The aesthetic challenge

By Dr. Mohamed El Sayed Hassanien, Egypt

Patient’s satisfaction has always been the main goal achievement of dental professionals particularly with esthetics. As the popularity of esthetic dentistry increases, a growing number of patients are seeking treatment for improvement of unaesthetic anterior dentition. Accordingly several treatment options have been proposed to restore the pleasant esthetic appearance that the patients are always seeking.

Based on the conservative approach and minimal invasive dentistry protocols, ceramic laminate veneers have been introduced to satisfy the patients growing esthetic demands.

Many construction techniques have been utilized in the dental market whether directly or indirectly to fabricate ceramic laminate veneers.

CAD/CAM being state of the art dental technology offers lots of merits for both the clinician and the patient. Being a chair side same day procedure, utilizing intra oral scanning avoiding conventional physical impressions, and long-term provisional restorations thus producing an esthetic all-ceramic restoration with highest degrees of accuracy and precision.

Case presentation
A twelve year girl, medically healthy, denies taking any medications visited my clinic complaining of fractured upper two central incisors Fig. 1 & 2. After clinical and radiographic examination, which revealed complete root formation, two ceramic veneers for both central incisors were proposed as a treatment option to solve her complaint.

Tooth preparation
Tooth preparations were made using the depth-guided diamond wheel no. 018 to indicate the facial reduction amount of 0.4 mm for both teeth. The labial diamond bur no. 016 was used to complete the preparation on the labial surface and precisely reproduce the cervical finish line located just below the free gingival margin Fig. 3.

Incisal preparations were made with type two-veneer preparation design ending with a butt joint on the incisal edge and not involving the palatal wrap around.

Finally finishing bur no. 014 was used to finish and smooth all the preparation surfaces Fig. 4.

All teeth preparations were made with loupes of magnification 2.5 X for better precision.

CAD/CAM fabrication steps
In lab SW 4.2.3 was used to scan, design and mill these two veneers.

The case was administrated as two veneers on tooth number 8 and 9; with the bio-generic individual design technique, materials were selected from Ivoclar Vivadent Empress Cad blocks being a Lucite reinforced ceramic material for this case. Where the adjacent sound teeth showed A1 shade. Visual shade matching was used for this case. Where the adjacent sound teeth showed A1 shade. Empress Cad blocks being a Lucite reinforced ceramic material was chosen for this case with a low translucency in order to mimic the adjacent shade of the teeth. Try in stage was done for the patient before glazing to check for proper seating and accuracy of the margins.

Glazing and characterization
Both veneers were seated properly with the object to fix putty material for better handling during glaze and stain process.

Empress Cad paste glaze was the material of choice for glazing the two veneers. In order to match the adjacent teeth, Empress Cad white stain was used on the middle and incisal areas in a scattered pattern with a thin brush to give the natural white stain effect. Single cycle was used for staining and glazing together Fig.9

Cementation procedures
- Ceramic veneer surface treatment:
  HF 4%; Empress etching gel was used to give the best morphological proposal to match with the adjacent teeth. The grid tool was used to show the veneers proportions to ensure that the two veneers showed similar length to width relations Fig.10.

With the two veneers linked, restoration virtual translucency tool was used to check the amount of ceramic extension in relation to the underlying tooth preparation Fig.7.

SW 4.2 showed a new colored model tool, which enables the operator to see both veneers with the same color match for more valid size comparison Fig.8.

Shade matching
Visual shade matching was used for this case. Where the adjacent sound teeth showed A1 shade. Empress Cad blocks being a Lucite reinforced ceramic material was chosen for this case with a low translucency in order to mimic the adjacent shade of the teeth. Try in stage was done for the patient before glazing to check for proper seating and accuracy of the margins.

Virtual design
The virtual design was proposed with the SW, both veneers were virtually linked as a group so they were both virtually active.

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KaVo MASTERSurg LUX Wireless: Redefining the best

By KaVo

With the successful launch of the EXPERT-surg LUX surgical unit and the SURGmatic instruments KaVo recently celebrated its comeback as a main player in the dental surgery field. As one of the world market leaders the dental company now presents another highlight: The MASTERSurg LUX wireless surgical unit. Thereby KaVo confirms its market position as a leading and innovative international dental player.

The new KaVo MASTERSurg now completes the attractive KaVo surgical portfolio and redefines surgical standards. Therewith all dentists and dental surgeons, no matter what their different individual needs are, will find the perfect solution for their surgical work. The KaVo MASTERSurg surgical unit convinces through outstanding comfort. It is offering a wireless foot control, allowing the user a great freedom of movement. The data documentation function supports procedure by real time displaying of the torque and other important digital data and saving it concurrently.

KaVo MASTERSurg makes it real: a customizable surgical unit that adapts to dentists’ and dental surgeons’ individual requirements. E.g. multiple programs, each with up to 10 treatment steps, maximum speed, maximum torque and even more parameters can individually be defined and saved.

The new INTRA LUX S600 LED, one of the lightest and smallest surgical motors in the world, enables to work with high power and precision.

When it comes to performance and comfort, KaVo continues to set the benchmark with the EXPERTsur and the MASTERsurg controllers, the SURGmatic instruments (now available with hexagon clamping system with optimized head gearing) and the INTRA LUX S600 LED motor. All these components combine to a system for dental surgery that is not only easy to use but that provides save and highly precise tools for dentists and dental surgeons to face their daily challenges.

Nobel Biocare to join Danaher dental business

By Dental Tribune International

ZURICH, Switzerland/CHARLOTTE, N.C., USA: Today, Danaher, a US health care conglomerate of brands from various industries, and Swiss dental manufacturer Nobel Biocare announced that the two companies have entered into a definitive transaction agreement. In order to further expand its global dental business, Danaher has offered to buy Nobel Biocare, which is the second-largest supplier of dental implants worldwide, for CHF2 billion (US$2.1 billion).

As reported by Dental Tribune ONLINE earlier this year, Nobel Biocare confirmed that it had been approached at the end of July by third parties with a potential interest in acquiring the business. Now, the company’s board of directors has unanimously decided to recommend that Nobel Biocare’s shareholders accept the offer, which in
By Dr. Theodore D. Freeland, USA

In this article, you will be introduced to the concepts, goals and techniques needed to diagnosis 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 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 goals 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 orthognathic 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, which you should be able to feel. If the joint is stressed, then there's a good chance that we'll have some surgical relapse.

**Joint status**

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 type of injuries to the mandible. 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 splitting,
– CRI position.

Range of motion should be between 45 mm and 55 mm on opening and includes assessing movement. We're looking for a symmetrical mandible motion — meaning the chin should not deviate to the left or right on opening — and it should be relatively free of digital 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 mautas 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 Ibsen, we have a way to measure joint position and get an idea if the condyle is basically in a state of degeneration. The imaging showed a joint 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 condyle is one that shows a definite symmetric outline to it as compared to the right side. The axial view confirms this; you see that the shape is better and has a more dense outline.

Thus, our basic imaging system helps us detect in the cone beam, one side is going to be the problem side, especially as it pertains to orthognathic surgery. If we go to the two-dimensional or hard structure, we can see that the right joint has definitely lost vertical height, and we definitely have a joint space 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 of the jaw, which is what we’d like to see. However, there have been some changes, which is why we’re starting to see a “hard-breaking” effect in the left joint. This kind of image is one of the important in determining if we should proceed with any kind of a surgical correction.

Soft-tissue analysis

When we’re trained in orthodontics, we’re 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 don’t take into account the good facial 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-papillar area is, where the cheekbones are 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 another 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 oriented from the 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, we can cover the basis that we need for orthodontics, but we also need to cover what we need in a surgical work-up.

We also need a frontal analysis, which is taken from the patient’s face. Most of the frontal workup is done in examining the patient clinically. This enables us to look at the orbital rim, cheekbone, sub-papill,alar bases, nasal bases and canthus of the eyes.

All of this enables us to assess if we have transverse asymmetries, where the occlusal plane is tilted instead of level. This is especially true with the mandibular plane, which we may also find is tilted. This is also 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 from 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 then he stands 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 from the true vertical line to Glabella.

This also holds true with the horizontal plane. In this case, we convert it to a two-dimensional X-ray. This allows us to orientate the CBCT data with the articulator. This allows us to visualize the CBCT data with the articulator mounting.

Now we have the true axis-horizontal plane and the true vertical line combined, and now we can read the facial, skeletal and functional issues can be assessed.

In the example we are using, the patient has a mandible that has an arch and a skeletal retrusive chin and a skeletal proclined facial plane. This is precisely the kind of case where you should be looking for degenerative joint disease. 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 reposition 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.
4) In most cases where there’s a retrusive chin and a skeletal open-bite, the patient has an occlusal plane, measured from the true vertical line that 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 much 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 coronal 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.

Figure 9 shows how we’ve completed the extrusion of the maxillary segment, and we’ve balanced the occlusal plane. The next objective is to place the mandible with the correct overbite. This is not 2 mm but 4 mm. This is because you want to have an adequate overbite to create adequate disharmony. In establishing the mandible, you can see in our example how the lower part of the face is placed normally enough with the true vertical line (Fig. 10).

In establishing the surgical treatment objective, we see that we want to place the anterior section in the superior direction and the posterior in the inferior direction. These are all the measurements we need to establish a surgical setup. Hopefully, this is performed preoperatively so the patient has a good idea of what needs to be done.

Pre-surgical and surgical setups

The pre-surgical and surgical setups are techniques that do require the clinician’s time. It's...
The importance of cementation: A veneers case using a new universal cement

By Kerr

E
thetic options in den-
tistry are the prevailing
choice of most patients
today. Veneers and bleaching
in particular have become buzz-
words in popular culture, and
TV sitcoms, film and magazine
advertisements have turned these
cosmetic techniques into house-
hold names. As a result, dental
teams must accommodate the
demands of their patients, be-
coming highly versed in placing
metal-free restorations.

Practitioners can find a multi-
tude of educational articles and
courses teaching the science
and technology of porcelain, zir-
conia and composite. But while
emphasis is frequently placed
on the final prosthesis or direct
restoration, often overlooked
are the increasingly important
auxiliary materials that contrib-
ute equally to the clinical suc-
cess of these new materials and
restorations: impression and
provisional materials, bonding
agents and cements. Education
is imperative because cemen-
tation 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 preser-
vation of tooth structure is im-
portant to dentists and patients
alike. The highly esthetic results
are due to the fact that cerami-
ics have a translucent finished
surface texture similar to that of
natural enamel.2 Therapists, assis-
tants and lab technicians spend
vast amounts of time and effort
perfecting veneers and avoiding
fracture through painstaking
preparation, material and shad-
eselection, fit and fabrica-
tion. Yet even after such arduous
processes, clinical failure and
patient dissatisfaction readily
occur with errors in cemen-
tation.

Cementing veneers is a delicate
process with a historical litany
of potential problems – color
instability, insertion difficulty,
handling and cleanup issues, unsatisfactory radiopacity, low
translucency after curing, mis-
match between try-in gels and
final cements, and debonding,
to name a few. Cement selection in
certain applications necessitates
knowledge of the chemistry and
physical properties of the particu-
lar ceramic type, and insertion
requires an exacting technique
for successful clinical results.3

This article outlines a veneer
case using NX3 Nexus® Third
Generation – a new, universal
cement from Kerr. The subject is
a long-standing patient-of-rec
cord with a current radiological
and medical chart. This focus is
on the steps and techniques im-
plemented at final cementation
of the prostheses.

Clinical Case

A female patient in her mid-
fifties presented a chief com-
plaint of being unhappy with her
smile. An examination of her	
hard tissues revealed immediate
concerns of multiple fractures,
hypocalcification, shortened an-
terior teeth due to wear and an
asymmetrical smile line (Fig-
ures 1 and 2).

After proposing a first phase
treatment plan to restore all of
her compromised upper ante-
orior teeth, the patient consented
to restoring only teeth numbers
6-11. The patient ultimately
qualified for and accepted ve-
neers as the mode of indirect
restorative treatment.

Prior to preparation, the tissue
around tooth No. 8 was recons-
toured. Then, the teeth were
prepared for pressed ceramic
veneers and provisionized in the
standard manner. Oc-
clusal analysis and adjustments
were performed over a period
of weeks and the veneers were
tried in. After the requisite steps
were completed preceding in-
sertion and the veneers were
finalized, the provisional were
removed and the teeth were

cleaned (Figure 5).

Exaplyx® was used for gingi-
val retraction and hemostasis
in order to gain cervical acces-
se and control bleeding in that
area (Figure 4).

The teeth were then etched
for 15 seconds with Kerr Gel
Etchant, which is composed of
57.5% phosphoric acid (Figure
5), and then rinsed and slight-
ly air-dried. (Note: While a total-
etch technique was used, NX3
works with both total-etch and
self-etch protocols, adding to the
distinctiveness of the product.)

Per manufacturer directions,
Optibond Solo Plus (Kerr) was
brushed onto the tooth sur-
faces for 15 seconds (Figure 6),
air-thinned for 5 seconds, and
cured for 10 seconds using the
L.E. Demetron II curing light
terry (Figures 7 and 8).

After etching and bonding, the
veneers were cemented using
NX3 light-cure cement in the
clear shade (Figure 9). The
ement was dispensed directly
onto the internal surface of the
veneer and was expected to
be “thixotropic,” the consist-
ency of non-drip paint; the resto-

For more information, kindly visit the first dedicated Middle East website for Kerr Corporation www.kerrdental.ae.

Figure 1: Pre-op

Figure 2: Interior upper pre-op

Figure 3: Tempus of sec 8232DC4

Figure 4: Exaplyx preven 8232DC3

Figure 5: Kerr etch

Figure 6: Optibond solo plus

Figure 7: Curing solo plus

Figure 8: Cured bonding agent

Figure 9: Veneers in NX3 8232186

Figure 10: Cleaned cement 82321DC7

Figure 11: Cleared cement 82321DC7

Figure 12: Final ant and 8232DC10

Figure 13: Post op

Manufacturer instructions allow
for 10-second cures with the L.E.
Demetron II. In this case, how-
ever, the doctor’s discretionary
use was 20-second cure times.)

Curing was adjusted using a
fine diamond bar and the
ngual aspects of the teeth were
finished and polished using CeraGlaze® Porcelain Polishing
System (Axis Dental), rendering
a very satisfied patient (Figures
12 and 15).

Conclusion

Cementation is an important
aspect of functional aesthetics.
An understanding of chemistry,
technology and physical proper-
ties are all essential to proper us-
age and clinical success. Cement
selection was the driving factor
in choosing the bonding system
for this case. NX3 Nexus® Third
genration cement is free of amine-
organic compounds containing
nitrogen as their key atoms—which were largely blamed for the colour shifts so prevalent with earlier cement formulations. In an earlier use of the product the cement proved to be “thixotropic,” the consis-
tency of non-drip paint; the resto-

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About the Author

Dr. Mitch Coudill, a 1985 gradu-
ate of Baylor College of Dentistry
in Dallas, TX, lectures inter-
ationally and has published nu-
merosous articles reviewing all as-
pects of restorative and cosmetic
dentistry.
Conservative approach to multidisciplinary aesthetic dental treatment

By Konits Giannakopoulos, Greece

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 decision 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 ethically dealt in three different ways: 1. canine substitution, 2. tooth supported restoration, and 3. implant supported restoration. Tooth auto transplantation (usually premolar) and removable partial dentures are other, less commonly applied treatment options. In the case of only one lateral incisor missing, an additional problem of symmetry between the right and left side usually exists and needs to be addressed.

Peg shaped lateral incisors pose another aesthetic problem that is usually restored with as follows: 1. all ceramic crowns, 2. porcelain veneers, and 5. direct or indirect composite veneers. Additional to the inadequate width and length of the peg shaped lateral, many times there is also a gingival aesthetic problem that can lead to a square looking restoration and too much gingival tissue display if not properly treatment planned with either orthodontic intrusion or gingivoplasty/gingivectomy before the restoration is fabricated.

In this article, a case is reported of a young patient with one congenitally missing and one peg shaped lateral incisor. The patient was treated with a combination of orthodontics, periodontal surgery and aesthetic restoration dentistry interventions.

Case report
A 22 year old Caucasian female presented to the clinic asking for aesthetic improvement of her smile. The patient was single and a student of law school. The medical history was unremarkable with no pathologies and no known allergic reactions reported to any kind of medicaments. No medications were taken on a systematic basis by the patient. The dental history was also unremarkable with only preventive and minor operative dentistry interventions and prophylaxis in the past. The patient mentioned a history of congenitally missing teeth in her family.

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 evaluation 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 4mm, asymmetry between the left and right side, especially in the space between #11-13 and #21-23, 6. 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 Class shade guide (Vita Zahnfabrik, Bad Sackingen, Germany).

Photographs and alginate impressions were taken in the exam appointment to fabricate study models. Then the team of aesthetic/restorative dentist, orthodontist and periodontist treatment planned the case. The recommended treatment plan was accepted by the patient in favor of the alternative treatment plans.

Orthodontic phase
The orthodontic treatment goals were as follows: 1. intrude #11 to align the incisal edges of the centrals, 2. equalize the spaces between #11-15 and #21-25, 3. transfer the dental midline to the left, and 4. correct misalignment 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

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.

<table>
<thead>
<tr>
<th>Tooth (#)</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Spacing (mm)</th>
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Notes
- Peg Shaped
- Overeruption upper canine right
- Tooth #21 gingivectomy 5mm incisally
- Table 1
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 ceramics - 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 A3/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 tip the upper into better alignment. The rationale for using upper clear and a lower Inman was that only 1 mm of movement was needed for the uppers and about 2.5mm 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 stage of alignment). 4. Change the composite temps to all ceramic crowns to match.
5. Retain the lower arch.

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 Spacewize™ software was given to the technician so they were aware of exactly where we wanted the teeth to be moved. Spacewize 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.

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.

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 knowing how much we are likely to need, with Inman Aligner treatment, we never completely all the IPR in one go. 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.
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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 intermittent wear reduces the risk of root resorption. On return 2 weeks later, it was clear that the contacts had closed tight and the teeth had moved a little.

More IPR was carried out on both the uppers 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 seen 2 weeks later, for 2 weeks. The temporary crowns 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 need not wear the bleaching trays 35-45 minutes a day.

The patient returned after another 3 weeks and was happy with the progress of whitening. 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 upper arch to ensure the crowns could be made with a good long centric contact. The tempus 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 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 HT (Ivoclar Vivadent) crowns were bonded using Variolink II (Ivoclar Vivadent) and Optifill P (IvoryLink). 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 Inman Aligner, then with whitening. If they are still keen to have full crowns, 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’m 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 composure 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. Kamayama et al. Tokyo Medical and dental university, Tokyo, Japan. For information contact the author at Kanev.ormco@tmd.ac.jp.
After the restorations were fabricated (Figure 14) and the temporary cements were removed, they were tried in and the fit and contacts were verified. Another try in was performed with a glycerin based paste (KY Jelly) so that the shade, contour and surface texture were assessed and approved by the dentist and the patient. At the same appointment the restorations were bonded after the porcelain was etched with 9% hydrofluoric acid and silanated (Ultradent Products Inc, South Jordan, UT, USA), and the teeth cleaned with pumice. A 5 step etch and rinse adhesive (All Bond 2, Bisco, Schaumburg, IL, USA) and a dual cure resin laminating cement (Dowlin, Bisco, Schaumburg, IL, USA) were used. Spot curing was performed and excess cement was removed and after light curing for 60 sec each surface, the cement layer was left for 5 additional minutes to complete the chemical cure mode as well. Final finishing, adjustments of occlusion and polishing were performed with finishing diamonds (KOMET, Lomza, Germany), rubber points (Astropol, Ivoclar Vivadent, Schaun, Lichtenstein) and finishing strips (Solflex, SM ESPE, Seefeld, Germany). Finally, a diamond polishing paste was used (Ultradent Products Inc, South Jordan, UT, USA) on a Flexiluff (Cosmedent, Chicago, IL, USA). An alginate impression was taken to fabricate a new Essix orthodontic retainer in the in-house lab within 1 hour. Oral hygiene and maintenance instructions were given to the patient and a follow up appointment was scheduled after 4 weeks (Figures 15-21).

A multidisciplinary approach in treatment planning and performance, as well as the use of contemporary restorative materials and techniques allow for a conservative, yet very aesthetic final result.

References
1. Managing congenitally missing lateral incisors. Part I: Case–

The Author would like to thank the Orthodontist, Dr. Evita Ka-

Kostis Giammakopoulos
DHS, PhD
Assistant Professor,
ARGOS Program Director
European University College
Dubai Health Care City
Ibn Sina Building, No. 27
Block D, 3rd Floor, Office: 302
P.O. Box 75582, Dubai, UAE
Email: Kostis@euc.ac.ae

Contact Information

Dr. Kostis Giammakopoulos
DHS, PhD
Assistant Professor,
ARGOS Program Director
European University College
Dubai Health Care City
Ibn Sina Building, No. 27
Block D, 3rd Floor, Office: 302
P.O. Box 75582, Dubai, UAE
Email: Kostis@euc.ac.ae

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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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By Qualident

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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
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 over 23 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 participants immerse themselves in plenty of knowledge themselves in plenty of knowledge exchange and share opportunities with one another.

On behalf of Emirates Dental Society, I would like to wish you all the best possible solutions for their esthetic needs.

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.

Our specialized conferences are evolving into land marks in the field of Continuous Dental Education. We offer a unique blend of Science, Clinical Knowledge, and Cutting Edge Technology in the field of Dentistry and beyond. All of us, organizers, speakers, and sponsors spare no time or effort to put bringing to you the best possible solutions for their esthetic needs.

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. Munir Silwadi
BDS, MRCSO, DUSS, FADI, FICD
Conference Chairman & Scientific Advisor
DAY ONE

08:00 – 09:00

BREAKFAST WITH THE SPONSORS / REGISTRATION

09:00 – 09:45

Dr. Gaetano Palovons, Italy

Adhesive esthetics solutions in anterior and posterior teeth

09:45 – 10:15

Prof. Sowaid Sami, Germany

Minor & Major Augmentation in Oral and Maxillofacial Surgery and Implantology: new perspectives with Non-anthropoic cements

10:30 – 10:45

MEET THE SPONSORS / COFFEE BREAK

10:45 – 11:30

Dr. Anton Lebedanks, Russia

Zirconia vs. glass-ceramics – pros and cons

11:30 – 12:15

Dr. Julian Caplan, UK

In-surgery CAD/CAM Dentistry – Fact or Fiction

12:15 – 13:40

LUNCH / PRAYER TIME

13:40 – 14:15

Dr. Costa Nicolaou, Greece

Simple Fast & High-Quality Implant Dentistry

14:15 – 15:00

Dr. David Garlidge, 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 – 16:00

DISCUSSIONS

16:00 – 16:45

Prof. Carine Mahanna Zogheib, Lebanon

Teeth whitening from A-Z

16:45 – 17:30

Prof. Khosrow Bash, KSA

The Effect of manufacturing features of rotary NiTi files on their performance: A clinical approach

17:30 – 18:15

Dr. Gary Severance, USA

Oral Rehabilitation Dentistry – Control Your Future

18:15 – 19:30

DISCUSSIONS

19:00

POSTER PRESENTATION

MEET THE SPONSORS / COFFEE BREAK

DAY TWO

08:00 – 09:00

BREAKFAST WITH THE SPONSORS / REGISTRATION

09:00 – 09:45

Dr. James Russell, UK

Accessible Aesthetic Dentistry

09:45 – 10:30

Dr. Michael Apa, USA

Advances in interdisciplinary Aesthetic Surgery and Implantology

10:30 – 11:15

Dr. Julian Caplan, UK

The Aesthetics of In-surgery CAD/CAM Dentistry

11:15 – 11:30

MEET THE SPONSORS / COFFEE BREAK

11:30 – 12:15

Dr. Anton Lebedanks, Russia

Adj Cut – Behind the Scenes

12:15 – 13:00

Dr. Marcus Engelschal, Germany

Double Scan vs. Single Scan – Two different workflows for essential improvement in fixed prosthodontic reconstruction in implantology

13:00 – 14:15

LUNCH / MEET THE SPONSORS

14:15 – 15:00

Dr. Marcus Engelschal, Germany

The virtual scan in prosthodontics – new workflows for more predictability

15:00 – 15:45

Dr. Petros Yvanoglou, 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 Severace, USA

The Landscape of Digital Dentistry

18:00 – 20:00

DISCUSSIONS

HANDS ON COURSES

VENERS vs. CROWNS THE CHALLENGE IN SMILE DESIGN
Dr. Eduardo Mahn, Chile
12 November 2014 (09:00 – 17:30)

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

VENERS vs. CROWNS THE CHALLENGE IN SMILE DESIGN
Dr. Eduardo Mahn, Chile
16 November 2014 (09:00 – 17:30)

Laser in Dentistry: Behind the Scenes
Dr. Eduardo Mahn, Chile
16 November 2014 (09:00 – 17:30)

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Dr. Caroline Tabarani, UAE

Lecture

Oral Health Management: Between Myth and Reality

09:45 – 10:30

Prof. Mary Rose Pincelli Boglione, Italy

Lecture

Management of The Orthodontic Patient

10:30 – 11:15

Victoria Wilson, Dental Hygiene Therapist, UK

Lecture

Communication & Implant Maintenance

11:15 – 11:45

Prof. Mary Rose Pincelli Boglione, Italy

Lecture

Polishing will Brighten Your Smile!

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**GAME PLAN**

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3. Complete the Game plan with products & stamps
4. Submit your contact details to the reception
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In ‘bleeding on probing’ trials over 4 weeks, **parodontax®** demonstrated significant effects in reducing bleeding gums by 22% (p<0.01).

Bleeding on probing increased after 4 weeks of brushing with the fluoride control toothpaste.

**Reduced bleeding on probing index after 4 weeks with parodontax®**

<table>
<thead>
<tr>
<th>Change vs baseline in bleeding on probing index after 4 weeks</th>
<th>Baseline</th>
<th>4 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoride-containing control toothpaste</td>
<td>23.75</td>
<td>26.00</td>
</tr>
<tr>
<td>parodontax®</td>
<td>25.40</td>
<td>19.80</td>
</tr>
</tbody>
</table>

*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 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 (7.36). *parodontax® vs control p<0.05.
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 of tooth #9 and extraoral photographs were obtained (Fig. 1). Upon clinical examination and review of the digital radiograph, I saw tooth #9 was horizontally fractured at the middle third. There was no pulp exposure evident, but the tooth did have a pinkish tint on the lingual. No mobility was noted and no periapical changes or root fractures were obvious at this time. The new American Association of Endodontists guidelines recommend taking one occlusal and two periapical radiographs with different lateral angulations for all dental injuries, including crown fractures. If cone beam-computed tomography is available, it should be considered to reveal the extension and direction of the fracture.1

Dr. Edward Mills in his presentation on Site Development and Implant Protocol Based on Etiology of Tooth Loss refers to a similar traumatic injury in which CT images revealed not only a root fracture within the bone but a fracture of the lingual plate.2 Upon clinical examination and radiographic evaluation of the fracture,1 it was determined that 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 maxillary anterior quadrant as well as obtain a bite registration (Figs. 3, 4). CS Restore software was then utilized to design the anterior crown (Figs. 5-7). The CS 5000 milled the crown from an

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Figure 1

Figure 2
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 tooth and are used to cover the teeth, aiming to enhance their appearance.

Many celebrities opt for this esthetic treatment to achieve what may seem like a picture-perfect smile. This may lead people to a false expectation that everyone is a good candidate for veneers. However, from a dentist’s perspective preparing and planning for veneers is very challenging, and if proper analysis of 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 veneer.

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 (Usel-Corot 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 is more likely to be a better candidate for veneers than teeth.

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

Marginal stains can be minimised changed after veneer placement to maintain the esthetics of their veneers (Beier et al., 2012). Marginal stains can be minimised by brushing or rinsing after smoking and consumption of dark colored foods.

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

Additional complications can arise during the preparation of teeth. There are two common approaches to placing porcelain veneers, one is done without altering the natural teeth - bonding the porcelain veneers to unprepared teeth. This might seem a conservative choice avoiding alteration to tooth surfaces, but it inevitably creates a bulky over-contoured appearance and increases the risk of the veneer de-bonding and gingival complications. Alternatively teeth are prepared for veneers by changing external contour, removing less than a millimetre of the facial surfaces and around 2 mm of the incisal edges, thus porcelain replaces the tooth structure removed, ensuring the porcelian 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 rate of the first method is much lower than the second method. The commonest complications with veneers are breaking and chipping (Usel-Corot et al., 2000)(Layton and D’Pall, 2013)(Akoglu et al., 2011).

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

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

References are available from the author.
Case report surgical correction of a class III malocclusion in an adult

By Dr. Fabien Depardieu

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

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

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

Diagnostic and Etiology

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

The pretreatment extra-oral photographs showed symmetrical facial structures (Fig 1). The patient had a concave profile, a decreased nasolabial angle and a protrusive lower lip. The intra-oral photographs (Fig 2) showed a Class III occlusion on each side with an anterior crossbite and without apparent crowding. Overjet was -2.0 mm, and overbite was -3.5 mm. His maxillary anterior teeth were prognathic, with inadequate display when smiling. The mandibular dental midline was deviated 2.5 mm to the right, although the maxillary dental midline was coincident with the facial midline. There were no signs or symptoms of temporomandibular joint dysfunction. Mandibular movements, such as maximal opening and lateral and anterior displacement were within normal limits. No deviation and pain were discovered during the border movement of the mandible. A cephalogram and a panoramic radiograph were taken before treatment. The cephalometric analysis and its tracing showed that the mandible protruded relative to the cranial base (SNB angle, 82°; ANB angle -3°). 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 upper right 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, fetiduration 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 decompensate 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 18 months of active treatment. Bonded lingual retainers were fitted to the lingual surfaces of the anterior teeth in both arches. Maxillary and mandibular essix retainers were delivered with instructions to wear them full time for two weeks and then night time.

**Treatment Results**

The post treatment photographs (Fig.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 decompensation of the malocclusion, is necessary. The dental decompensation we performed was intended to retract the proclined maxillary incisors to a normal axial inclination. Lack of optimal dental compensation compromises the quality and quantity of an orthodontic correction. The patient’s teeth were decompensated 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 aesthetic 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 rehabilitation by correcting any emerging dental discrepancies (2).

**References**


**Contact Information**

Dr. Fabien Depardieu
Orthodontist specialist at Dr Roze & Associates Dental Clinic
fabien@dradubai.com
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. As a result, the dental implant market will continue its decline before stabilising in 2015. Only then will the European market slowly begin to recover. Factors such as low gross domestic product growth and high unemployment continue to render dental implant procedures—which are primarily paid out of pocket by patients—cost prohibitive, while alternatives, such as bridges and dentures, that are perceived as more affordable will represent attractive options.

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

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

Straumann’s price reduction is not its only foray into the value market. In the first quarter of this year, the company purchased US$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$600 million. While the effect of this acquisition on the market remains to be seen, the fact that the sales force will not be decreasing bodes well for the newly merged companies, likely resulting in an increased market share in the dental implant segment.

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

This, combined with the aforementioned economic factors, is turning the market into a dynamic, acquisition-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 US-based market information provider.
SameDay Dental Implants® & Teeth
A Surgical & Prosthos Protocol

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

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

Several clinicians then proceeded to immediately load these one stage implants with good success provided good primary stability (more than 45Ncm) was achieved at time of implant placement and provided micromovements could be limited to 100µm. 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 acceptability.

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

1) Angled implants in a tilted manner placed into available bone anterior and posterior to the maxillary sinus (Fig 2).
2) Wider and appropriately shaped implants placed into intermediate extraction socket walls thereby avoiding socket or sinus grafting (Fig 5).

High Primary Stability
An important factor for immediate loading success is high primary implant stability (greater than 45Ncm) which can be achieved by using a surface enhanced tapered implant design to enhance lateral compression of bone. By underprepping, high insertion torque and primary stability can be achieved even in cases of decreased bone density such as is often the case in maxillary alveolar bone and as well as in osteoporotic patients. Primary stability can easily be measured during implant placement with a torque wrench (Fig 4).

If 45Ncm insertion torque is not achieved, the implant should be removed and further bone preparation a 1mm wider implant is placed. This usually results in adequate primary stability of 45Ncm for immediate loading. If 45Ncm insertion torque is still not achieved then again the implant can be removed and replaced with an even wider diameter implant if the available bone width permits. This very rarely results in adequately high insertion torque and primary stability for an implant to be loaded immediately. Scientific research shows less bone loss, better bone levels and peri-implant soft tissues when the transmuscular abutments are placed at time of surgery and never removed (Fig 5). Healing caps are then placed on the multi-unit abutments (Fig 10). After abutment placement, at the same surgical appointment, the impression is taken at abutment level and provisional acrylic screw retained fixed teeth are placed in the same day as the implant surgery.

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 then connected and torqued to 45Ncm directly onto the implant without an intermediate/transmuscular abutment (Fig 11). No multi-unit abutment is included or placed in the single implant case as the multiunit abutment has no anti-rotation feature. This flapless/minimal flap surgery in extraction cases is based on a mucosal punch is reflected. The integrity of the extraction socket walls is inspected and assessed with a 15mm or 20mm periosteal probe placed into the extraction socket walls. If the extraction socket walls is performed with the probe (Fig 12) and this is complicated 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 change that allows 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 a 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 and quality
2) Implant length & diameter
3) Implant distribution (A-P spread)
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. All implants with good primary stability (>45Ncm) are immediately loaded with screw-retained teeth. For single implant cases, the final all ceramic screw retained tooth is fabricated and delivered to the patient within six hours. For multiple implants cases, temporary screws retained acrylic teeth are fabricated with an acrylic screw retained all ceramic or metal ceramic teeth are delivered one week later.

Timing of Immediate Loading Dental implants either should be loaded the earliest possible (never exceed ten days after stability) or alternated two months after placement. This is because the so-called initial instability (mechanical stability) that an implant has, starts to drop gradually and the implant cannot tolerate load if failure is applied. Fortunately, simultaneously a “secondary stability” (Osteointegration) starts to build up. The sum of the two “stabilities” which is demonstrated on the stabilty 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 planning is required. 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. All implants with good primary stability (>45Ncm) are immediately loaded with screw-retained teeth. For single implant cases, the final all ceramic screw-retained tooth is fabricated and delivered to the patient within six hours. For multiple implants cases, temporary screws retained acrylic teeth are fabricated with an acrylic screw retained all ceramic or metal ceramic teeth are delivered one week later.
While the patient is waiting in the operative impressions, impressions are taken during the surgery, either buccal/lingual surfaces of the teeth, are fabricated, which will be used during the surgery to guide the implant placement.

**Impression During Surgery**

An impression of the implants is taken during the surgery, either via implant at level for single implants, at level alignment for multiple implants, or following a crestal incision. It's imperative to make sure that the impression copings are seated well all the way onto the implants (peritapical x-rays can be used for verification).

For the prosthetic restorations, the open tray technique is recommended with the use of very hard additions, such as silicon impression material.

At the end of each surgery, preoperative impressions, impression of the implants and bite registration are provided to the dental lab (Fig. 10). The dental technician mounts the implant models and starts the fabrication of the implant prosthesis.

**Single Implant Reconstruction**

For single implant cases the permanent, screw retained, all ceramic zirconia teeth are fabricated immediately with the use of prefabricated zirconia cores (Fig. 19). They are available in different sizes and shapes, according to the prosthetic platform of the implant in use and the available prosthetic space, between the adjacent teeth.

While the patient is waiting in the recovery room the dental technician grinds and shapes the zirconia core and eventually bakes the porcelain on to it. Four to six hours later the permanent tooth is placed into the mouth of the patient. The prosthetic screw is torqued down to 45 Ncm. 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 silicobr=lingual surfaces of the teeth, are fabricated, which will be used during the surgery to guide the implant placement.

Once all necessary modifications are made and the patient is satisfied, we need to convey all newly established parameters of the prosthesis onto the technician. This is achieved by:

1. taking photos and videos to record the esthetic result, in the mouth and
2. using the so-called “Clinical Remounting Procedure”, in the laboratory.

Alginates impressions and bite registration are taken from the temporary teeth, which are removed from the mouth and remounted on the articulator. From the newly remounted teeth the clinical technique was fabricated:

1. a series of silicon keys which will guide him to fabricate the permanent teeth and
2. an “Anterior Custom Made Guiding Table” (Fig 22) which will allow him to reproduce the occlusal scheme of the temporary teeth to the permanent teeth.

Two months later the temporary teeth are placed again in the mouth of the patient and the screw is torqued down to 20 Ncm. He is instructed not to bite hard onto the acrylic teeth andocclusion is checked adequate instructions are provided to him.

2. Permanent Teeth Fabrication

With the help of i) the interchangeable implant and temporary models, ii) the silicon keys, iii) the anterior custom made guiding table (Fig 22), the prosthetic screw is torqued down to 25 Ncm and the prosthesis is delivered. A night guard is provided and the patient is instructed to wear it every night. Oral hygiene instructions are demonstrated and their importance is emphasized.

**Follow up**

Two months later the occlusion of the implants 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 late complication of the prosthodontic complications are porcelain fractures/chipping. These are caused by breaking the teeth, and relaxing the porcelain.

**Conclusion**

By using tapered angular implants as well as wide immediate molar replacement implants in a prosthetically driven fashion it is possible in most cases to avoid bone grafts, achieve high primary stability and treat patients with implants and passively fitting, screw retained teeth all in the same day (Fig 27). This reduction in treatment time, immediate function and cost saving leading to high patient satisfaction and implant acceptance by patients.
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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.

Dr. Mohamed Hassanien
B.D.S – M.D.S – P.H.D
Fixed Prosthodontics dept.
Faculty of Dentistry – Cairo University
I.S.C.D Certified Cerec Trainer

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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 tarnish 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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