Concepts, goals and techniques for successful orthognathic surgery

By Dr. Theodore D. Freeland, USA

In this article, you will be introduced to the concepts, goals and techniques needed to diagnose surgical cases, when surgical cases should be started and how to gain the knowledge needed to create successful results.

We’ll delve into joint status, soft-tissue analysis, surgical treatment objectives, pre-treatment surgical setups and surgical setups. We’ll then follow-up by looking at the concepts of natural head position, the axis-horizontal plane and the true vertical line will be introduced. By the end of this article, you should have:

– An overview of the knowledge needed for successful treatment.
– An introduction into what, when and how to perform successful cases.
– The goal of joint health.
– A summary of the soft-tissue analysis.
– An outline of the surgical treatment objective.
– An overview of diagnostic and surgical setups.

Remember that this article is an introduction only; it’s not intended to teach you how to do surgical cases. Advanced training will be required to master successful orthognathic surgical cases. So with no further ado, let’s get started.

Functional occlusion
The goal is to obtain functional occlusion. Before treatment, you have to determine if you have an orthodontic surgery case. You don’t want to begin orthodontic treatment with the idea that if orthodontics fails, we will do surgery.

You’ll see in Figures 1–5 that this case involves every facet of dentistry. Changes occurred not only in the facial features, but also in the teeth themselves. It involved orthodontic and orthognathic surgery, but also lengthening the front teeth by the restorative dentist to achieve the natural smile in balance (Figs. 1–2). To this end, we need to look at five areas:

– Joint status,
– Soft-tissue analysis,
– Surgical treatment objective,
– Pre-surgical setup/surgical setup technique,
– Surgery.

We’ll give you a brief overview of the goals for each of the areas, then do an in-depth look into each of them individually.

Joint status
Starting with the first area, you need to know the joint status. Is the joint healthy, is it degenerating, is there a disc problem? This means you’ll need to apply not only a good clinical exam, but also articulated models that can measure the difference between centric occlusion and centric relation.

Soft-tissue analysis
You’ll need to know how to analyze the soft tissue. You’ll need this because you are looking at everything from a soft-tissue standpoint, or put another way, you’re recording the basic measurements that come from soft tissue, not hard tissue. If you deal with hard tissue only, then you will come up short in the soft tissue. Ignoring the soft tissue will result in a face that’s not improved, just different.

Surgical treatment objective
You need to know how to do a surgical treatment objective. You’ll need to know the technique, and you’ll need to know how to apply it because the surgical treatment objective allows you to treat the face, the occlusion, in a two-dimensional medium.

Pre-surgical setup/surgical setup technique
Once you have established what you’ll need to do from the surgical treatment objective, you will need to do what we call a pre-surgical setup. Otherwise you’ll need to apply the knowledge you’ve gained from the patient, soft-tissue analysis and the surgical treatment objective, and perform a three-dimensional workup to make sure what you have planned will work with the joints, muscles and nervous system.

Surgery
Finally, you need to know surgery. I recommend that the orthodontist be in the operating room so you know what the surgeon is doing, and how the surgery goes. It’s very important to know that the surgeon gets the joints seated in a passive manner. If the joint is stressed, then there’s a good chance that we’ll have some surgical relapse.

Joint analysis
Joint analysis will include three portions: history, a clinical examination and imaging.

Building a history will be similar to traditional patient assessment. We need to know if there are any family members who exhibit TMJ problems. If yes, then there’s a good chance the patient will develop significant joint issues that will affect the outcome of treatment.

After an oral investigation, a thorough clinical examination of the joints will need to occur. We’ll be on the lookout for any tendency to affect joint status. If the patient has had any injury that involves the chin, there’s a good chance that the joint may have been damaged.

Finally, we need to look into any past treatment. Has the patient had orthodontics before? Has the patient had a lot of restorative dentistry? This is important because all of the above have a tendency to affect joint status.

Clinical examination
Next is the clinical examination. Clinical examination includes the following:

– Range of motion,
– Symmetry of jaw motion,
– Palpation,
– Auscultation,
– Muscle splinting,
– CR position.

Range of motion should be between 45 mm and 55 mm on opening and includes assessing movement. We’re looking for a symmetrical mandibular motion — meaning the chin should not deviate to the left or right on opening — and it should be relatively free of dental interference.

Now check for palpation of the muscles of mastication. If you don’t check the muscles that move the mandible, then there’s a good chance that you’ll miss some sort of functional bite issue.

We also listen to the joint with a stethoscope, and we apply some anterior pressure to the disc through external auditory meatus to make sure the disc is functioning properly.

When trying to manipulate the mandible, one can feel the muscles. If the muscles will not let you obtain a centric joint position, then we cannot do a diagnosis because the muscles aren’t holding the condyle out of the socket. This is usually due to some inflammation.

Finally, we’ll check what we call the centric relation position, which you should be able to feel. It should feel solid and the patient should be able to open from this position with relative ease, and there should be no noises.

Imaging
The clinical examination will tell us a lot about the joint status. The use of imaging will help us build our base of case-specific intelligence. We’ll use two types of imaging: MRI and cone beam.
LCBCT

Most of the time, we start with cone beam because it’s easy to obtain a 3-D image of the joints. Thanks to the work of Rickets and Dr. Ibaa, we have a way to measure joint position and get an overview of the condyles basically seated. With cone beam, we can measure the health of the condyles.

Our imaging showed a joint that is in a state of degeneration. The condylar head has changed in vertical height. Therefore, we would expect to see an asymmetrical opening where the chin deviates to the affected side. In all three views (sagittal, coronal, and axial), we have a condyle that is actually changing, especially when you make a comparison to the left condyle (Fig. 5).

In a side-by-side presentation, you can see that the left side is definitely in a lot better shape, having a more rounded effect to it. The size of the coronal view is one that shows a definite symmetric outline to it as compared to the axial view. The axial view confirms this; you see that the shape is better and has a more dense outline.

Thus, our basic imaging system heightens our goals for the case, one side is going to be the problem side, especially if it pertains to orthognathic surgery. If we go to the two-dimensional axial view created in the cone beam, we can see that the right joint has definitely lost vertical height, and we definitely have a joint spacer that is excessive (Figs. 4 & 5).

In the coronal view, we can even see that there may be some sort of cyst formation. When you compare the right side to the left side in the coronal view, you get a more traditional image to which is what we’d like to see. However, there have been some changes. The reason for this has been that we’re starting to see a “hard-breaking” effect in the left joint. This is different than the joint that are ones that are important in determining if we should proceed with any kind of a surgical correction.

In the sagittal view, the right side, the joint looks pretty normal. However, if we look at it in a transverse direction, you’ll see less joint space laterally than you do mediolaterally, something we see in both the left and right joints (a more anterior joint space). This is why it’s important that you not only look at a sagittal view, but you also need to look at the coronal view to see if you have a transverse problem occurring in the joints.

Soft-tissue analysis

When we’re trained in orthodontics, we’re also trained in hard-tissue analysis, otherwise all of our cephalometric analysis are based on hard structures. If you use hard structure to determine soft-tissue corrections, then you are not using the law of good functional aesthetics. That’s why a soft-tissue analysis is so important.

Using soft-tissue markers with 3-D facial mapping, we are able to diagnose the soft tissue, and we can also relate it to the hard tissue.

In Figure 4, we’ve overlaid the soft tissue on top of the hard tissue. With the markers on, after we convert it to a two-dimensional X-ray, we can see where the sub-pupillary area is, where the cheekbones and where the alar base is. In addition, you will see a marker that we call a hinge access marker, which comes from establishing the true hinge axis of the patient. There is also a marker that’s placed on the nose that we call the horizontal point.

We are going to analyze everything from a basic coordinate system of a true vertical to an axis horizontal.

The image is orientated from the axis horizontal plane and the true vertical plane, which is based on the patient’s natural head position.

Figure 5 shows how these two corners are at 90 degrees from each other. In this analysis, we’re recording all of the soft-tissue measurements, both horizontal and vertical, and we’re going to base them on the line that runs through the subnasale (SN). This establishes the true vertical line based on natural head position.

Furthermore, we’re including a few hard-tissue measurements that will tell us about the architecture of the mandible. These come from Bickels and from the Jarabak analysis. With this analysis, you can cover the basis that we need for orthodontics, but we can also cover what we need in a surgical workup.

We also need a frontal analysis, which is taken from your patient’s face. Most of the frontal workup is done in examining the patient clinically. This enables us to look at the orbit, the chin, the eye, the sub-pupillary, subnasal bars, nasal bases and canthus of the eyes.

All of this enables us to assess if we have transverse asymmetries, where the occlusal plane is cantled instead of level. This is especially true with the mandibular plane, which we may also find is cantled. This is especially true in cases where there’s a degenerative process happening in one joint.

Head position, profile and frontal analysis

The natural head position is different for each individual patient. This will make the distance recorded in Glabella to the true vertical line different.

To measure how far Glabella is from SN (true vertical line), we first need to establish the patient’s natural head position (Fig. 6). To do so, we have the patient stand in front of a mirror. First, the patient is asked to close his eyes and bob his head up and down three times.

After this is complete, the patient is asked to open his eyes and look himself directly in the eyes in the mirror. After we have established the natural head position, we then use the measurement in Glabella to the true vertical line. This is precisely the kind of case where you should be looking for degenerative joint disease. Once all of the above enables us to establish the parameters and coordinates we need to analyze the face and occlusion and then apply the correct treatment so the patient will have a functioning stable occlusion with the necessary facial improvements.

Soft-tissue analysis

The treatment objectives are based on the soft tissue. You perform the surgical treatment objective in this order.

1) Establish the position of the upper lip to the true vertical line in a vertical and horizontal manner.

2) Determine what you need to do with the anterior teeth to create the correct upper lip position.

3) Once you established the anterior part of the maxilla, then proceed to the posterior part of the maxilla and determine if you need to do an intrusion or extrusion of the posterior segments to level the occlusal plane.

In most cases where there’s a retrusive chin and a skeleton open bite, the patient has an occlusal plane, measured from the true vertical line that is some distance behind the maxilla. By leveling the occlusal plane, based on the anterior tooth position, you can set the mandible to the maxilla. This will usually balance the lower third of the face. If you still find the chin is too far forward or too far back, you may need to do genioplasty.

In the example case (Fig. 8), we have performed a surgical treatment objective, established the true vertical line and we have our axis-horizontal plane. In this patient, we need to move the anterior teeth up because in the frontal analysis the patient showed too much tooth structure and too much gingival tissue. To fix this, we balance the maxillary anterior teeth based on the upper lip position. Once we’ve established the correct tooth position in the anterior, we’re able to set up our occlusal plane at 95 degrees, showing us what we need to do with the posterior segment. In the example case, we need to extrude the posterior segment.

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The importance of cementation: A veneers case using a new universal cement

By Kerr

Esthetic options in dentistry are the prevailing choice of most patients today. Veneers and bleaching in particular have become buzzwords in popular culture, and TV sitcoms, film and magazine advertising have turned these cosmetic techniques into household names. As a result, dental teams must accommodate the demands of their patients, becoming highly versed in placing metal-free restorations.

Practitioners can find a multitude of educational articles and courses teaching the science and technology of porcelain, zirconia and composite. But while emphasis is frequently placed on the final prosthesis or direct restoration, often overlooked are the increasingly important auxiliary materials that contribute equally to the clinical success of these new materials and restorations: impression and provisional materials, bonding agents and cements. Education is imperative because cementation and bonding are two areas of esthetic dentistry that have evolved through generations of products and techniques.

These processes are essential in making esthetic restorations both functional and comfortable. That’s why veneering can be an optimal, conservative alternative to crowning teeth, since preservation of tooth structure is imperative (Figure 1). Cementation is an important aspect of functional aesthetics. An understanding of chemistry, technology and physical properties are all essential to proper usage and clinical success. Cement selection was the driving factor in choosing the bonding system for this case. NX5® Third Generation cement is free of amines—organic compounds containing nitrogen as their key atoms—which were largely blamed for the color shifts so prevalent with earlier cement formulations. In an earlier use of the product the cement the proved to be “flintocitic,” the consistency of non-drip paint; the restorations were frail and adjusted before curing with no dripping or running. Cements with a double-cure, use was 20-second cures (Figure 1). Conclusion

Manufacurer instructions allow for 10-second cures with the L.E. Demetron II. In this case, however, the doctor’s discretionary use was 20-second cure times. Occlusion was adjusted using a fine diamond bar and the lingual aspects of the teeth were finished and polished using Ceraglaze® Porcelain Polishing System (Axis Dental), rendering a very satisfied patient (Figures 12 and 15).Cementing: from first to

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The aesthetic performance of dental restorations has always been a factor of utmost importance in the success or failure of the treatment. Lately, as aesthetic awareness of the population increases and the evolution of dental materials have made new techniques possible, optimal aesthetics can be achieved following less invasive restorative procedures. In many cases, multidisciplinary treatment is necessary so that the best possible outcome is achieved with a minimum degree of compromise between invasiveness and aesthetics. Every complex case should be treated planned by a team of specialists, so that every detail and limitation from each point of view is taken into account. The restorative dentist usually designs the smile and oversees each phase of the treatment by all other specialists.

Congenitally missing lateral incisors are a common dental problem that can be esthetically dealt in three different ways: 1. canine substitution, 2. tooth supported restoration, and 3. implant supported restoration. Tooth auto transplantation (usually premolar) and removable supported restoration, and 3. Tooth auto transplantation (usually premolar) and removable supported restoration.

The chief complaint of the patient was spaces between the teeth and specifically the missing upper left lateral incisor tooth, the irregularly shaped upper right lateral incisor, and the diastema between teeth #11 and #21. Also, she was concerned about asymmetries in her smile and misalignment of her teeth. Finally, the patient stated she would like to have a brighter smile (Figures 1-3).

The dental examination revealed no pathological findings or signs of dental disease. The DMFT was low and the comprehensive periodontal examination was within normal limits, soft tissue examination resulted in no pathological findings; radiographic bitewing examination revealed no pathological findings as well.

The aesthetic evaluation of her smile resulted in the following issues that would need to be addressed in the treatment plan: 1. peg shaped lateral incisor #12, 2. congenitally missing lateral incisor #22 with diastema between #11 and #21, 5. dental midline transmitted to the right by 5mm, asymmetry between the left and right side, especially in the space between #11-13 and #21-23, 5. gummy smile, especially on the area of #12 and the missing tooth #22, and 6. the gingival zenith was asymmetrical between #11 and #21 (Figures 4-6, Table 1). The occlusion was Class I.

The base shade of the teeth was A3 on the upper central incisors and A3,5 on the upper canines with the Vita Classic shade guide (Vita Zahnfabrik, Bad Sackingen, Germany). Photographs and alginate impressions were taken in the orthodontic phase of the treatment.

The orthodontic treatment goals were as follows: 1. intrusion #11 to align the incisal edges of the centrals, 2. equilibrate the spaces between #11-15 and #21-25, 3. transfer the dental midline to the left, and 4. correct misalignments and minor rotations in different areas. Some composite resin was bonded on the facial surface of tooth #12 to facilitate bracket placement. The composite was white in shade to

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Table 1: Teeth and spaces between them were measured. The proportions of the teeth (length to width ratio) and the arrangement of the spaces are crucial information in treatment planning, especially in patients with a high lip line.

**Figures 1-3:** The unaesthetic smile of the patient before treatment.

**Figure 4-6:** Retracted view of the teeth before treatment. Note the peg shaped #12, the missing #22 and the asymmetry of the spaces between teeth #11-13 and #21-23.

**Figure 7-9:** Photographs of the patient during the orthodontic phase of the treatment.
A multi-disciplinary approach to minimally invasive functional aesthetic dentistry

By Dr. Tif Qureshi, UK

Simple tooth alignment is rapidly becoming accepted as the norm in cases that previously would have been treated with porcelain veneers. However, patients often present with a mix of problems such as previous metal ceramic work, the treatment of which should be integrated as part of the treatment plan. Timing becomes a vital part of the treatment when mixing restorative care, alignment, tooth whitening and occlusal planning. The following case illustrates an effective approach to treatment.

Case report
A patient presented complaining that “his two front teeth [old upper anterior crowns] felt as if they were too large and were always hitting the lower teeth”. In addition, his bite never felt “right” (Figure 1). He also wanted to try to improve the appearance of his teeth. He was aware of what could be done with porcelain veneers, but wanted to try to make the best of his own teeth.

Examination
On inspection, it was clear there were several issues:
1. Occlusion - The irregular alignment of the lowers and the thickness of the upper old crowns were adding to the problem of unbalanced anterior contacts. The back of the crowns, especially the upper left central, were hitting the front of his lower teeth, in particular the lower left central.
2. Thickness/aesthetics of crowns - The occlusion meant that the upper crowns had been placed quite labially and because they were metal ceramic, made them feel particularly thick. They also appeared rather opaque.
3. Lower crowding - The patient was also keen to improve the aesthetics of the lower teeth as the incisors had an irregular outline. The incisal edges appeared to be of different heights. This was down to the varying anterior-posterior position.
4. Colour - The old crowns had been made at A2/A3.5 and the natural teeth had darkened a little with age.

Treatment plan
A combination of techniques and good timing can make sure we optimize the opportunity for treatment. In this case, the treatment plan was as follows:
1. Remove the two upper crowns and replace them with temporary composite crowns;
2. Simultaneously fit a lower Inman Aligner to align the lower incisors into a better functional position, while using bespoke clear aligners to slightly tilt the uppers into better alignment. The rationale for using upper clears and a lower Inman was that only 1 mm of movement was needed for the uppers and about 2.5 mm of movement was required for the lowers. Inman Aligners are much faster than clear aligners with these kinds of movements. And 2-3 clear aligners can be just as quick with very small movements of 1 mm and be a little more cost effective if made bespoke. It would also allow us to treat both arches more or less simultaneously.
3. Whitening the teeth (during last phase of alignment).
4. Change the composite temps to all ceramic crowns to match.
5. Retain the lower arch.

Our aim was to try to treat these multiple issues simultaneously so that treatment could be completed over a few months.

Alternative options
Alternative options were discussed. Fixed braces were discounted because of the cost, the difficulty in simultaneous whitening and added difficulty in having the crowns as temporary through treatment. The patient’s posterior occlusion was also good. Full anterior veneers were discussed, but after the patient understood how simply and quickly the alignment could be done, seemed a completely ridiculous and unethical solution.

TREATMENT
On the initial appointment the two old crowns were removed (Figure 2). The preps were merely cleaned and treated as conservatively as possible. Temporary crowns, which could be adjusted, were placed (Figure 5). Upper and lower impressions were taken for upper clear aligners and for a lower Inman Aligner. A prescription of the tooth movement using Spaceswize™ software was given to the technician so they were aware of exactly where we wanted the teeth to be moved. Spaceswize also calculates a figure for the amount of crowding present giving us an idea of the total amount of space that would need correcting and whether the case is suitable for Inman Aligners or not.

Two weeks later, the patient returned. The Inman Aligner and clear aligner were fitted on the lower and upper teeth respectively. Minimal interproximal reduction (IPR) was started. Despite calculating the amount of crowding present, the IPR is never carried out in one go. Only IPR strips or discs are used. This gives the opportunity to ensure the stripping is far more anatomically respectful than using burs or heavy discs. This massively reduces the risks of excess space-formation, gouging or poor contact anatomy. No more than 0.15 mm per contact on the posterior teeth were adjusted on this single visit. The contacts are smoothed and fluoride gel is applied each time.

Dental Lab Technology at its best

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The patient was then sent home. The Inman Aligner was worn for 16-20 hours per day with the patient removing it for eating and rest. 20 hours a day is the maximum needed wear and this interruption wear reduces the risk of root resorption. On return 2 weeks later, it was clear that the contacts had closed tightly and the teeth had moved a little.

More IPR was carried out on both the upper and lowers. The occlusal contacts of the upper temporary crowns were adjusted to allow clearance for the lower teeth to move and the lower left lateral to advance particularly and the patient was then sent away again for 2 weeks. The temporaries were also facially contoured to ensure they were flush with the natural teeth. On the subsequent return visit, it was clear that the teeth were aligning rapidly and especially well (Figures 4 and 5). We then decided to start some simultaneous tooth whitening. Impressions were taken, even though the result was still 25% from completion. Sealed, rubber trays were made and careful instructions given to the patient. While the patient is concentrating on using the Inman Aligner, they are always highly receptive to using bleaching trays. It adds greatly to motivation and often means they achieve a far better result. DayWhite from Oral Healthcare (Formerly Discus Dental) is used so that the patient only needs to wear the bleaching trays 55-45 minutes a day.

The patient returned after another 3 weeks and was happy with the progress. Now, simply whitening was achieved. Upper and lower alignment was now complete. An impression was taken for a lower retainer wire to be fitted later. The temporary crowns were removed, the prep cleaned with CHX and new impressions were taken after some minor adjustments to the incisal margins.

A new lower impression was taken of the final stage of the lower occlusion to ensure the crowns could be made with a good long centric contact. The tempos were replaced and impressions sent to the laboratory. The patient booked in for a shade one week later and two weeks after cessation of bleaching where colour and tooth morphology was examined and discussed with the patient. Two weeks later, the patient returned. A retainer wire 0.015" was bonded to the lower incisor teeth using a preformed wire on a jig made by the orthodontic technician. The temporary crowns were removed and new IPS e.max F (Ivoclar Vivadent) crowns were bonded using Variolink II (Ivoclar Vivadent) and Optilink II (Ivory). The occlusion against the aligned lower teeth was checked. The patient was extremely happy with the end result and felt his teeth looked natural (Figures 6-12).

Discussion
The case is another example of why a progressive form of smile design can be so essential in any case where a patient is looking to improve their smile. At every point, the patient sees their smile improving, first with the upper and then lower incisors, then at least the teeth are straight and light, so less invasive and more translucent veneers can be used. More often than not, patients prefer a more natural result where we make “their own teeth look as good as they can”. In a case like this with previous metal ceramics, one can see how integrating alignment, and whitening can enhance aesthetics and simplify restoration dramatically. This makes a stable and aesthetically pleasing outcome far easier to achieve (Figures 15-17).

Conclusion
In each of our practices, there must literally be hundreds of patients who have issues similar to this gentleman’s complaint. Previously, conventional solutions often placed a barrier to treatment, adding time and cost into what was already an expensive treatment. Most patients just could not be bothered and would live with it. Now, simple anterior alignment can be so much quicker and more cost effective. I am amazed at the sheer volume of patients who will have treatment like this done if they are suitable. Being able to combine whitening because the aligners are removable is just another bonus so we can capitalize on the patient’s current compliance and get an even better result. Of course, case selection is absolutely vital! Understanding what is treatable and what should be referred to a specialist orthodontist is essential. This means that patients must be fully consented and understand the risks and disadvantages of not treating any posterior issues if just concentrating on anterior alignment.

Disclosure
Dr Qureshi runs courses with Dr James Russell and Dr Tim Bradstock-Smith and lectures on the

References
10. Inactivated periods of constant orthodontic movement forces related to desirable tooth movement in rats. T. Kameyama et al. Tokyo Medical and dental university, Tokyo, Japan. For information contact the author at Kane.ortho@tmd.ac.jp.

Figure 16. Side smile after.
Figure 17. Side smile after closed.
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Figure 81. Side smile after closed.
Figure 82. Side smile after.
Figure 83. Side smile after closed.
Figure 84. Side smile after.
Figure 85. Side smile after closed.
Figure 86. Side smile after.
Figure 87. Side smile after closed.
1. align the gingival zeniths of teeth #11 and 21, 2. gingivectomy with osseous reduction on #12 to reduce as much as possible the gingival display without compromising the long term prognosis of the tooth due to loss of periodontal support, 5. gingivectomy in mostly all the upper teeth to bring the gingival display to a more pleasing appearance. After surgery, a healing period of 8 weeks was recommended by the periodontist before the restorative procedures start (Figures 10, 11). The option of a single implant placement for the missing lateral incisor #42 was rejected before surgery, as an additional bone grafting procedure would be required and this was not accepted by the patient (Figure 12).

Aesthetic/Restorative phase
Six weeks after the periodontal surgery, in office whitening was performed so the patient's desire for brighter teeth is met (Phillips Zoom, Philips Oral Healthcare, Stamford, USA). The shade of the teeth 10 days after the whitening was completed was A1 for the upper centrals and A2 for the canines (Figure 15).

After proper healing of the periodontal tissues was confirmed with the periodontist, tooth #12 was prepared for an all ceramic lithium disilicate crown and two #21 and 25 were prepared for an all ceramic lithium disilicate Maryland type bridge with wings (e.max, Ivoclar Vivadent, Schaan, Lichtenstein). The latter was selected because of the conventional Maryland bridge with frequent debondings and the metal showing through thin and translucent porcelain. After gingival retraction with a retraction paste (Astringent Retraction Paste, 3M ESPE, Seefeld, Germany), a final impression and polishing were performed so the patient's desire for brighter teeth is met (Philips Zoom, Philips Oral Healthcare, Stamford, USA). The shade of the teeth 10 days after the whitening was completed was A1 for the upper centrals and A2 for the canines (Figure 15).

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workshops and self-instruction programmes). For the past ten years, CAPP has facilitated over 550 continuing education programmes with over 52,000 international participants. With the opening of CAPP Asia in 2012, CAPP’s reach has expanded to the Asia Pacific region and beyond.

In 2012, CAPP joined the global family of 96 publishers by becoming the proud owner of the Dental Tribune Middle East & Africa edition, and has since been delivering six print editions annually to over 20,000 dental professionals in the Middle East and Africa region and has delivered 24 newsletters to more than 41,000 active subscribers. Through its international website, the latest industry news reaches the largest dental community worldwide—an audience of over 650,000 dentists.

CAPP started out in Dubai ten years ago as a centre for professional training. It quickly grew and developed two very important international conferences: the CAD/CAM and Digital Dentistry International Conference and the Dental-Facial Cosmetic International Conference. Next year, the tenth CAD/CAM and Digital Dentistry International Conference will be celebrated together with the CAPP anniversary. The last decade has been a journey with challenges in keeping pace with the incredibly fast growth of the industry combined with new technologies, particularly in digital dentistry.

Ten years ago, it would have been difficult to imagine the kind of opportunities presently available to change dentistry and improve overall patient care, including diagnostics, planning and treatment, in terms of precision, treatment and healing time, and aesthetics. What has been accomplished in the past ten years has been significant and CAPP would like to thank all of its business partners, sponsors and supporters for together making CAPP the success it is today. CAPP would especially like to acknowledge all who have worked at and continue to be with the CAPP office and share the challenges and passion. Thanks also go to all of the dentists, dental technicians, dental hygienists and dental assistants who have followed us in the decade of rapid development of the dental industry and dental technology.

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5th Dental Facial Cosmetic International Conference in 2013 at the Jumeirah Beach Hotel

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SEM images of denture surface.

*In vitro single species biofilm after 5 minutes soak


Date of preparation: June 2014.
Ref: CHSAU/CHPLD/0008/14c

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Dear Friends and Colleagues,

November is upon us once again. This year for the sixth consecutive time the amazing Jumeirah Beach Hotel in Dubai will host the Dental Facial Cosmetic International Conference for a two day scientific weekend offering all dental professionals the latest research and developments in the field of Aesthetic Dentistry. The Dental-Facial Cosmetic International Conference has become a vital platform for the success and perception of dentistry in the Middle East region. Yearly hundreds of top dental professionals, practitioners, researchers and industry players gather together to listen to the latest world acclaimed professional Key Opinion Leaders as well as discuss hot topics through the interactive networking opportunities the event offers. The interdisciplinary meeting brings together the dental and medical professionals with common interests in facial aesthetics and cosmetics exchanging knowledge for the best quality of patient care.

This year’s conference will cover several subjects related to Aesthetic Dentistry enlightening all delegates with experiences from over 25 International Key Opinion Leaders who have gathered in Dubai. Participants will also have the unique chance to see the latest equipment which will be showcased at the product display made available by the top of the dental industry. We sincerely hope that this meeting will let our audience the most refreshing update.

On behalf of Emirates Dental Society, I would like to wish you all a successful conference and a happy visit to Dubai. Join us and experience as well as the adventure Dubai Participants will also have the unique chance to see the latest equipment which will be showcased at the product display made available by the top of the dental industry. We sincerely hope that this meeting will let our audience the most refreshing update.

Dr. Aisha Sultan  
President Emirates Dental Society  
President of the Conference

Dear Colleagues of the Dental Team,

It is my honor and pleasure to welcome you all to our 6th Dental - Facial Cosmetic International Conference.

This 6th edition of our DFICIC features a joint meeting with the American Academy of Implant Dentistry. During this session, the AAD will share with us their vast knowledge and experience as well as the latest in the field of Implant Dentistry. I am sure that this conference will be of the greatest help to our audience the most refreshing update of technology in the dental field with few “surprises” as well.

We will continue this unsurpassed cooperation to bring to our audience the most recent updates of technology in the dental field with few “surprises” as well. See you all in the dynamic Emirate of Dubai.

Dr. Aisha Sultan  
President of the Conference

Dr. Munir Silwadi  
BDS, MRCDSO, DUSS, FADI, FICD  
Conference Chairman & Scientific Advisor

10th CAD/CAM & DIGITAL DENTISTRY INTERNATIONAL CONFERENCE

Jumeirah Beach Hotel  
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Dr. Aisha Sultan  
President Emirates Dental Society  
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AGENDA
Speaker Highlights  
Scientific Conference  
Dental Hygienist Day  
Hands-On Courses

GAME PLAN
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PLANMECA
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08-09 May 2015

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Show Edition
**DAY ONE**

**08:00 – 09:00**  Breakfast with the Sponsors / Registration

09:00 – 09:45  Dr. Gaetano Paulino, Italy  Adhesive esthetic solutions in anterior and posterior teeth

09:45 – 10:30  Prof. Svend Sanni, Germany  Minor & Major Augmentation in Oral and Maxillofacial Surgery and Implantology: new perspectives with Nonanophosphate cement

10:30 – 10:45  Meet the Sponsors / Coffee Break

10:45 – 11:30  Dr. Anton Labedzka, Russia  Zionite vs. glass-ceramics – pros and cons

11:30 – 12:15  Dr. Julian Caplen, UK  In-surgery CAD/CAM Dentistry – Fact or Fiction

12:15 – 13:40  Lunch / Prayer Time

13:40 – 14:15  Dr. Costa-Nikolopoulos, Greece  Simple Fast & High Quality Implant Dentistry

14:15 – 15:00  Dr. David Glaridge, UK  An Introduction to Digital Impressioning and the Digital Workflow

15:00 – 15:45  Dr. Richard John Simonson, USA  Photography – Clinical for Dentistry, and Nature for Hobby

15:45 – 16:30  Discussions

16:00 – 16:45  Prof. Carina Mehanna Zogheib, Lebanon  Teeth whitening from A – Z...

16:45 – 17:30  Prof. Khalid Albu, KSA  The Effect of manufacturing features of rotary NITI-Endo on their performance: A clinical approach for analysis

17:30 – 18:15  Dr. Gary Severance, USA  Collagene Restorative Dentistry – Control Your Future

18:15 – 19:30  Discussions

18:30 – 19:00  Poster Presentation

**DAY TWO**

08:00 – 09:00  Breakfast with the Sponsors / Registration

09:00 – 09:45  Dr. James Russell, UK  Adhesive Aesthetic Dentistry

09:45 – 10:30  Dr. Michael Apa, USA  Advances in interspecialty Aesthetic Surgery and Implantology

10:30 – 11:15  Dr. Julian Caplen, UK  The Aesthetics of In-surgery CAD/CAM Dentistry

11:15 – 11:30  Meet the Sponsors / Coffee Break

11:30 – 12:15  Dr. Anton Labedzka, Russia  A “F” in Behind the Scenes

12:15 – 13:00  Dr. Marcus Engelshahl, Germany  Double Scan vs Single Scan – Two different workflows for essential improvement in fixed prosthetic reconstruction in implantology

13:00 – 14:15  Lunch / Meet the Sponsors

14:15 – 15:00  Dr. Marcus Engelshahl, Germany  The introral scan in prosthodontics: a new workflow for more predictability

15:00 – 15:45  Dr. Petros Yuvanoglou, Greece  The Science & Art of Restoring Immediately Loaded Implants

15:45 – 16:30  Dr. Bjorn Tittel, Germany  Innovative Solutions & Surgery in Aesthetic Dentistry

16:30 – 17:15  Dr. Gary Severance, USA  The Landscape of Digital Dentistry

18:15 – 21:00  Dr. Emilio Rodriguez, Spain  Immediate Load/with-Aesthetic and Functional Restoration

**DENTAL HYGIENIST DAY**

Jumeirah Beach Hotel, Dubai, UAE

15 November 2014

Part of 5th Dental Facial Cosmetic International Conference 14-15 November 2014

**09:00 – 09:45**  Lecture  Oral Health Management: Between Myth and Reality  Dr. Carine Tabarani, UAE

**09:45 – 10:30**  Lecture  Management of The Orthodontic Patient  Prof. Mary Rose Pincelli Boglione, Italy

**10:30 – 11:15**  Lecture  Communication & Implant Maintenance  Victoria Wilson, Dental Hygiene Therapist, UK

**11:15 – 11:45**  Lecture  Polishing will Brighten Your Smile!  Prof. Mary Rose Pincelli Boglione, Italy

**Hands on Courses**

**VENEERS vs. CROWNS THE CHALLENGE IN SMILE DESIGN**

Dr. Eduaro Mami, Chile  12 November 2014 (09:00 – 17:30)

JBH, Dubai, UAE

**ESTHETIC IN SAME DAY DENTISTRY**

Aisham Farah, CST, UAE  13 November 2014 (09:00 – 17:30)

JBH, Dubai, UAE

**LASER IN MODERN DENTAL PRACTICES**

Dr. Manaf Tahar Agha, UAE  13 November 2014 (09:00 – 17:30)

JBH, Dubai, UAE

**DIRECT VENEERS: THE SHADES DILEMMA**

Abdelaziz Yuvanoglou, Greece  13 November 2014 (09:00 – 17:30)

JBH, Dubai, UAE

**INDIRECT VENEERS**

Dr. Murad Silehdeh, UAE  13 November 2014 (09:00 – 17:30)

3M Innovation Centre Dubai Internet City, UAE

**PERIODONTAL INSTRUMENTATION**

Prof. Mary Rose P. Bogoelone, Italy  14 – 15 November 2014 (13:00 – 16:30)

JBH, Dubai, UAE

**FACE AND SMILE ANALYSIS**

Dr. Eduaro Mami, Chile  15 November 2014 (15:30 – 19:30)

JBH, Dubai, UAE

**ESTHETIC IN ONE LAYER METAL CERAMIC & COMPOSITE GINGIVA**

Aisham Farah, CST, UAE  15 – 16 November 2014 (09:00 – 17:30)

JBH, Dubai, UAE

**INDIRECT VENEERS**

Dr. Murad Silehdeh, UAE  16 November 2014 (09:00 – 17:30)

3M Innovation Centre Dubai Internet City, UAE

**VENEERS vs. CROWNS THE CHALLENGE IN SMILE DESIGN**

Dr. Eduaro Mami, Chile  16 November 2014 (09:00 – 17:30)

JBH, Dubai, UAE

**LASER IN ESTHETIC DENTISTRY**

Dr. Manaf Tahar Agha, UAE  16 November 2014 (09:00 – 17:30)

JBH, Dubai, UAE
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2. Find out the Main Product
3. Complete the Gameplan with products & stamps
4. Submit your contact details to the reception
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Baseline values [Mean SD]: Control (fluoride-containing toothpaste) group 24.75 (6.34); parodontax® group 25.40 (6.80). After 4 weeks:
Control (fluoride-containing toothpaste) group 26.00 (9.14); parodontax® group 19.80 (7.38). *parodontax® vs control p<0.05.

Adapted from Saxer et al 1994. All interdental spaces from 6+ to +6 were tested at baseline and 4 weeks for bleeding on probing on the right side (buccal) and left side (lingual). Findings were recorded as 0=no bleeding; 1=slight/isolated bleeding; 2=marked bleeding. Mean scores were determined. N=22.

Baseline 4 weeks 4 weeksBaseline

Change vs baseline in bleeding on probing index after 4 weeks

Reduced bleeding on probing index after 4 weeks with parodontax®

Fluoride-containing control toothpaste parodontax®

22% reduction in bleeding (p<0.01 vs. baseline)

Helps stop bleeding gums

OH/CA/00/13/003
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, 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 5, 4). CS Restore software was then utilized to design the anterior crown (Figs. 5-7). The CS 5000 milled the crown from an Ivoclar

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> Page 34
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 dental clinician’s perspective preparing and planning for veneers is very challenging, and if proper attention is not taken the patient and proper techniques in preparing the teeth are not used, multiple complications can 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/or recession can occur due to the bulkiness of the veneer (Weissgold and Cohen, 1981). Additionally, a tooth which is unnaturally closed will not only create a bulky 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 mms 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)(Lexton and DPull, 2013) (Akoglu et al, 2011).

A study analysing 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 84%; 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 author

About the Author

Dr. Nadia Tufenkjeri is a second year resident at Dubai College of Dental Medicine (DCDM), Prosthodontic MSc. Program. Located in Dubai Healthcare City (DHCC).

Dr. Fatemeh Amir Rad is a lecturer of Prosthodontics at Dubai College of Dental Medicine (DCDM).

Prof. Crawford Bain is the Director of the Periodontics MSc. programme at Dubai College of Dental Medicine (DCDM).

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 surgical correction 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 relationships, 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 unsatisfactory facial and uneven bite. His medical history showed no contraindication for orthodontic therapy and orthognathic 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 protusive lower lip.

The intra-oral photographs (Fig 2) showed a Class III occlusion on each side with an anterior crossbite and without apparent overjet and overbite. 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 -7°). The panoramic radiograph showed no other abnormal signs. After the analysis of the photographs, 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 (2).

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 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, frenestation or dehiscence.

The second alternative was combined surgical and orthodontic treatment. The anterior crossbite would be corrected with a single-jaw surgery; a mandibular setback. The concave profile would be improved...
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 second premolars were extracted to decompenstate 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 projection 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 16 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.5) 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 decompenstate the malocclusion, is necessary. The dental decompenstate we performed was intended to retract the proclined maxillary incisors to a normal axial inclination. Lack of optimal dental decompenstate compromises the quality and quantity of an orthodontic correction. The patient’s teeth were decompenstate 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. 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 repositioning by correcting any emerging dental discrepancies (2).

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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$5.7 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 2015.1 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 for 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.2

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 the only foray into the value market. In the first quarter of this year, the company purchased US$30 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$400 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 for 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.

About the Author
Kristina Vidug is Market Research Analyst at Decision Resources Group, a U.S.-based market information provider.
SameDay Dental Implants® & Teeth
A Surgical & Prostho Protocol

By Costa Nikolopoulos Oral & Maxillofacial Surgeon (S.A.) & Petros Yvanouglou 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 45Nm) was achieved at time of implant placement and provided micro-movements could be limited to 100µm. Ample 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 prosthesis leads to increased patient satisfaction & treatment acceptance.

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 following:

1) Bone volume & quality
2) Implant length & diameter
3) Implant distribution
4) Patient’s age
5) Patient’s finances (cost to benefit ratio)

Prosthodontic Protocol
The prosthodontic protocol of SameDay Dental Implants & Teeth is focused and designed around the patient’s needs. It’s fast, efficient and doesn’t compromise quality. The patients are never left without teeth for more than six hours. As a result treatment acceptance is high.

Immediate loading of dental implants either should be loaded the earliest possible (never exceed ten days after primary stability) or alternatively 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 becomes more prone to failure 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

By underprepping, high insertion torque is still not achieved and the implant should be removed and without further bone preparation a 1mm wider implant is placed. This usually results in adequate primary stability of 45Nm for immediate loading. If 45Nm insertion torque is still not achieved then the implant is placed.

In single implant cases the healing abutment is placed directly at implant level. An implant impression is taken and six hours later a full ceramic/zirconia screw retained crown is connected and torqued to 45Nm directly on to the implant without an intermediate/transmucosal abutment (Fig.11). No multi-unit abutment is used or placed in the single implant case as the multiunit abutment has no anti-rotation feature.

Flapless/Minimal Flap Surgery
In extraction cases no mucoperiosteal flap is reflected. The integrity of the extraction socket walls is inspected and assessed, with a 15mm or 20mm peri-oral probe placed into the extraction socket. If the integrity of the extraction socket walls is performed, the probe (Fig 12) and this is completed by good vision with magnifying loops and light illumination. In healed sites where possible the “punch” technique is used (Fig 15).

Alternatively minimal flaps are raised where indicated. This flapless/punch technique/minimal flap approach results in minimal or no soft tissue changes thereby allowing the restorative dentist/prosthodontist to proceed with the provisional acrylic screw retained teeth in the same day and permanent ceramic screw retained teeth in 1 week in the case of multiple implants.

In the case of the single implant the permanent full zirconia screw retained tooth can be delivered in 6 hours on the same day.

Number of Implants
In edentulous cases 4 to 6 implants (lips 14 & 15) are placed per arch depending on:
1) Bone volume & quality
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While the patient is waiting in the dental lab (Fig. 18), the dental technician will guide the implant placement. For multiple implant cases (three unit bridges to full mouth reconstructions), the temporary screw retained (titanium + acrylic) teeth are fabricated in the in-house dental lab within five to six hours and are delivered immediately to the patient on the same day. The majority of the prosthodontic treatment will be completed immediately with the use of prefabricated zirconia cores (Fig. 19). They are available in different shapes and sizes, according to the prosthetic platform of the implant and use in the mouth. The zirconia core and eventually the porcelain on it. Four to six hours later the permanent tooth is placed into the mouth of the patient. The provisional zirconia screw is torqued down to 45Ncm. A periapical x-ray helps to verify the perfect fit (Fig. 5) on to the implant (Fig. 20). Occlusion is checked and verified with the help of high quality “schimshcock” articulating paper. The provisional access hole is obturated with an impermeable filling (telfon tape + opaque composite resin) to allow easy access for retrievability in the future but simultaneously excellent esthetics. Two months later upon maturation of the soft tissues and osseointegration, an additional x-ray is taken and if needed modifications are made to the prostheses.

Multiple Implants Reconstruction

1) Temporary Teeth

For multiple implant cases (three unit bridges to full mouth reconstructions), the temporary screw retained (titanium + acrylic) teeth are fabricated in the in-house dental lab within five to six hours and are delivered immediately to the patient on the same day. The majority of the prosthodontic treatment will be completed immediately with the use of prefabricated zirconia cores (Fig. 19). They are available in different shapes and sizes, according to the prosthetic platform of the implant and use in the mouth. The zirconia core and eventually the porcelain on it. Four to six hours later the permanent tooth is placed into the mouth of the patient. The provisional zirconia screw is torqued down to 45Ncm. A periapical x-ray helps to verify the perfect fit (Fig. 5) on to the implant (Fig. 20). Occlusion is checked and verified with the help of high quality “schimshcock” articulating paper. The provisional access hole is obturated with an impermeable filling (telfon tape + opaque composite resin) to allow easy access for retrievability in the future but simultaneously excellent esthetics. Two months later upon maturation of the soft tissues and osseointegration, an additional x-ray is taken and if needed modifications are made to the prostheses.

2) Permanent Teeth Fabrication

The fabrication of the metal framework starts with the help of i) the interchangeable implant and temporary models, ii) the silicon keys, iii) the anterior custom made guiding table, iv) the photos and v) the videos starts to be recorded. The silicon keys, the anterior cusps are layered (buccaly) with porcelain (Fig. 21). The patient is instructed to use it every night. Oral hygiene instructions are demonstrated and their importance is emphasized.

Follow up

Two months later the oversealing of the implant is radiographically and mechanically evaluated. 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 most common problems of the prosthodontic complications are porcelain fractures/chipping. These are easily repaired by removing the teeth and relaying the porcelain.

nium machine-cut interface component/cylinder, offsets all the 3D inaccuracies, provided that the implant model is accurate. The passive abutment is cemented with the help of the dental technician onto the fitting surface of the prosthesis, in the lab. The master implant model is used as a blueprint for the cementation. Based on our experience over the past 15 years of using passive abutments, the metal try in procedure is not necessary, thus speeding up the fabrication of the prosthesis. Fitting of the prosthesis is assisted with x-rays. Like with the provisional abutments, the metal try in abutments (titanium) are delivered immediately the permanent teeth are screwed onto the implants. Two months later the osseointegration is evaluated. In case of soft tissue recession, a pick up impression is taken and if needed modifications are made to the prostheses. The material of choice, used by our dental lab, for the past 20 years, is porcelain fused to metal. The fabrication of the metal ceramic prosthesis involves a series of technique sensitive procedures, inevitably in each step, small “5 dimensional inaccuracies” are introduced into the final prosthesis. The sum of these inaccuracies is never zero. As a result, at the end of the fabrication procedure, the final prosthesis will never have a perfect fit onto the implants. The use of the “Passive Abutment” (Fig. 25), which is a titaniu...
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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 Monobond-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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By Dental Tribune MEA

Under the high patronage of his Excellency the President of the Parliament of Lebanon Mr. Nabil Berry, Lebanese Dental Association known by its yearly BIDM (Beirut International Dental Meeting) has organized the 24th BIDM 2014 in collaboration with the Saudi Dental Society at BIEL in Beirut on 11-15 September 2014.

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 Exhibition

BIDM 2014 Opening Ceremony
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 adding 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 56 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: Endodontology, restorative dentistry, pedodontology, 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.

With Former President of Lebanese republic General Michel Sleiman

Scientific Session
Dr Elie Maalouf LDA President , Dr Mohammad El Obaida SDS , Dr Ibrahim Tarwneh Jordanian dental association president
Dr Rahil Doueihy LDA-Tripoly President
Welcome dinner to delegates at Sultan Restaurant
Gala Dinner BIDM 2014

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With Former President of Lebanese republic General Michel Sleiman (4062267)
Saliva and Oral Health

By Michael Edgar, Colin Dawes & Denis O’Mullane and contributed to by Mahvash Navazesh

Excerpt from Saliva and Oral Health- An Essential Overview for the Healthcare Professional

Different diagnostic criteria and interchangeably, utilisation of differences in study populations, due to varying study design, differently in medically compromised older adults. They can result in nutritionally deficient fluids which are mirrored in saliva. Basal levels can be decreased, and awareness is increased and understanding is important to the maintenance of healthy oral health and treatment of the condition.

There is an extensive body of research exploring saliva fluid. It has been used to indicate an individual’s susceptibility to developing caries, it has also been linked to oropharyngeal and physiological and pathological changes which are mirrored in saliva. Subjective benefits of saliva as a diagnostic fluid is that it is easily available for assessment and analysis. It can be used to monitor the presence and levels of harmful oral microorganisms and ions.

The following article provides an overview of oral complications associated with xerostomia clinical implications and management of xerostomia. Xerostomia and Salivary Gland Hypofunction

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 smand of oral disorders, 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.8

Global estimates of xerostomia and salivary gland dysfunction are difficult to ascertain due to varying study design, different diagnostic criteria, usage of the term xerostomia and salivary gland hypofunction interchangeably, utilisation of different diagnostic criteria and salivary collection methods, and small sample sizes. However, overall, the prevalence of xerostomia and salivary gland hypofunction increases with age and affects approximately 60 minutes or greater, aged 65 years and older.

There are multiple causes of xerostomia and salivary gland hypofunction, the most common association, with the presence of all or some of the conditions in a person is awake. The most common clinical manifestations of xerostomia and salivary gland hypofunction are dry mouth, mouth dryness, and mouth thirsting. It is also becoming increasingly common among older adults and includes the presence of unstimulated whole saliva (typically 1-2 ml). A test tube or similar container will be weighed prior to saliva collection. The person is instructed to swallow the remaining saliva in the container. The volume is recorded gravimetrically and expressed as ml/min.

Stimulated whole saliva flow rates of less than 0.5 ml/min are also considered to be suggestive of salivary hypofunction. The most useful technique for collecting this form of saliva is with the use of a standard piece of paraffin wax placed under the gum base (typically 1-2 g). A test tube or similar container is weighed. The person is instructed to chew the wax or gum base at a rate of 60 chews/minute. Without swallowing, the rate of saliva secretion can be determined. In patients over age 65 have at least one chronic condition and 50% have at least two. Hypersensitivity to various substances, such as gluten and animal proteins, and preceding a period of fasting, may be increased in patients with xerostomia. It is also important to note that xerostomia may occur in association with other conditions, such as certain medications, which may cause hyposalivation and thus result in decreased saliva flow rates.

The presence of saliva is vital for the maintenance of healthy hard (teeth) and soft (mucosa) oral tissues. Saliva is produced by the salivary glands and other glands associated with the oro-pharynx and nasopharynx. Salivary gland output varies between individuals and is affected by a variety of factors including age, gender, and health status. The presence of saliva is also important for the maintenance of healthy 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 provide better care for the healthcare professional. Understanding saliva and its role in oral health can help to identify problems early and provide effective treatment. The presence of saliva is vital for the maintenance of healthy hard (teeth) and soft (mucosa) oral tissues. Saliva is produced by the salivary glands and other glands associated with the oro-pharynx and nasopharynx. Salivary gland output varies between individuals and is affected by a variety of factors including age, gender, and health status. The presence of saliva is also important for the maintenance of healthy oral health but also has a detrimental impact on the quality of life for the sufferer.

The tongue can lose its filiform papillae and appear dry, erythemic, and raw with an ir- terostomia and Salivary Collection

Saliva Collection

Saliva collection methods can be classified into two main categories: non-invasive and invasive. Non-invasive methods include the collection of saliva from the mouth, the use of saliva substitutes, and the use of saliva substitutes in combination with medications. Invasive methods include the collection of saliva from the salivary glands, which requires the use of surgical procedures.

Overview for the Healthcare Professional

The presence of saliva is vital for the maintenance of healthy hard (teeth) and soft (mucosa) oral tissues. Saliva is produced by the salivary glands and other glands associated with the oro-pharynx and nasopharynx. Salivary gland output varies between individuals and is affected by a variety of factors including age, gender, and health status. The presence of saliva is also important for the maintenance of healthy oral health but also has a detrimental impact on the quality of life for the sufferer.

The tongue can lose its filiform papillae and appear dry, erythemic, and raw with an ir-...
(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 colonisation of the lungs with Gram-negative anaerobes from the gingival sulcus. 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.

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 practices should lessen the severity of dry mouth symptoms. A low sugar diet, daily topical fluoride use (e.g. fluoride toothpaste and mouth rinses), antimicrobial mouth rinses, and use of sugar-free gum or candy to stimulate salivary flow, help to prevent dental caries.

Patient education is instructed on the frequent use of fluids during eating, particularly for dry and rough 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 continuous salutogenic, since it increases salivary output and increases salivary pH and buffer capacity. Buffered xylitol-containing chewing gums or mints are often recommended, because xylitol has an anti-cariesogenic 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 wellbeing. 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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References

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Robert Pauley, Jr., DMD

Dr. Pauley has been practicing dentistry in the Atlanta area since graduating from the University of Kentucky College of Dentistry in 1988. Currently enrolled in the Advanced Dental Implant Studies, Dr. Pauley is an Associate Fellow of the American Academy of Implant Dentistry and a Fellow of the International Congress of Oral Implantologists.

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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 bucal 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 have been possible in the past with a panoramic 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.

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).
New 3Shape advisory board develops plan to improve patient care

By Dental Tribune International

COPENHAGEN, Denmark: 3Shape, a global provider of digital 3-D solutions for dental laboratories and dental clinics, has formed a dental advisory board made up of 12 prominent dental professionals from around the world. The new board will provide the company with insight and direction in digital technology and product development, as well as help the company move towards its goal of improving dental patient care.

“The 3Shape Dental Advisory Board provides 3Shape with a unique opportunity to work with the dental industry’s top digital experts to develop our technology and solutions and better answer real needs for dentists. Our goal is to improve patient care. Working alongside these industry leaders brings us one step closer to this,” said Flemming Thorup, President and CEO of 3Shape.

The group met for the first time earlier this month in Copenhagen. Leading digital dentistry advocate and practitioner Dr Jonathan Ferencz from the US chaired the two-day meeting. The advisory board developed a four-point plan to achieve the following objectives: (1) to share best practices in the use of digital technologies; (2) to define actual needs for better dentistry based on cases and experience; (3) to support the research and development of and innovation in dental technologies; and (4) to promote education and awareness of digital dentistry.

All board members are respected leaders in the use of digital dental solutions and intra-oral scanning. Members work with a variety of the digital dental systems available on the market and not necessarily 3Shape’s own 3-D scanners and CAD/CAM software.

“The way dentists care for patients has changed dramatically over the past few years, with digital technology driving much of this change. Digital workflows enable dental professionals to work more efficiently and accurately, with digital case handling now in many cases surpassing analogue treatment in quality. The creation of the board will serve to improve patient care further and strengthen 3Shape’s reputation as an industry leader. At the two-day meeting we got a sense of 3Shape’s passion not only from their willingness to listen to the expertise and insight of the professionals gathered, but also from their commitment to taking action and applying our recommendations to create better solutions and improve patient care,” said Ferencz.

The 3Shape Dental Advisory Board comprises 11 dentists and one dental laboratory owner. Board members are from Australia, Brazil, Denmark, France, Germany, Italy, Israel, New Zealand, Portugal, South Korea, Spain, Switzerland and the US. Plans for the board include bimannual meetings to ensure the success of the four-point plan, as well as to assess both the industry and 3Shape product development.

Ferencz likened support for 3Shape in the industry to that of IT giant Apple: “I think there is a passion that users have for 3Shape that is analogous to the passion that Apple users have for their products. 3Shape is driven by innovation much the same as Apple. And like Apple, they make products that are more useful, beneficial and incidentally, look cool too.”
Dental Tribune MEA: Dr. Brendan Carr, thank you for your time. Could you share with us your background and the road to becoming VP at The Emirates Dental Clinic Services in Dubai?

Dr. Brendan Carr: I graduated from Glasgow University in 1998 and worked in the NHS for 5 years before accepting a position in a large private practice in the Gold Coast Australia. After working and living in Australia for 4 years I took up a position in a private practice in West London for a further 3 years. I moved to Dubai in 2009 having been very fortunate to be selected for a position in the Emirates Airline dental clinic which has been a great move and a clinic I thoroughly enjoy working in. I took on the role as VP of the clinic in March 2015 and am very fortunate to have an excellent team working with me to provide high quality dental care to our eligible patient base.

What makes The Emirates Dental Clinic Services so unique in comparison with the hundreds of clinics in UAE?

The Emirates Clinic is unique in the way that we solely look after eligible staff and their dependants of the Emirates Group and no one else. This includes our team of over 3500 pilots, and no one else. This includes our team of over 3500 pilots. We need to ensure that this important group are dentally fit and most importantly, fit to fly. The dental treatment for all our patients is covered under the company’s generous insurance scheme. In addition our dentists are all salaried and as a result patients have the confidence that whatever treatment we recommend is done so with their best interests at heart and with no commercial motivation. The clinic has been open now for 19 years and in that time has grown from 2 dentists and 1 hygienist to the current position of 10 dentists and 7 hygienists in order to support the expansion of the airline over the years with the aim of providing ethical, quality dental care in a safe environment as its core philosophy. Our clinic has also been internationally accredited by the Australian Council on Health Care Standards (ACHS), which assesses the quality and safety of health care provided by clinics and hospitals. This is an award which we are all very proud of within the team and the Emirates Group as a whole.

How do you assess the level of dental care in the UAE?

There is no doubt that the quality and safety of health care is improving in the UAE and that the regulatory bodies such as the DHA are striving to ensure that all dental professionals within the UAE are following required standards. In the 5 years I have lived in Dubai, I am more aware of dental health promotions taking place and products being advertised. I believe much work is still required to make people aware of the links smoking, diabetes and heart disease have with dental health.

What is your impression of the Dental Industry Market and its fast development especially in Digital Dentistry?

In the past 10 years there has been a dramatic increase in the amount of new products and technologies coming into the market and it can often be a challenging keeping up with all of these developments. I am of the opinion that as with all industries, we should embrace new technologies that will improve the service that we provide for our patients and the working environment we work in. The digitalization of equipment whether it be with radiograph systems or CAD/CAM scanners is becoming more and more an integral part of the dental surgery. It is clear that when feedback has been provided to the manufacturers of problems being faced with new technology, this feedback is being listened to so as to improve the functionality of this technology. I am of the belief that the digital technology available nowadays justifies the investment required by dental clinics.

How do you and your staff keep up to date with the latest developments in Dentistry?

All of our staff are required to meet both the DHA continuing professional development standards and the CPD requirements of their home countries regulatory bodies. In order to achieve this we attend conferences and seminars both locally and overseas. We also have subscriptions to dental journals from around the world which we share within the group. We also take advantage of online CPD articles and reports.

What would you say is your dental philosophy? The message you would like to give to your patients?

My dental philosophy is to aim to provide high quality, ethical dental care in a caring way that encourages patients to be regular attenders to ensure that all their dental needs are met.

Is there anything else you would like to add?

I would like to take the opportunity to thank you for your interest in our clinic and team and for the work you do in promoting dental education both locally and globally.

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Concept No. 1: You need to start with a seated condylar position. You will need to learn techniques to know when you have a seated condyle, and if it's in a stable position.

Concept No. 2: You can't believe what you see in the mouth. This is foreign to what we've taught in the orthodontic profession. We're trained that when we finish a case we have the patient bite down, and we say that the occlusion looks good or it doesn't. However, you need to understand that this is a learned muscle position. It's not a position that is usually conductive to normal joint function.

Concept No. 3: Quit trying to do the impossible with orthodontic tooth movement. This is where orthognathic surgery comes into play. Don't try to fix skeletal aberrations with orthodontic tooth movements. Too often cases are treated with a compromised treatment plan, but due to the skeletal that it is impossible to establish a functioning occlusion, thus resulting in failure.

We need a ruler to measure our successes. How we come up with a diagnosis and then we need the same ruler to measure our successes. So in the sample case, the ruler consists of five goals: joint, face, perio, teeth and function.

In a pre-surgical diagnostic setup, which is a trial treatment, the case can be diagnosed and treated before you start. This way you have the result in mind before beginning (five goals).

The orthodontic, surgical and restorative modalities can all be combined pre-treatment. This way the patient knows what is needed to solve his or her particular malocclusion.

These pre-treatment setups are based on the VTO (tooth movement) and the STO (skeletal movement). Once all treatment modalities have been tried, the clinician will know if orthognathic surgery will work for the patient.

The surgical setup is performed just before surgery to determine the skeletal changes needed to correct the skeletal malocclusion and see if the prediction setup is correct. We use our ruler again to make certain that the five goals are obtainable. The surgical splint can also be constructed from the surgical setup. The surgical splint is used to place the skeletal parts in their correct position.

Steps in pre-surgical setups
First, we need to get the maxilla positioned in the articulator. We still recommend that you use the articulator as a tool to do your setup. Virtual setups tend not to include the patient's true functioning hinge axis. If you don't have the axis, you're liable to setup an arc of closure that disrupts the condyle.

We establish the functioning terminal hinge access of the patient on both the left and right. We're then transferring the hinge access to the side of the face. Once we have it on the side of the face, we can do our axis-horizontal transfer. The dot shows the functioning hinge axis on the patient, represented on both the right and left sides.

The axis-path tracing that we created while trying to find the terminal hinge axis of this patient allowed us to look at the angle of eminence. What we like to see is a steep angle of eminence as that helps disclude the posterior teeth in lateral border movements. Moreover, we like to see nice, smooth curved lines in the jaw motion, as that tells us the condyle and disc are working in harmony with each other.

We determine the best centric relation position in the mouth. Nevertheless, remember, you can't believe what you see in the mouth. That means this may even be worse, especially when we do a true hinges-axis mounting.

Figure 11 shows a true hinges-axis mounting. We have the true hinge axis, we have the axial horizontal plane and we have the dental teeth position according to this setup. That means the pin, which was removed for the photograph, would be the true vertical line. The articulator mounting is now the same as the CBCT imaging.

What we see in the next image is that this patient only hits on the left side. Nothing touches on the right. As you can also see, the open bite is even worse on hinge-axis mounted models (Fig. 12)

Diagnostic setup
The diagnostic setup we've been discussing is based on the VTO, STO and the articulated cast mounting. The orthodontic setup, as well as a surgical setup, can be done on the same set of hinge-axis mounted models. We can also include in the diagnostic setup the correct arch form so a mutually protected occlusion can be obtained (Fig. 15).

Surgical setup
The surgical setup allows us to plan the surgery case before we go to the operating room. We perform this after we've finished the pre-surgical orthodontics and we're getting ready for the surgery itself.

What you should find when you compare the pre-treatment setup with the surgical setup is that the bony part should look very similar on the articulated mounting as the pre-treatment.

In this case, we've leveled the occlusal plane as part of our surgical setup. In doing so, we gained a large correction of the mandible without doing genioplasty. Again, this is based on the axial horizontal and the true vertical line.

Now that the surgical orthodontics has been completed, and the patient is now ready for surgery, we go back and do the natural head position and measure how far the articulator is forward. We then do our axis transfer and place the markers. Then we double check that we have the natural head position (Fig. 14).

Next, we do our axis transfer, placing the maxilla exactly how it's related to the axis-horizontal plane. This is important because it enables us to place the maxilla on the articulator exactly as it exists on the patient, to the functioning axis.

Figure 15 shows the surgical models mounted according to the axis-horizontal plane. We use a centric bite to position the mandible to the maxilla, allowing the musculature to seat the condyles up and forward.

We then get into our surgical correction. We've corrected the maxilla. To maintain the proper torque of the anterior teeth, we'll need a four-part maxilla. Now we have our anterior segment (lateral to lateral) and two posterior segments (cuspids to second molars) and palate. The anterior segment is positioned vertically and horizontally to the maxillary relaxed lip position. In addition, we take into account the tooth and gingival display the patient exhibits.

We've done the correction in the maxilla, putting the uncorrected mandible on. This shows the discrepancy you see once you've leveled the maxillary occlusal plane. Now we position the mandible. If we've done our pre-treatment surgical orthodontics correctly, things should fit together. Thus, after the mandibular correction is completed in the setup, our maxilla is placed on the articulator. You should see a large posterior open bite.

This is also an easy way to construct our intermediate surgical splint, which you can see in Figures 16a & b. Note how we changed the plane of the mandible. This is based on doing the mandible first. By placing the mandible correctly in all three planes of space, we can establish the functional axis of the mandible.

This helps eliminate some of the errors that occur in orthognathic surgery. If we do the mandible first, and we know the vertical...
measurement that we need, it's easy to place the maxilla correctly to the mandible.

There are certain surgical techniques that need to be applied to accomplish the maxilla's relationship to the mandible. By following the proper surgical techniques, the postsurgical relapse can be kept to a minimum.

The other thing that we can do is establish even centric stops, according to the axis position. That's why in Figures 17a & b the models are painted red. We can do an occlusal analysis and equilibration and establish a stable tooth fit before surgery; all of which is based on the true terminal hinge axis.

We're able to get a Class I and we are able to gain enough overbite. We will need to do some postsurgical orthodontics to finish the occlusion, but the image shows the hinge axis closer on the articulator.

If you were able to hold the model, you would notice that there's no rocking. Everything is stable. You don't want the patient to come out of burger and find that the problem has trouble finding a surgical position before the second time was performed with the joint seated.

In order to gain even stops, we had to remove some tooth enamel around the upper and lower arches. That's what we do in the operating room before we begin the operation. We do the equilibration when the patient is asleep and before the operation begins.

As you can see in the post-treatment intra-oral and extra-oral photos (Fig. 18), the facial changes include a shortening of the lower facial third. An adequate overbite has been established so a mutually protected occlusion can be seen. The proper description, where the back teeth separate by at least 2 to 3 mm has been established.

If we apply the second concept to the surgical setup (as you can see in the middle*), we need to go to post-treatment hinge-axis mounted models. Figure 19 shows the cone-beam data, both pre- and post-treatment. Note the double plates that are intermaxillary to establish a stable platform to position the maxilla.

Surgery

One of the most important take-home lessons from this article is that you need to know your surgeon. Establishing a one-on-one relationship with your surgeon can be challenging. If the orthodontist does not know what the surgeon goes through, then in the planning stage pre-treatment, the teeth may be placed in a position that the surgeon will have trouble establishing in the correct skeletal position. This is a relationship that simply takes time.

Once you have knowledge of the surgeon, then you need to know what happens at the hospital because this becomes an important part, especially during recovery.

The people who are handling recovery need an exceptional level of compassion, and they need to be able to handle emergencies. Oftentimes the patient will get sick, and his or her teeth are held together with elastic and wires. The healing period normally lasts 10 weeks. It may be longer depending on how the segments are healing. The point is that we don't get into post-surgical orthodontics before the segments have stabilized.

Additional considerations

We know that you need to know the joint status. You'll need to know how to do a soft-tissue analysis and how to establish surgical treatment objectives. You'll need to know how to do pre-treatment setups and surgical setups. You need to apply all of the techniques for all patients (mixed dentition, adolescent or adult).

If the teeth aren't in the correct position in the jaw, then there's no way the surgeon can place the parts correctly, resulting in surgical failure. Most surgical failures happen because of orthodontics.

One of the things you need to keep in mind is that if you pre-treat dental surgeons to establish the correct arch form. Without the correct arch form, it's difficult to put the parts together.

The other thing to keep in mind is that the actual 5-D position of the teeth. If you have up-righted the anterior teeth, the surgeon will have a difficult time filling the mandible to this.

If you have tipped the lower anterior teeth back too far — such as in a Class III — then you can't obtain a good maximum intercuspation because of the incorrect torque of the anterior. The setup part of the procedure will give you this information.

Age

If it's an adolescent patient, you can do the presurgical orthodontic and establish the correct axial position of the teeth in each jaw. However, do not try to fix the occlusion. That means the teeth will be in the proper positions when you approach the surgery.

As a rule, I won't get into a surgical case before a female is in her early 20s, and with males in their mid 20s. I've seen cases where they were done earlier and actually grew out of the correction.

Learning these techniques

We all need to be taught to do these things, and it needs to be from someone who has done them for a number of years so you can be certain that the methods you are learning will work. They are taught in the Advanced Education in Orthodontics (AOE) course, and we do practice them.

That includes surgical setup, orthodontic setup, soft-tissue cephalometric analysis and surgical treatment objectives. They need to be practiced a number of times. It's not something you can learn on your own. You need a mentor who will teach you all the characteristics you'll need.

In the lab phase of the AOE class, we do get into mounting cases on the true hinge axis. You will learn how to establish these on patients. They are not time consuming. Normally, establishing a hinge axis in the axis-path tracing and transfer takes no more than six or seven minutes, so the clinician is not using a lot of his or her time to establish a correct hinge-axis mounting.

The instructors will demonstrate how it's done, and then you have to perform the procedures. Under the right guidance, you can learn these techniques and apply them in an office setting in an economical manner.

Without the coaching, these procedures can feel like too much of a chore. Moreover, without coaching, there's no way to do a surgery/workup for the benefit of the patient, which of course, is the main reason you need to know these procedures.

It also helps if you work with the pre-surgical orthodontist because it’s the restorative dentist who obtains the final outcome, so you need to finish the case from where you left it.

It takes some time and it takes some effort to learn these procedures. But once you do learn them, and you have the technique, your surgical cases will be more stable, because you can control down the instances of surgical relapse that you see.

Above all, remember this is all for the benefit of the patient. You need to spend time learning and you need to spend time in the operating room to know the procedures. Then you need to spend time in the diagnoses and workup.

However, the benefit is for the patient, who winds up with a functioning occlusion and improved aesthetics. The gingival tissues are healthy and the jaw functions correctly.

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*Fig. 18. Post-treatment intra-oral and extra-oral photos.

Fig. 19. Cone-beam data, both pre- and post-treatment.