusion which can lead to chipping and breaking of the veneers. Care must also be taken in patients with missing posterior teeth, as this increases the loading on the anterior teeth. Patients’ habits and general health should be taken into consideration. Nighttime grinding or heavily clenching, often related to stress, or even biting or chewing on fingernails or objects like pens, create high horizontal forces impacting on survival of the veneers at a rate 8 times higher than patients who don’t have such habits. Such forces can readily lead to fracture, chipping or total de-bonding of the veneer. We should also consider the patient’s high consumption of dark or acidic foods as well as smoking habits which can lead to dark stains around the margins of the veneers (Fig 1). Since patients with dark stained teeth will often consider veneers as a solution, habits should be identified changed after veneer placement to maintain the esthetics of their veneers (Beier et al., 2012).

Marginal stains can be minimise by brushing or rinsing after smoking and consumption of dark colored foods.

The patient’s oral hygiene must also be assessed, which leads us to the last key point of gingival health. Veneers should not be prepared on bleeding inflamed gingiva, which indicates poor oral hygiene. If this is done, complications which arise include placing the veneer margin too deep due to gingival enlargement, and bleeding during preparation and bonding leading to poor marginal seal and marginal staining after veneer placement. Eventually gingival recession or worsening inflammation will result. Good oral hygiene and gingival health should be achieved before veneers are started. All of these factors need to be considered during the initial assessment to avoid complications.

Additional complications can arise during the preparation of teeth. There are two common approaches to placing porcelain veneers, one is done without altering the natural teeth - bonding the porcelain veneers to unprepared teeth. This might seem a conservative choice avoiding alteration to tooth surfaces, but it inevitably creates a bulky over-contoured appearance and increases the risk of the veneer de-bonding and gingival complications. Alternatively teeth are prepared for veneers by changing external contour, removing less than a millimetre of the facial surfaces and around 2 mm of the incisal edges, thus porcelain replaces the tooth structure removed, ensuring the porcelain is seated properly onto the tooth with enough bulk of porcelain at the edge to minimise chances of chipping and breaking. Studies have shown that the overall success and survival of the first method is much lower than the second method. The commonest complications with veneers are breaking and chipping (H.Serdar Cotert et al., 2009)(Layton and DPhill, 2013) (Akoglu et al., 2011).

A study analyzing the overall survival rate of porcelain veneers over a 20 year period concluded that the estimated survival rate over a 5 year period is at 95%, at 8 years is 94%; at 10 years is 86% and at 20 years is 85% (Beier et al., 2012). It should be noted that these were veneers placed after adequate tooth preparation.

The clinician must consider all these factors before choosing to place veneers if complications are to be minimised and patient satisfaction achieved.

References are available from the authors.

Figure 1. A significant staining of the veneer margins as a result of smoking and high coffee consumption.
Case report surgical correction of a class III malocclusion in an adult

By Dr. Fabien Depardieu

This case report describes a successful orthognathic treatment of a skeletal Class III malocclusion with mandibular prognathism in an adult individual. The patient with Class III malocclusion, having mandibular excess in sagittal and vertical plane was treated with orthodontics, bilateral sagittal split osteotomy. The surgical-orthodontic combination therapy has resulted in near-normal skeletal, dental and soft tissue relationship, with marked improvement in the facial esthetics in turn, has helped the patient to improve the self-confidence level. The interdisciplinary approach is the treatment of choice in most of the skeletal malocclusions (1).

Keywords: Class III malocclusion, decompensation, Orthognathic Surgery, Bilateral sagittal split osteotomy, prognathism, surgical orthodontic treatment.

Introduction

The Skeletal Class III malocclusion is characterized by mandibular prognathism, maxillary deficiency or both. Clinically, these patients exhibit a concave facial profile, a retrusive nasomaxillary area and a prominent lower third of the face. The lower lip is often protruded relative to the upper lip. The upper arch is usually narrower than the lower, and the overjet and overbite can range from reduced to reverse.

The effect of environmental factors and oral function on the etiological factors of a Class III malocclusion is not completely understood. However, there is a definite familial and racial tendency to mandibular prognathism. For many Class III malocclusions, surgical treatment can be the best alternative. Depending on the amount of skeletal discrepancy, surgical correction may consist of mandibular setback, maxillary advancement or a combination of mandibular and maxillary procedures. After surgical correction of the skeletal discrepancy, the occlusion is usually finished orthodontically to a Class I relationship. However, if surgical treatment is not performed, and the final molar relationship is Class III or Class I, there are challenges specific to the static and functional Class III occlusion that must be considered. Sometimes a Class III relationship is caused by a forward shift of the mandible to avoid incisal interferences. This is a pseudo-Class III malocclusion. In these cases, it is important to establish the inter-occlusal relationship with the teeth in the retruded contact position.

In this paper, the surgical orthodontic treatment of a young adult patient with a Class III malocclusion is illustrated.

Diagnostic and Etiology

The patient was a 28 year-old man who had a Class III facial type and slight crowding with a complete Class III relationship. His chief complaint was an unesthetic facial and uneven bite. His medical history showed no contraindication for orthodontic or surgical treatment. No one in his direct family had a skeletal Class III features.

The pretreatment extra-oral photographs showed symmetric facial structures (Fig 1). The patient had a concave profile, a decreased nasolabial angle and a protrusive lower lip.

The intra-oral photographs (Fig 2) showed a Class III occlusion on one side with an anterior crossbite and without apparent crowding. Overjet was -2.0 mm, and overbite was -3.5 mm, His maxillary anterior teeth were prognathic, with inadequate display when smiling.

The mandibular dental midline was deviated 2.5 mm to the right, although the maxillary dental midline was coincident with the facial midline.

There were no signs or symptoms of temporomandibular joint dysfunction. Mandibular movements, such as maximal opening and lateral and anterior displacement were within normal limits. No deviation and pain were discovered during the border movement of the mandible.

A cephalogram and a panoramic radiograph were taken before treatment. The cephalometric analysis and its tracing showed that the mandible protruded relative to the cranial base (SNB angle, 82°; ANB angle -9°). The panoramic radiograph showed no other abnormal signs.

After the analysis of the photographic, the casts and radiographs, it was decided to approach his problems as a skeletal Class III malocclusion with an anterior cross bite and a lower deviated midline.

Treatment Objectives

The treatment objectives (5) were to obtain a harmonious facial profile by decreasing the protrusion of the mandible, improve the occlusion, including correction of the anterior crossbite, establishment of ideal overjet and overbite, achievement of a functional molar relationship; and place the dental midlines in the middle of the patient's face.

We planned:

• To set back the mandible to correct the prognathism and the midline deviation.
• To relieve the proclined maxillary incisor position and to relieve the dental compensations.
• To relieve the dental compensations by straightening the mandibular incisors to an upright position over basal bone.

Treatment Alternatives

The first alternative was combined surgical and orthodontic treatment with extraction of 4 premolars. Through the retraction of the mandibular anterior teeth, the anterior crossbite and Class III molar relationships would be corrected and the concave facial profile would be camouflaged. Nevertheless, the mandibular incisors were not suitable for much distal movement because of the thin trabecular bone in the mandibular anterior area that could damage the periodontal tissues by gingival recession, frenestration or delinement.

The second alternative was surgical correction of the skeletal malocclusion with an anterior cross bite and a lower deviated midline.
as well. It was decided to extract the upper second premolars to relieve the dental compensations by repositioning the upper incisors.

The third alternative was to correct the class III malocclusion by miniscrew-assisted mandibular dentition distalization. However, we decided that the skeletal problem was too excessive and required orthognathic surgery.

After we discussed the three alternatives with the patient, he chose the second option.

Treatment Progress
The preoperative orthodontic preparation began on December 2011. Before the levelling and alignment procedures (4), the maxillary and mandibular arches were decrowded to compensate for the maxillary incisor inclination and to reduce the acute nasolabial angle.

Pre-adjusted 0.022-in edgewise brackets were bonded to all teeth. The preoperative orthodontic treatment was achieved in 12 months, ending with 0.018 x 0.025 stainless steel surgical archwires for the maxillary and mandibular arches. The orthognathic surgery involved a set back of the mandible with a bilateral sagittal split osteotomy. This was performed to improve the mandibular protection and establish an Angle Class I canine position with ideal overjet and overbite. After the surgery, the patient was placed in intermaxillary fixation for 2 weeks. Two months after surgery, finishing was performed with maxillary and mandibular 0.016 x 0.022-in. titanium-molybdenum alloy archwires. The appliances were removed after 18 months of active treatment. Bonded lingual retainers were fitted to the lingual surfaces of the anterior teeth in both arches. Maxillary and mandibular Essix retainers were delivered with instructions to wear them full time for two weeks and then night time.

Treatment Results
The post-treatment photographs (Fig.3) showed that facial aesthetics were improved, and ideal occlusion was achieved with proper overjet and overbite. The maxillary dental midlines coincided with the facial and mandibular midlines. The occlusion was finished to a therapeutic Class II.

Discussion
The decision for surgical orthodontic treatment for this patient was based on the fact that his primary concern was his facial profile. Before the single-jaw surgery: a mandibular setback, preoperative orthodontic treatment, including decrowding of the malocclusion, is necessary. The dental decrowding we performed was intended to retract the proclined maxillary incisors to a normal axial inclination. Lack of optimal dental decrowding compromises the quality and quantity of any orthognathic correction. The patient’s teeth were decrowded by extracting the upper second premolars and levelling the mandibular arch. This phase was achieved in 12 months.

Conclusion
This case report describes the surgical orthodontic treatment of a young adult man with dental and skeletal class III relationship problems. The orthognathic treatment was the best option for achieving an acceptable occlusion and a good esthetic result. An experienced multidisciplinary team approach ensures a satisfactory outcome. Presurgical orthodontics removes all the dental compensations and suggests the extent of the skeletal discrepancy. Normal skeletal base relationship is achieved by osteotomy and setback of the prognathic mandible, postsurgical orthodontics guides the normal occlusal re-habilitation by correcting any emerging dental discrepancies.

References

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Dental implant competitors shake things up amidst economic uncertainty

By Kristina Vidug, USA

In 2015, the global dental implant market—composed of the sale of dental implant fixtures, final abutments and other devices—was valued at over US$3.7 billion. The European market, valued at nearly one-third of the global market at close to US$1.2 billion, contracted through 2014, as uncertain economic conditions continued to reduce procedure volumes and as more low-cost competitors entered the market, driving down prices. These factors hampered the expected economic recovery and resumption of growth projected for 2015. As a result, the dental implant market will continue its decline before stabilising in 2015. Only then will the European market slowly begin to recover. Factors such as low gross domestic product growth and high unemployment continue to render dental implant procedures—which are primarily paid out of pocket by patients—cost prohibitive, while alternatives, such as bridges and dentures, that are perceived as more affordable will represent attractive options.

Dental implants were invented in Sweden; as a result, it is not surprising that a great number of premium manufacturers are based in Continental Europe. In the past, premium manufacturers, such as Straumann and DENTSPLY Implants, were able to rely on their long-standing reputations in the market and the high quality of their products to command higher prices than did some of their competitors. More recently, however, some of the premium competitors have employed strategies to appeal to increasingly cost-conscious consumers. For instance, Straumann has reduced the price of its titanium implants by 15 per cent in Austria, Germany and Switzerland. While the price change only came into effect in the first quarter of this year, the strategy appears to have been effective because the company reported a 6 per cent rise in first-quarter revenue compared with a 6 per cent decrease in the same period last year.

The price reduction has come at a perfect time: while economic conditions begin to slowly improve, consumers are still extremely price sensitive. These price cuts therefore allow dental professionals to offer premium implant products to their patients at a reduced rate.

Straumann’s price reduction is not its only foray into the value market. In the first quarter of this year, the company purchased US$50 million worth of bonds from low-cost South Korean dental implant manufacturer MegaGen. The investment, which will be converted to shares in 2016, will help bolster Straumann’s revenue while allowing it to participate in both the premium and value segments, thus appealing to a wide range of practitioners and patients alike. Straumann is not the only company shaking things up in the world of dental implants. Zimmer Dental recently announced its acquisition of rival Biomet. While both companies are better known for their orthopaedic products, they are fairly significant competitors in the dental industry as well. Lay-offs are not uncommon when companies merge, especially when the companies in question offer the same types of products. This can have a negative impact on sales in the short term, as the newly conjoined companies’ sales force decreases, leading clients to switch to other competitors.

However, this will not be the case with the Zimmer–Biomet merger, at least not in the short term, as the sales teams from both companies are expected to be retained through the merger. The cost of retaining both sales teams has been estimated at US$40 million. While the effect of this acquisition on the market remains to be seen, the fact that the sales force will not be decreasing bodes well for the newly merged companies, likely resulting in an increased market share in the dental implant segment.

There is discussion of merger and acquisition activity among other companies in the segment too, with Nobel Biocare reportedly in talks to sell to private equity firms and strategic buyers. While these talks are still in the very early stages, what is certain is that there has been a great deal of activity in the competitive landscape in the past several years.

This, combined with the aforementioned economic factors, is turning this once stable and mature market into a dynamic, action-filled space. With the dental implant market set to rebound in Europe and with revenues expanding in other countries—particularly in the rapidly developing BRIC and Middle Eastern markets—the global industry is poised for even further change, and the competitive landscape could look entirely different a few years from now.
Same Day Dental Implants® & Teeth
A Surgical & Prostho Protocol

By Costa Nikolopoulos Oral & Maxillofacial Surgeon (S.A.) & Petros Yevanooglu Specialist Prosthodontist (U.S.A.)

The original Branemark protocol advocated the use of a two stage surgical approach where the turned (smooth) implants were buried for several months under the mucosa. With the advent of surface enhanced and tapered implants the protocol later evolved into a one stage approach.

Several clinicians then proceeded to immediately load these one stage implants with good success provided good primary stability (more than 45Ncm) was achieved at time of implant placement and provided micromovements could be limited to 100µm. Ampule reports have been published on immediate loading of dental implants showing an initial unloaded period of 5 - 6 months is not necessary. From a patient's point of view the reduction of treatment time between implant placement & installation of a functional prostheses leads to increased patient satisfaction & treatment acceptance and a gain in time the patient implies an economical benefit especially for professionally and/or socially active patients.

High treatment acceptance and patient satisfaction are the most important advantages of immediate loading and immediate function.

Surgical Protocol
The surgical protocol of immediate loading of dental implants with same day teeth is based on the principle of “Lesser Surgery to Treat More Patients”. (Fig.1).

With increased costs and patient morbidity due to bone grafting, an increased patient resistance to implant treatment has been noted. An alternative method of treating implant patients who have suboptimal bone volume without bone grafting is made possible by using:

1) Angled implants in a tilted manner placed into available bone anterior and posterior to the maxillary sinus (Fig 2).
2) Wider and appropriately shaped implants placed into immediate extraction socket moxar sockets thereby avoiding socket or sinus grafting (Fig 3).

High Primary Stability
An important factor for immediate loading success is high primary implant stability (greater than 45Ncm) which can be achieved by using a surface enhanced tapered implant design to enhance lateral compression of bone.

By underprepping, high insertion torque and primary stability can be achieved even in cases of decreased bone density such as in patients with maxillary alveolar bone and as well as in osteoporotic patients. Primary stability can readily be measured during implant placement under a torque wrench (Fig 4).

If 45Ncm insertion torque is not achieved, the implant should be removed and without further bone preparation a 1mm wider implant is placed. This usually results in adequate primary stability of 45Ncm for immediate loading. If 45Ncm insertion torque is still not achieved then again the implant can be removed and placed with an even wider diameter implant if the available bone width permits. This can result in adequately high insertion torque and primary stability that is greater than 45Ncm. If this is inadequate, primary stability is not achieved then immediate loading is not recommended.

Prostho Driven Implant Placement
By using a silicone key of the facial surfaces of the existing teeth (Fig 5) or a silicone key of a diagnostic wax up (Fig 6), it is possible to place the implant in the correct position and angle so that the screw access hole can exit in the correct place to allow for screw retention.

In order not to loose significant orientation, extractions are not performed all at once prior to implant placement but are rather performed one at a time followed by implant placement so that the silicone key can direct the implant surgeon (Fig 7).

It is very often necessary to use an implant with a build in angle of 12°, 24° or even 50° so that the case can be screw retained.

Screw retention is an absolute requirement for biological reasons (to avoid risk of inflammation due to excess cement) as well as the ease of handling of immediate loading in a surgical environment.

Bite registration is started prior to extraction of all the teeth in the mouth/arch case so as not to loose the centric relation and vertical dimension (Fig 8).

A stable implant is then performed, further implants are placed and the bite registration is completed with addition of bite registration material onto the remaining healing caps.

One Abutment One Time
After bone milling to remove any interfering bone, a variety of massive implants are placed, with an even wider diameter implant if the available bone width permits. This can result in adequately high insertion torque and primary stability that is greater than 45Ncm. If this is inadequate, primary stability is not achieved then immediate loading is not recommended.

Relative abutments are then placed on the remaining implants.

One Abutment One Time
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The patients are never left without teeth for more than six hours. As a result treatment acceptance is high.

All implants with good primary stability (>45Ncm) are immediately loaded with screw-retained teeth. For single implant cases, the final all ceramic screw retained tooth is fabricated and delivered to the patient within six hours.

For multiple implants cases, temporary screw retained acrylic teeth are fabricated with porcelain surmounts and permanent screw retained all ceramic or metal ceramic teeth are delivered one week later.

Timing of Immediate Loading Dental implants either should be loaded the earliest possible (never exceed ten days after surgery) or alternately two months after placement. This is because the so-called initial stability (mechanical stability) that an implant has, starts to drop gradually and the implant could fail to osseointegrate if forces are applied. Fortunately, simultaneously a “secondary stability” (Osseointegration) starts to build up. The sum of the two “stabilities” which is demonstrated on the stability graph (Fig.16), gives us the “total stability”. As a golden rule implants ideally should never be disturbed during the “stability dip” period.

Preoperative Preparation
In order to achieve this protocol, preoperative screening and detailed surgical and prosthodontic

> Page 28

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IMPLANT TRIBUNE 27

PLANTS (LIPS 14 & 15) ARE PLACED PER ARCH DEPENDING ON:
1) Bone volume & quality
2) Implant length & diameter
3) Implant distribution (A-P spread)
4) Patient's age
5) Patient's finances (cost to benefit ratio)

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> Page 28
Adaptation of the final gery. While the patient is waiting in between the adjacent teeth. (Fig. 19). They are available in cated immediately with the use ceramic zirconia teeth are fabri- Single Implant operative impressions, impres-At the end of each surgery, pre- material.

The patient should be eval- at implant level for single im-

It's imperative to make sure that the impression copings are seat- ed all the way onto the implants (peritopical e-ys can be used for verification). For multiple units, the open tray technique is recommended with the use of very hard addi- tions and silicon impression material.

At the end of each surgery, pre- operative impressions, impres- sion of the implants and bite registration are provided to the dental lab (Fig. 18). The dental technician mounts the implant models and starts the fabrication of the implant prosthesis. Single-Implant Reconstruction For single implant cases the permanent, screw retained, all ceramic zirconia teeth are fabri- cated immediately with the use of prefabricated zirconia cores (Fig. 19). They are available in different sizes and shapes, ac- cording to the prosthetic platform of the implant in use and the available prosthetic space, between the adjacent teeth. While the patient is waiting in the recovery room the dental technician grinds and shapes the zirconia core and eventually bakes the porcelain on to it. For four to six hours later the per- manent tooth is placed into the mouth of the patient and the prosthetic screw is torqued down to 45Ncm. A periapical x-ray helps to verify the perfect fit (Fig) on to the implant (Fig. 20). Occlusion is checked and verified with the help of 3D software “chimichort” articulating paper. The prosthetic access holes is ob- tained with an angled filling (telfon tape + opaque composite resin) to allow easy access for retrievability in the future but simultaneously excellent esthet- ics. Two months later upon matura- tion of the soft tissues and osse- ointegration, an additional x-ray is taken and if needed modificati- ons are made to the prostheses. Multiple Implants Reconstruc tion

1) Temporary Teeth For multiple implant cases (three unit bridges to full mouth reconstructions), the temporary screw retained anterior teeth are fabricated by the in house dental lab within five to six hours and are placed in the patient on the same day. Providing the temporary teeth are placed properly and don’t only a gross service to the patient but is also the best “diagnostic tool” for the pro- thorapist to record all necessary information for the fabrication of the permanent teeth. If needed modifications are easily made to the acrylic teeth either directly in the mouth or in the dental lab. The patient should be evalu- ated for esthetics, phonetics and occlusion. Milieu, plane of oc- clusion and buccal corridors are established. The “S” and “P” sounds are checked. The Oc- chusional scheme is adjusted. For extensive cases the “mutually protected occlusion” (Fig. 23) is established which means that in centric occlusion, all teeth are touching but the posterior teeth have slightly heavier contacts compared to the anterior and on lateral and protrusive excursive movements the anterior teeth are touching/guiding and there are no posterior “working” or “non-working” interferences (anterior guidance). X-rays are taken in order to verify the pas- sive fit of the prosthesis. The material of choice, used by our dental lab, for the past 20 years, is porcelain fused to met- al. The fabrication of the metal ceram is the major factor in the fabrication of a well fitting prosthesis. Since the porcelain zirconia teeth are layered (buccaly) with porcelain and the esthetic teeth are screwed onto the im- plants.

There is a big benefit having to work only with “one piece screw retained” (Fig. 24) prosthesis. There are no multiple custom abutments to be positioned first, the retrieval and the embedding of the “one piece prosthesis” makes adjust- ments much easier, there is no need to deal with to optimize esthetics and pas- thisorecession, a pick up impression of the temporary teeth all parameters (esthetic, phonetics, occlusion) are checked and final adjust- ments are made. The prosthetic screw is torqued down to 32Ncm and the prosthetic access holes are obturated. A night guard is provided and the patient is in- structed to use it every night. Oral hygiene instructions are demonstrated and their impor- tance is emphasized.

Follow up Two months later the osseoint- gration of the implants is ra- diographically and mechanically assessed. In case of soft tissue recession, a pick up impression of the prosthesis is done. A new soft tissue model is fabricated and the dental technician can add porcelain accordingly (Fig. 25). The patient is followed up every six months for the first two years and thereafter according to his/her oral hygiene level.

Complications The complications of the prosthod- onic techniques are porcelain fractures/chipping. These are usually repaired by removing the porcelain from the implant and relaying the porce- lain.
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- Educational versions available
used to etch the fitting surface of each veneer for 60 seconds as recommended by the manufacturers to obtain a clean ceramic surface for durable bonding.

Empress ceramic primer Mono-bond-S was used as a silane-coupling agent for one minute and then air dried for five seconds according to the manufacturers instructions. One layer of Excite bonding agent was applied on the fitting surface of each veneer for 60 seconds then air thinned for 5 seconds Fig 10.

Tooth structure surface treatment:
Transparent strips were used on the proximal surface of adjacent teeth to avoid etching effect. Phosphoric acid 35 % was used to etch the enamel margins of the tooth preparations for 30 seconds and 15 seconds for the dentin areas. Copious air water spray was used to remove the acid for 20 seconds. One layer of Excite bonding agent was applied on the tooth structure and air thinned for five seconds. LED light curing unit was used for curing.

Vario-link Veneer light activated resin cement was used for cementation of the two laminate veneers. Optra Sticks were used for holding the labial surface of the veneer for better handling processes during cementation. Initial polymerization was made and excess cement was removed with a sharp tip of a probe. Dental floss was used to ensure that there is no trapped cement in between the embrasures. Final polymerization was completed. Intra oral proximal strips were used for better smooth proximal margins Fig.11.

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Pre-congress courses and workshops took place on September 10 at “USJ” - University St. Joseph - Faculty of Dentistry which was managed by Professor Ghassan Yared and Professor Carina Mehanna, under the supervision of Prof. Nada Naaman, Dean of Faculty of Dentistry. On the first day of the event the attendees witnessed the ribbon-cutting ceremony followed by a tour of the exhibition exploring the latest dental technologies, equipment and services displayed by numerous key industry leaders and dental manufacturers.

The BIDM 2014 not only opened the doors to open-discussions and learning for the region but allowed the participants to build their skills and use the opportunity for networking by up-to-date knowledge and sharing experiences in the application of technology throughout the event.

President of Lebanese Dental Association, Prof. Elie Maalouf discussed during the opening ceremony: “With the theme “Planning for the Future” we encourage all Lebanese living in Lebanon and abroad, as well as all Arab and foreign dentists to attend this highly regarded meeting, in an effort to plan for a better future, not just scientifically, but culturally and politically.”

Prof. Maalouf further announced, “We should all denounce terrorism and extremist behavior. Attending this meeting and especially in this dire time will tell the world that we are strong together and will show them that no matter how hard they try to separate us we will always find a platform to meet. Lebanon is a small country but it has always reflected to the world a sense of modern civilization and openness to all cultures and religions. Lebanon does not tolerate extremist behavior and will not allow negative media to taint its reputation. Holding ambitious annual dental meetings with world renowned international and local speakers will show the world that we are competing with first world countries regarding scientific achievements.”

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Beirut International Dental Meeting 2014
The general secretary of LDA, Dr Walid Khattar further declared during the ceremony: “Efforts exerted leading to this conference were colossal, we did very important team work as council members, committee members, professional and competent employees, to accomplish this conference. I hope that you will benefit from interesting scientific topics aiding therefore to dental medicine a new scientific cornerstone.”

The conference further proved to be a vital platform for the participants to share ideas, explore the potential of new advances in technology and foster closer ties. The BIDM 2014 gathered under one roof of 6,000 square meters more than 4,500 dental professionals in the dental field.

The scientific conference brought together more than 2,500 dentists registered to the event program from Lebanon and the region and more than 1000 have been registered as visitors to the exhibition area. This year, despite the difficult situation in the region, the event gathered 36 highly esteemed guest speakers from 16 countries around the world (USA, India, France, Germany, United Kingdom, Italy, Bulgaria, Libya, Greece, Spain, Lithuania, and from the Arab countries Kuwait, Sultanate of Oman, Egypt, Kingdom of Bahrain and KSA) in addition to an interesting panel of Lebanese talented lecturers who will attempt to clarify during 3 exciting days some of the most important issues and dilemmas arising today. They highlighted on areas of ongoing developments and frontiers of research challenges in treatment planning, clinical performance and sustainable measures that are essential for a long-term treatment success. The event also received sponsorship by major market players and dealers in the region and the world leading companies, more than 157 companies were part of a unique huge space offered this year.

The event came to a conclusion with 13 lucky draws sponsored by Lebanese Dental Association during the closing ceremony.

Overall, The BIDM 2014 was a resounding success with nothing but positive feedback from the visitors.

The courses this year covered a variety of topics including: Endodontontology, restorative dentistry, pedodontontology, laser in dentistry, Surgery and implant loading. Each course received specific continuing education hours in collaboration with CAPP (Center for Advanced Professional Practices) which is an ADA CERP recognized provider.
Excerpt from Saliva and Oral Health-An Essential Overview for the Healthcare Professional

Saliva plays a significant role in the maintenance of oral-pharyngeal health. Subjective complaints of a dry mouth (xerostomia) and objective evidence of diminished salivary output (salivary gland hypofunction) are common conditions, particularly in medically compromised older adults. They can result in impaired food and beverage intake, a soury oral odour, and diminished host defence and communication. Persistent salivary gland hypofunction can produce permanent oral and pharyngeal disorders and impair a person’s quality of life.1

Global estimates of xerostomia and salivary gland hypofunction are difficult to ascertain due to varying study design, different saliva collection techniques, and the usage of the terms xerostomia and salivary gland hypofunction interchangeably, utilisation of different diagnostic criteria and saliva collection methods, and small sample sizes. However, overall, the prevalence of xerostomia in adults and salivary gland hypofunction increases with age and affects approximately 10% of the population aged 65 years and older.

There are multiple causes of xerostomia and salivary gland hypofunction, the most common being Sjögren’s syndrome, which account for approximately 50% of all cases. The prevalence of xerostomia is nearly 100% among patients with Sjögren’s syndrome, regardless of age. Estimates of the prevalence of xerostomia in adult ambulatory and nursing home populations range from 16-72%.13 Combining the prevalence of xerostomia associated with Sjögren’s syndrome and the percentage of the population with these conditions who complain of xerostomia, a commonly reported estimate is approximately 30% xerostomia prevalence in adults 65 years and older.

Approximately 80% of all persons over age 65 have at least one chronic condition and 50% have at least two. Hypertension, diabetes, heart disease, and strokes are the most frequent occurring conditions among older adults. This is not a coincidence, and the medications of these chronic conditions are known to induce dry mouth. Estimates have been made regarding the prevalence of xerostomia and salivary gland hypofunction leading to complaints of xerostomia that are related to current medications 65 years and older.

Subjective responses and functional outcomes are also vulnerable to recurrent caries. Many of the oral-pharyngeal conditions that develop as a result of xerostomia and salivary gland hypofunction, such as candidiasis and thrush, are frequently encountered in elderly patients. The increase in salivary output facilitates microorganisms and ions.

The following article provides an overview of oral complications associated with salivary gland hypofunction, including pathophysiology, diagnosis, clinical implications and management of xerostomia.

Xerostomia and Salivary Gland Hypofunction

Saliva provides the necessary lubrication for the maintenance of healthy hard (teeth) and soft (mucosa) oral tissues. Salivary output not only results in a rapid deterioration of oral health, but also has a detrimental impact on the quality of life for the sufferer. An understanding of saliva and its role in oral health helps to program proper instruction for oral health care professionals of the problems arising when the quantity or quality of saliva is decreased; this awareness and understanding is important to the effective prevention, early diagnosis and treatment of the condition.

There is an extensive body of research supporting the use of unstimulated saliva. It has been used to indicate an individual’s susceptibility to developing caries, it has also been used for its potential physiological and pathological changes which are mirrored in saliva. Regardless, the benefits of saliva as a diagnostic fluid is that it is easily available for collection and can provide important information. It can be used to monitor the presence and levels of harmful bacteria and oral microorganisms and ions.

The following article provides an overview of oral complications associated with salivary gland hypofunction, which will adversely impact a person’s quality of life.1, 2

Candida species (angular chelitis). Visible and palpable lesions are typically associated with consumption of foods and beverages that increase salivary output such as eating, drinking, smoking, or performing oral hygiene for at least 60 minutes. The patient is seated in a quiet environment with the head tilted forward temporarily before the test begins. The patient should swallow any residual saliva and then be in the mouth. The time is recorded and the person is instructed to allow saliva flow into a pre-weighed test tube or other container placed under the chin for five minutes (see Figure 1). At five minutes the person is instructed to expectorate the remaining saliva into the container. The volume is recorded gravimetrically and expressed as ml/min.

Stimulated whole salivary flow rates of between 0.5 and 2 ml/min are also considered to be suggestive of salivary hypofunction. The most common technique for collecting this form of saliva is with the use of a standard piece of paraffin wax or gum base with a pre-cut gum base (typically 1-2 g). A test tube or similar container with the paraffin wax on the base is weighed prior to saliva collection. The person is instructed to chew the paraffin wax and spit into the container that may be in the mouth before the saliva collection begins. A timer begins and the person is instructed to chew the paraffin wax base at a rate of 60 chews/minute. Without swallowing, the paraffin wax is weighed before the person is instructed to expectorate the remaining saliva into the collection container and the collection is completed. The volume is recorded gravimetrically, and expressed as ml/min.

Values below 0.45% of normal levels can be used as a sign of salivary gland hypofunction. It is also generally accepted that when salivary flow rates fall below 0.5 ml/min, the condition is considered to be salivary gland hypofunction and the patient is considered to have a severe xerostomia syndrome compared with healthy controls,14 which may be due to greater attention to oral hygiene and more frequent use of professional dental services. In addition, while several studies have demonstrated significant dryness, greater numbers of caries-associated mutans streptococci and lactobacilli are found with salivary gland hypofunction compared with healthy controls, similar levels of micro-organisms associated with gingival inflammation were detected in both populations.15 Therefore, the primary dental problem in patients with salivary gland hypofunction is compared with less risk (but greater than that for healthy individuals) for developing gingival and periodontal problems.

Impaired quality of life

Many of the oral-pharyngeal sequelae of salivary gland hypofunction and chronic xerostomia lead to an impaired quality of life. Dental and pharyngeal disorders can rapidly lead to systemic disease, particularly in medically complex patients.3

Denture and Frail Oral mucosal tissues are more likely to develop traumatic ulceration and recurrent infections, especially in edentulous or partially edentulous older adults, which cause pain and interfere with nutritional intake. Also, dysgeusia (taste function), dysphagia


gingivitis. The increase in salivary output during and immediately after food intake, together with the saliva from the mouth, can wash off the oral cavity and remove the removal of food particles from the oral cavity and teeth, reducing the risk of dental decay.

Decay. Salivary hypofunction—associated root surface caries is a particular challenge to diagnose and treat and, therefore, identification of patients at risk will need to be taken to preserve the dentition.

With deficient remineralisation, dental erosion is a more frequent occurrence in patients with salivary gland hypofunction. In addition, erosion of teeth occasionally receive greater abrasion from tooth brushes and are susceptible to dental erosion. Occlusal and incisal surfaces of masticatory and traumatic forces can also undergo greater loss of enamel and dentine where there is insuf-
(difficulty swallowing), and difficulty chewing food secondary to salivary gland hypofunction can lead to changes in food and fluid selection that compromise nutritional status. The speech and eating difficulties that develop can impair social interactions and may cause some patients to avoid social engagements. Dysphagia increases susceptibility to aspiration pneumonia and colonization of the lungs with Gram-negative anaerobes from the gingival salus.10

Management of xerostomia and salivary gland hypofunction

The initial step in the management of xerostomia is the establishment of a diagnosis. This frequently involves a multidisciplinary team of health care providers who communicate effectively, since many patients have concomitant medical conditions and frequently experience complications of polypharmacy. The second step is scheduling frequent oral health evaluations due to the high prevalence of oral complications.11

Maintenance of proper oral hygiene and hydration (water is the drink of choice) are helpful. Several habits, such as smoking, mouth breathing, and consumption of caffeine containing beverages, have been shown to increase the risk of xerostomia. Limiting or stopping these habits may reduce symptoms.12

Patients must be instructed on the frequent use of fluids during eating, particularly for dry and rough foods. Eating and swallowing problems secondary to salivary gland hypofunction can impair the intake of fiber-rich foods, restricting some older adults to a primarily soft and carbohydrate diet. Accordingly, patients must be counselled on a well-balanced, nutritionally adequate diet and the importance of limiting sugar intake, particularly between meals.

If there are remaining viable salivary glands, stimulation techniques using sugar-free chewing gum, candies (sweets), and mints can stimulate salivary output. Chewing sugarless gum is an extremely effective and continuousialogue, since it increases salivary output and increases salivary pH and buffer capacity. Buffered xylitol-containing chewing gums or candies are often recommended, because xylitol has an anti-carbohydrate effect.

Conclusion

Saliva not only plays a pivotal role in the maintenance of a healthy homeostatic condition in the oral cavity, but contributes to one’s overall health and well-being. Components from saliva interact in different ways with the dentition to protect the teeth. Patients who lack sufficient saliva suffer from many oral diseases, of which caries is only one. To alleviate discomfort they are advised to use saliva stimulants and substitutes which have the function of lubricating the oral surfaces. Chewing sugar-free gum is increasingly being viewed as a delivery system for active agents that could potentially provide direct oral care benefits, as it promotes a strong flow of stimulated saliva.


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Figure 3
Figure 4
Figure 5
Figure 6
Figure 7
Figure 8
Figure 9

clar Vivadent e.max shade A1 size 12 ceramic block. We tried in the crown and took a digital PA radiograph to verify the margination, and made a slight occlusal adjustment on the lingual surface. The patient and parents were pleased with the appearance of the unglazed product. We polished, glazed, and added a slight white line on the buccal of #9 to mimic natural tooth #8. The crown was fired in the Ivoclar Programat Oven on e.max glazing setting. After a final try-in, the crown was cemented in place using variolink translucent base and catalyst. We cleaned off the excess cement, verified the final occlusal scheme, and captured a final periapical image verifying cement removal (Fig. 8).

Post-operative instructions were given. The patient and parents were advised to call immediately if there was sensitivity, swelling, questions or concerns. I spoke with the parents and checked on the patient one day and one week postoperatively. She was proud of her new tooth and said it felt “awesome” (Fig. 9).

Testimonial
Carestream Dental products helped me gather valuable clinical information, diagnose, monitor treatment status, and provide better care for this patient. The digital radiographs initially captured by the CS 8100 3D to evaluate the tooth were clear and beneficial to determine fracture and position of nerve tissue. This clarity allowed us to see the bone pattern and periodontal ligament space surrounding the damaged tooth. In addition, the 3D scan, taken at a 5 cm x 5 cm field of view and 500 voxels, allowed us to rule out buccal or palatal plate fractures before finalizing the treatment plan. The various voxel settings let us select the best exposure time to image the structures we desire to view. This would not have been possible in the past with a panorex or digital 2D radiograph system.

The fact that we were able to provide the patient and her parents with a three-dimensional CBCT of tooth #9 gave them the opportunity to see and understand what was going on under the surface; ultimately resulting in positive acceptance of the treatment plan. I find that the CS 8100 3D unit gives me an incredible level of detail with actual size images that I can view from any angle or cross-section to get the best possible diagnostic image. CS Solutions (CS 5900 intraoral scanner, CS Restore software and CS 5000 milling unit) allows my office the opportunity to fabricate same-day permanent restorations. My patients appreciate the fact that our office is staying up to date with new available technology and giving them a safer environment with less radiation.