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Shear Bond Strength to Zirconia (Cercon) after 3000 thermal cycles

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(Source: Kuraray Norilake Dental Inc.)
Some ‘styles’ are eternal

_Cosmetic dentistry will never go out of style. Why? Because a beautiful smile is always in style. I first became interested in cosmetic dentistry when I was in high school, working with dentures for my family dentist. I couldn’t believe what a boost a nice denture can give a patient. It was more exciting than plastic surgery. In fact, given the acrylic nature of dentures, it was “plastic surgery” at its finest. The dentist I worked for taught me a valuable lesson that applies to all aspects of cosmetic dentistry: A good-looking denture always fits better.

After dental school, I began my residency at the dawn of adhesive cosmetic dentistry. Back then, cosmetic dentistry wasn’t considered “serious” dentistry, at least not by most dentists. Yet, my patients thought it was serious. Heck, they thought it was damn exciting. They even thought it was glamorous too, which made me even more excited to get involved. I was there at the beginning for good and for bad. The good is that I’ve seen a lot and learned a lot, and the bad is that I made many mistakes in the beginning. This is why what we do is called “a practice.”

It’s also why I urge all cosmetic dentists to always consider first the most conservative approach. As health-care providers our first obligation is to do no harm. The least amount of treatment that yields the desired outcome is the best treatment. You can always do more, but you can’t put back what you’ve already taken away.

That’s why almost all cosmetic cases begin with whitening, then consider bonding before veneers, veneers before crowns, endo before extractions, implants before bridges and so on. Unfortunately, with all the excitement over cosmetic dentistry from both the public as well as the dentists’ perspective, too much cosmetic dentistry is being done, and not always conservatively nor correctly. This has led to another growth industry in dentistry — the redos. And these are not always the happiest or the most appreciative patients.

That’s why the American Academy of Cosmetic Dentistry (AACD) is so important. It’s the only organization that’s dedicated to training cosmetic dentists, and the accreditation process substantiates that commitment. The AACD recommends that all cosmetic dentists visually document everything. Moreover, with digital photography, it’s now very easy to do this. A cosmetic dentist should be his or her own worst critic. Everyone should have a digital camera and take a full series of before-and-after photos of every patient. These can be just as important as radiographs, and when it comes to esthetics, even more so. In addition, be sure you share all these pictures with your patient. This is an important start and finish to every cosmetic case.

And please keep in mind that recent studies have proven that certain axioms — such as men have square teeth and women have round teeth — are not always true. That’s why it’s important to use smile guides to help the patient choose the appropriate shape and length combination for the front teeth, especially for worn dentition and redos. I also recommend composite mock-ups, cosmetic imaging and/or a “trial smile” before beginning any big cosmetic case. You always want to know where you’re going before you begin.

I truly believe that only a dentist that’s forever critical of his or her own work can continue to improve. Finally, I encourage every dentist who wants to provide cosmetic dentistry to join the AACD and begin the accreditation process.

Sincerely,
Lorin Berland, DDS, FAACD
**c.e. article**

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Resin bonding of the human dentition has become a “standard” in the United States and Canada. There are more than 80 different bonding systems on the market today. We have seen them evolve through multiple generations in an attempt to “simplify” the bonding process. Yet, as these agents have simplified, many in our profession have seen many challenges arise.

A significant number of reports in the literature have been showing that the “immediate bonding effectiveness of contemporary adhesives are quite favorable, regardless of the approach used [however] in the long term, the bonding effectiveness of some adhesives drops dramatically.”1 They continue to report that these bonding agents do not coagulate the plasma proteins in the dentinal fluid enough to reduce this permeability. The fluid droplets contribute to the incompatibility of these simplified adhesives and dual-/auto-cured composites in direct restorations and the use of resin cements for luting of indirect restorations.

The term “water-tree” formation has been coined to describe this process, which originated from the tree-like deterioration patterns that were found within polyethylene insulation of underground electrical cables. It is now being applied to the water blisters formed by the transfer of dentinal fluid across the dentin-bonding interface. These “water blisters ... act as stress raisers and form initial flaws that cause subsequent catastrophic failure along the adhesive-composite interfaces.”4

Bioactive materials support proactive dental care

Author: John C. Comisi, DDS, MAGD

Fig. 1 Fig. 2 Fig. 3

This article qualifies for C.E. credit. To take the C.E. quiz, log on to www.dtsstudyclub.com. The quiz will be available on Sept. 28.
The previously mentioned plasma proteins are released by the dentin when subjected to acids and cause hydrolytic and enzymatic breakdown of the dentin and resin bonding agent interface. These enzymes are called matrix metalloproteinases (MMPs).

Currently, there are only three methods of reducing these MMPs: 2 percent chlorhexidine solutions that are used prior to application of bonding agents; etchants containing benzalkonium chloride, otherwise known as BAC (i.e., Bisco's Uni-etch products); and polyvinylphosphonic-acid-producing products (glass ionomer and resin-modified glass ionomers).

Due to the short efficacy of these chlorhexidine solutions being used before bonding, this methodology has come into question as of late. Etchants with BAC have been shown to be valuable in the reduction of MMPs and should be considered in all bonding processes. However, the most intriguing methodology of reducing MMPs and remineralizing tooth structure is with the use of glass ionomer cements (GIC) and resin-modified glass ionomers (RMGIC).

Glass ionomers and resin-modified glass ionomers

Glass ionomer cements have long been used as a direct restorative material. Their early formulations made the material difficult to handle, and the break down of the material made it an undesirable solution in dental restoration. However, these materials, especially in today's formulations and pre-encapsulated presentations, have many properties that make them very important in the restorative process.

The work at companies such as SDI North America (Riva product line), GC America (Fuji product line) and VOCO (Iono product line) have continued to make great strides in improving these products for easier and longer-lasting use of GIC and RMGIC products.

First, these materials are bioactive, and up until recently, they were the only materials with this property; that is they have the capacity to interact with living tissue or systems. Glass ionomers release and recharge with ions from the oral cavity.

This transfer of calcium phosphate, fluoride, strontium and other minerals into the tooth structure helps the dentition deal with the constant assault of the acidic nature of day-to-day ingestion of food and beverages and encourages remineralization; and the incorporation of phosphorous into the acid in today's GICs creates polyvinylphosphonic acid.

This property of GICs makes them a major agent in the reduction of MMP formation, and thereby minimizing if not eliminating the collagen breakdown commonly found in many resin-dentin bonding procedures.

Second, they bond and ultimately form a union with the dentition by chemically fusing to the tooth. The combination of the polyacrylic acid and the calcium fluoroaluminosilicate glass typically found in GICs reacts with the tooth surface, which releases calcium and phosphate ions that then combine into the surface layer of the GIC and forms an intermediate layer called the "interdiffusion zone."

No resin bonding agents are required due to this chemical fusing to the tooth structure. This ion release helps inhibit plaque formation and provides an acid buffering capability that helps to create a neutralization effect intraorally. In addition, these GICs have very good marginal integrity with better cavity-sealing properties, have better internal adap-
tion and resistance to microleakage over extended periods of time, have no free monomers, can be bulk filled and offer excellent biocompatibility. 11

Another important consideration is that GICs are moisture-loving materials, which makes them very sensible for use in the intraoral cavity.

The transfer of dentinal fluid from the tooth to the GIC essentially creates a "self-toughening mechanism of glass ionomer based materials ... serves to deflect or blunt any cracks that attempt to propagate through the matrix [and] ... plays an adjunctive role by obliterating porosities [which] delay the growth of inherent cracks in the GIC under loading." 4

The intermediate layer of the GIC provides flexibility during functional loading and acts as a stress absorber at the interface of the restoration and the tooth. 12

Resin-modified glass ionomers (RMGIC), which are a hybrid of traditional glass ionomer cements with a small addition of light-curing resin, exhibit properties intermediate of the two materials. 13 This material has been shown to have properties similar to GIC, but with better esthetics and immediate light cure. RMGICs have been shown to undergo slight internal fracturing from polymerization shrinkage, yet have an inherent ability to renew broken bonds and reshape to enforce new forms. 12

Application of RMGIC to all cut dentin in Class II composite restorations has been shown to "significantly reduce micro-leakage along (the) axial wall" of the restoration, 14 and helps prevent bacterial invasion of the restored tooth. RMGIC biomaterials are multifunctional molecules that can adhere to both tooth structure and composite resin, thus providing an improved sealing ability by chemical or micromechanical adhesion to enamel, dentin, cementum and composite resin.

They, like GICs, can be bulk filled to reduce the amount of composite necessary to restore the cavity preparation and act as dentin substitutes in the restoration. 15

The use of GIC and RMGIC in the restoration of posterior Class V restorations and conservative Class I restorations provides many benefits. They are easy to place and reasonably forgiving, even in a slightly moist environment. They should be placed in a moist but not wet environment, so familiarity with technique is imperative as it is with all dental restorations. I will often use Riva SC (SDI) or Fuji 9 GP Extra (GC America) in posterior Class I and V restorations (Figs. 1–7).

Polishing and shaping of the materials must be done with water spray and fine/ultra fine composite finishing burs and polishers so as not to destroy the surface of the material (Fig. 8). The use of RMGIC products, such as Riva LC or Fuji II LC, is great in bicuspid and anterior Class V restorations, especially in high caries prone patients (Figs. 9–12).

Class II restorations, however, have always presented a challenge to the clinician. If the operator wanted to use GIC or RMGIC, there was no easy way to do this that appeared to provide satisfactory results. It is with this in mind that the "sandwich technique" was developed.
It was thought that using the properties of GIC to bond to the tooth and then applying resin-bonding agents and composite to the set GIC could help reduce sensitivity and bond failures typically seen in many resin-bonded composite (RBC) techniques.

Typically, the GIC is placed in the preparation, allowed to set, cut back to ideal form and then bonded to with an RBC technique. However, the inability of RBCs to adhere to the set GIC often creates many failures. The materials by themselves are incompatible over the long term.

The modified sandwich technique evolved as a means to overcome this problem. Placing RMGIC over set GIC — and then adding a RBC to that — provided a better solution, but was as laborious and time consuming to do, as is the sandwich technique.

**The ‘Co-Cure Technique’**

In 2006, an article was published\(^\text{16}\) that, in my opinion, has revolutionized the way I approach direct posterior restorations and direct restorations as a whole. The article presented a radical approach to direct posterior restorations, called the Co-Cure Technique. This technique is defined as the simultaneous photo-polymerization of two different light-activated materials that involves “the sequential layering of GIC, RMGIC and composite resin prior to photo-polymerization and before the initial set of the GIC [which] enables an efficient single-visit placement of a [direct] restoration…”\(^\text{16}\)

In the Co-Cure Technique, the composite restoration does not require a bonding agent because the bonding agent is essentially the RMGIC. The RMGIC acts as the interface between the GIC and the composite.
posite material. It combines the GIC, RMGIC and composite in a way to form what can best be described as a "monolithic biomimetic restoration."

This restoration is an "open sandwich" type of sandwich technique. That is, the GIC component is exposed to the oral environment (Fig. 13) at the gingival portion of the restoration. It is quickly and efficiently accomplished and has significantly reduced postoperative sensitivity compared with typical direct RBC techniques. I have been placing these types of direct posterior restorations since 2008. They have become the cornerstone of my practice.

Technique procedure (Fig. 14)

After placement of an appropriate dental matrix, the technique incorporates the use of 37 percent phosphoric acid to prepare the tooth for restoration. The acid is essentially "flooded" into the preparation in a similar manner to doing a "total-etch" RBC. It is, however, washed off after five seconds of placement. The tooth is then dried but not desiccated. The area remains slightly moist because the GIC that will be placed next is hydrophilic.

Fill the preparation with the triturated GIC material up to the level of the DEJ, then immediately place the triturated RMGIC in a very thin layer to cover the GIC and walls of the preparation. Finally, place the composite over the previous materials to slightly overfill the preparation. With a large round burnisher dipped in an unfilled resin material (i.e., Riva Coat by SDI or G-Coat by GC), wipe away the excess GIC and composite restoration material to create your margins and prevent ditching and white lines.

The occlusal table of the restoration can then be compressed gently with a plastic occlusal matrix by either having the patient bite or by the operator pressing gently with his thumb or forefinger to improve the coalescence of the three materials. This can help reduce the time involved in creating the final occlusion of the restoration by creating a functional occlusal table.

The restoration is then cured for 30 to 40 seconds with an LED curing light that generates at least 1,500 mw/cm². Appropriate light output is critical for all direct cured restorations, and assurance that appropriate output is provided by the curing light is needed for complete cure of any direct restoration.

The restoration is evaluated for complete cure and then a layer of an unfilled resin is placed on the exposed GIC/RMGIC/composite complex and cured for an additional 10 seconds. The matrix band is removed and the restoration is trimmed and polished as any typical RBC restoration would be.

I have found that an entire three-surface posterior restoration can be accomplished in less than three minutes. This makes the direct posterior restoration quite efficient and beneficial to the clinician and the patient because we are providing a restoration that will help enhance healing of the dentition and reduce recurrent decay and restorative failure.

Nanotechnology in dental materials

Nanotechnology involves the production of functional materials and structures in the range of 0.1 to 100 nanometers by various physical or chemical methods. Today, the development of nanotechnology has become one of the most highly energized disciplines in science and technology because it can stimulate the creation of many new materials with previously unimagined applications and properties.

Several studies have shown that the inclusion of these types of nano-fillers and nano-fibers into the dental materials (dental composites and bonding agents) can improve the physical properties by increasing the strength, polishability, wear resistance, esthetics and bond strengths in many dental applications.

It is also envisioned that the incorporation and utilization of these nanoparticles in the form of nanorods, nanofibers, nanospheres, nanotubes and ormocers (organically modified ceramics) into dental restorative and bonding agents can create more biomimetic (life-like) restorations. This will not only enable these materials to mimic the physical characteristics of the tooth structure, but will also be able to facilitate the remineralization of that structure.

As Saunders states in his conclusion, "such nanorestorative biomaterials could very credibly be the next transformative clinical leap" in restorative dentistry.

Giomers

In that vein, an exciting advancement in bioactive materials is the development of giomer products (Shofu Dental, Beautifil II, and Beautifil Flow Plus). These giomers are resin-based composites that contain pre-reacted glass ionomer particles (S-PRG). These particles are made of fluoroaluminate glass reacted with polyacrylic acid (just like a GIC), just before being incorporated into the resin. This creates a new type of bioactive material.

These giomer products display properties in a manner similar to GICs: They release ions and recharge with ions from the oral cavity, inhibit plaque formation and neutralize and buffer the acids of the mouth.

No other composite material has this property to date. I use these giomers instead of traditional nano-hybrid composites in my restorations because of these properties. They complete the entire
biomimetic and bioactive nature of all the co-cure procedures that I create.

The Beautifil Flow Plus product line has also expanded the way that I create restorations due to their unique viscosities. These materials can be stacked (Fig. 15) and used in a restorative process I call the “modified resin cone technique” (Fig. 16).

They can also be applied to create direct composite veneers that can be easily placed, sculpted and highly polished (Fig 17). Easy placement, the ability to stack and maintain position and shape, plus their bioactive nature, make these materials a “game changer.”

Resin-modified, light-cured bonding agents

Another advancement that I have been working with is a product that is a resin-modified, light-cured bonding agent (SDI, North America: Riva Bond LC). This product is a specially formulated liquid RMGIC that can be used to bond composite restorations in the traditional sense, used in traditional sandwich and modified sandwich techniques and, of course, used in the Co-Cure Technique.

This concept is especially appealing in light of the research that indicates RMGICs provide quite good marginal seal when used as a bonding agent on cut dentin surfaces.\(^1\) I especially like to use it with the Co-Cure Technique and when doing anterior restorations.

Using this technique I am able to get a completely biomimetic, bioactive restoration in both situations because of the bioactive nature of the materials used.

The technique for use of this RMGIC bonding agent with composite is as follows:

1) Etch with 37 percent phosphoric acid for five seconds.
2) Wash and dry but do not desiccate.
3) Triturate and apply the RMGIC bonding agent with a micro-brush and cure for 20 seconds.
4) Place composite to fill the preparation and cure as appropriate.

When I use this material in the Co-Cure Technique, I just substitute it for the traditional RMGIC material that I would have used otherwise.

Resin-modified calcium silicates

Another recent interesting product release is from Bisco and is called TheraCal ™ LC. This light-cured bioactive material is used to seal and protect the dentin-pulp complex. It is the first of a new class of internal pulpal protectant materials known as resin-modified calcium silicates (RMCS).

It acts as a pulp capping and liner material. Calcium hydroxide (CH) has been the “gold” standard for pulp capping for many years. However, it has always had difficulties in use as a liner under RBC adhesives. In fact, despite their frequent use, the success of CH based therapies is only 30 to 50 percent.\(^2\)

It has also been shown that traditional resin-based light-cured liners have been cytotoxic to cultured odontoblast-like cells, while light-cured resin-based MTA cements presented the lowest cytopathic effects.\(^3\) Based on this, the creation of light-cured RMCS is a logical step in developing a solution for direct pulp protection.

Calcium has been shown to be crucial to the formation of apatite, dentin bridge formation and re-apatite potential of affected dentin. Additionally, alkalinity also seems to be contributory toward this goal. This combination in the RMCS material appears to form good, hard and thick dentin bridges and stimulates dentin pulp cells to turn into odontoblastic dentin cells.\(^4\)

This type of material represents a promising new direction in direct pulp-capping clinical procedures with its ability to form apatite and further contribute to the formation of new dentin.

Conclusion

It is my belief that using bioactive materials in the provision of care for my patients has been paramount to the success of the care I have been providing. In this way, I have provided ways to heal the dentition, enhance the restoration and improve the health of my patients.

I believe we are on the threshold of further bioactive material advancements and that learning and incorporating these restorative materials into the day-to-day provision of care will continue to help our patients, our practices and our profession.

References

4. Tay FR, Frankenberger R, Krejci I, Bouillaguet S,


8. CE Renson, BDS, PhD, FF GDP(UK) DDPH, LDS RCS, FICD. The Future for Clinical Dentistry. Hong Kong Dental Journal 2004;1:5–12


14. Titley, K BDS, MScD, FRCD, Kulkarni, G, BDS, MSc, PhD, FRCD. Paediatric Dentistry: How In-Vitro Research Can Contribute to an Appreciation of the Clinical Requirements for the Long-Term Success of Bonded Restorations In Primary Molar Teeth. Oral Health, July 2003.


23. IADR 2011, Abstract #2520, Gandolfi et al. Apatite-forming ability of TheraCal pulpcapping material.

about the author

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Esthetic long-span bridge using BruxZir

Author: Mark McOmie, DMD

One of the challenges that we face in dentistry today is how to build a long-span bridge with maximum esthetics in mind. In the age of implants, we can usually shorten the span by adding in a few implants or eliminate the need for a bridge altogether by using implants to replace those missing teeth.

However, what about those cases where we don't have the quality or quantity of bone that we need, a medical history that won't allow implant surgery such as free bleeding, a high-risk host such as a poorly controlled diabetic, smoker, etc.? Often times a patient doesn't desire to go through the complex surgery of a sinus lift or bone graft to make an acceptable site for implants.

Patients should be given the options and risks associated with each approach and allowed to make an informed decision with the dentist's guidance. For a missing tooth there could be five or more options presented to the patient as ways to restore the space.

A case history

In 1998, a 39-year-old female presented with an abnormally loose tooth #12. Upon radiographic and clinical examination, it was noted there was little to no root left on teeth #10–13. Teeth #8 and #9 appeared normal as did tooth #14. Her gingival health was optimal and her medical history was unremarkable, and she was taking no medications at the time.

The patient recalled that when she was 14 years old she was hit in the face right above these teeth with a golf club during a friend's backswing, which probably lead to the resorption of the roots of the teeth in question. All options and risks were explained to the patient.

The sinus floor was 3 to 4 mm from the crestal bone. Implants with a sinus lift to allow room for placement were discussed. The patient did not like the idea of surgery and the healing time that would be required for a permanent restoration.

A partial was discussed; however, the young patient did not want to have a partial and was worried her esthetic demands would not be met. More options for less permanent treatment were offered, but the patient did not desire them.

The patient choose to do a long-span bridge, double abuting on teeth #8 and #9 with pontics to replace teeth #10–13 and using tooth #14 as a distal abutment. This would meet the patient’s demands for esthetics.
for esthetics and be a non-removable restoration. She would have the permanent restoration in less time than it would take to undergo implant therapy.

Porcelain-fused-to-metal was used on the original bridge work done in 1998. The highest noble metal content available that could span a four-pontic length was used. The porcelain work was done with a layered porcelain technique to provide a life-like appearance.

In January 2012, the patient, who was now 52 years old, presented with a broken tooth. She was eating a peppermint, incised it with the distal of tooth #8 and fractured the porcelain in an incisal gingival direction. About 2 mm of porcelain came off toward the distal contact.

The metal substructure of the bridge was showing. The piece of porcelain was intact. She was on her way to a meeting she could not get out of and desired a temporary fix.

I tried the piece of porcelain in and found it to be adequate but not an exact match for fit. Some of the porcelain had chipped away and was lost. I roughened the surface of the bridge in her mouth in the area that needed the repair then placed K-etchant Gel by Kuraray to clean the area. I used Alloy Primer from Kuraray on the metal substructure.

On the porcelain, I placed Clearfil Ceramic Primer. Clearfil Majesty flowable composite was placed on the metal and on the piece of chipped porcelain. I refit the porcelain and light cured. All of these materials to do the repair are readily available in the Clearfil Repair Multi Purpose kit from Kuraray.

It makes life simple to have everything you need in one place. The patient was able to get on with her day and make it to her meeting (Fig. 5). You can see the repair on the distal of #8.

_Material selection_

In the pre-op photo (Figs. 1, 3, 5) you can see there is the telltale sign of a metal allergy to the metal that is in the bridge. The dreaded “black gum” look. In addition, there is a difference in height of the gingiva on teeth #8 and #9. The patient had already made the choice of a bridge, now we had to decide which material to use.

The patient reported that she has metal allergies to jewelry unless it is gold. So odds are high that any metal we use that is not 80 percent gold or more is going to cause a metal allergy and the dark gingiva. However, a metal that high in gold will bend on this long of a span, so we ruled out the use of metal. By eliminating the metal, the “black gum” look will go away (Figs. 5, 6).

BruxZir was the material of choice for this case. BruxZir is a solid zirconia material that is sold to laboratories in a pre-sintered disk. CAD/CAM technology is then used to design and mill the restoration.
BruxZir Zirconia exceeds the flexural strength of typical zirconia (up to 1,465 MPa versus 1,200+ MPa for typical zirconia). BruxZir exhibits three to six times the fracture toughness (also known as the K1C value) of typical zirconia.

To better understand this concept, consider that a piece of steel or lead has high fracture toughness, whereas glass or brittle materials have a low K1C value. This property gives it high impact resistance. It also has excellent resistance to thermal shock. This low thermal expansion means the restorations will remain very stable in the mouth.

BruxZir is available in all the Vita Classic shades. Due to the esthetic demands of the patient, a monolithic colored restoration would not be acceptable. By performing a “cut back” on the facial of the bridge, we could achieve the desired esthetics and have the necessary strength. The advantage of BruxZir zirconia over other zirconia frameworks with overlay porcelain is that the lingual and occlusal surfaces do not have the opportunity to de-bond or chip.

The old bridge had metal lingual on #8 and #9 (Fig. 3) and a metal occlusal surface on tooth #14. This allowed minimal tooth reduction. Using BruxZir allows us to use the same minimal reduction, as low as 0.5 mm, thus conserving tooth structure. In addition, BruxZir allows us to have the esthetics desired with no additional reduction (Figs. 3, 4).

If using a zirconia framework system that required full-contour porcelain, we would need to reduce tooth #14 substantially. This theoretical reduction would give a clinical height on the premolar of around 1 mm.

This would be an insufficient abutment for a bridge of this length. Minimal preparation of the tooth structure, especially on #14, makes BruxZir an ideal material.

Additional considerations were given to try to balance this smile. The patient wanted to change the anatomy of #7 and add a little more length. A veneer was added to this case on tooth #7. IPS e.max lithium disilicate by Ivoclar Vivadent was chosen for the veneer material. IPS e.max lithium disilicate is an all-ceramic material that is available in a millable block or pressable ingot using the lost wax technique. IPS e.max CAD blocks have a flexural strength of 360 MPa versus 400 MPa for the IPS e.max press ingot.

Blocks and ingots are available in various shades and levels of opacity to achieve a final shade match. A stump shade is recommended for IPS e.max due to the level of translucency. IPS e.max press was used for the veneer and is indicated for anterior crowns and bridges with one pontic as well as posterior single units. A gingival recontouring procedure to match gingival heights was performed on teeth #8 and #9 using radiosurge electrocautery.

Lab portion

This case was sent to Oral Arts Dental Laboratories, a full-service lab located in Huntsville, Ala. I took a stick bite to establish the horizontal place along with full upper and lower impressions and bite. Once the model work was completed, the models and dies required digital scanning. BruxZir is a CAD/CAM-fabricated material and thus must be digitally designed by a technician using a digital scanner and design software.

Once the final contours and design are complete, the file is “nested” or positioned in the zirconia disk (Figs. 10, 11) and milled to a full contour approximately 30 percent larger than the final restoration. Once the restoration is milled and removed from the disk, it is dipped in the appropriate coloring solution and sintered in an oven for 6.5 hours at 1,530 degrees Celsius where it shrinks to its final size.

I requested that Oral Arts e-mail me the initial design for my approval before milling (Fig. 7). The case met my expectations on design and we proceeded...
with fabrication. On large complex cases, I enjoy the option of approving digital case design via e-mail before case completion. After the bridge framework was sintered and checked for accuracy of fit and margins (Fig. 8), IPS e.max Ceram was stacked and baked onto the facial surfaces for enhanced esthetics. IPS e.max Ceram is a stackable ceramic powder within the IPS e.max system. The veneering ceramic is the key to highly esthetic results, both on lithium disilicate and on zirconium oxide (Fig. 9).

The veneer was then waxed to a cut-back shape with mamelons, invested, burned out using the lost wax technique and pressed using IPS e.max Press lithium disilicate. Once the veneer was divested, it was layered using IPS e.max Ceram to further improve esthetics.

**Final delivery and cementation**

One of the challenges of cementing a case like this is the fact there are two dental materials side by side. Tooth #7 has an IPS e.max veneer and teeth #8 and #9 will be BruxZir with porcelain facials. IPS e.max is more translucent than the BruxZir, thus allowing more visibility of the cement and tooth that is prepped.

The cement chosen for the bridge was Panavia SA Cement, a self-adhesive resin. I choose a self-adhesive resin cement for the bridge because it has ease of use in that it can be light cured, but if the light doesn’t penetrate the zirconia completely it will auto cure. This gives strength but also keeps the cementing process simple; it also would work on a full crown made of IPS e.max.

The cement for the veneer was Clearfil Esthetic Cement EX, a resin cement. Veneer preps do not have a retentive and resistant form. The veneer needs to have the maximum strength that resin bonding can give. I can get light though the veneer to fully cure the cement so an auto-cure option is unnecessary. Clearfil Esthetic Cement EX is one of the strongest bonds available and will work excellently on this veneer or a full crown made from IPS e.max.

Both restorations, the veneer and bridge, were tried in and contacts and occlusion checked. The colors were very close to exact to between the two restorations. Clearfil Esthetic Cement EX comes with try-in paste, so we used the try-in paste and found that Universal colored try-in paste on both the bridge and veneer made a perfect match.

K-etchant gel was used to clean both restorations; the abutments were cleaned using a prophy cup and simple flour pumice with no fluoride. Panavia SA Cement was placed in the bridge abutments and the bridge was placed on the teeth. There is no need for a silinating agent on BruxZir because Panavia SA Cement will bond to the zirconia. Then it was light cured in place and the excess cement cleaned off.

An advantage to this type of cement is that it gives the benefits of resin bonding, and if you can’t get the curing light to the cement through the material it will auto cure in five minutes on its own, thus giving the benefit of a resin cement but the ease of use of a glass ionomer. The veneer was treated with ceramic primer before resin bonding using Clearfil Esthetic cement in the Universal shade and light cured, then the excess cement was cleaned up.

**The bottom line**

In 2011, many labs reported the number of metal-free restorations surpassed the number of porcelain-fused-to-metal restorations for the first time. Most of these metal-free restorations are full-contour zirconia and lithium disilicate. Porcelain-fused-to-metal restorations have reigned as the predominant tooth-colored, indirect restorations for 50 years, so they have a long, successful history.

On the other hand, BruxZir has a much shorter history and most labs have only had it available for less than four years. The demand on the dentist to place esthetic restorations that are strong and will last has lead to BruxZir’s large market share. Learning new ways to employ this material is a must, and new innovative techniques can evolve to meet our patients’ demands._

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Fig. 10: Layout of crowns on a design computer to be milled in BruxZir.

Fig. 11: BruxZir disc with the crowns “nested” and fully milled.

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Identification and management of passive eruption

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This article qualifies for C.E. credit. To take the C.E. quiz, log on to www.dtstudyclub.com. The quiz will be available on Sept. 28.

Excessive gingival display can affect the total esthetics of a smile, becoming the focus instead of the frame of the smile. This can be the result of passive eruption of the gingival complex as the teeth erupt. The condition of delayed or altered passive eruption exists when the gingival complex remains positioned coronal to the cementoenamel junction with the attachment on the enamel instead of the cementum of the root, giving the appearance of short clinical crowns.

Crown lengthening is critical to the success of creating a smile that is harmoniously balanced with its surrounding facial features. Patients who clinically display too much gingival tissue and short teeth require a thorough diagnosis and treatment plan to provide a predictable esthetic outcome.

If a patient has altered passive eruption (APE) of the maxillary anterior teeth either secondary to orthodontic treatment or without orthodontic treatment, but the patient has completed facial growth, then the practitioner must first correct the gingival levels with either a gingivectomy or esthetic crown lengthening procedure before the placement of veneers or crowns. Thus ensuring that the eventual gingival margins of the maxillary anterior teeth will be at their correct level relative to the adjacent anterior teeth.

Understanding altered passive eruption

In a human mouth absent of periodontal disease, the osseous structure roughly follows the scalloped parabolic contour of the cementoenamel junction (CEJ), from facial to interproximal at an average distance of 2 to 3 mm.

Fig. 1: Excessive gingival display with pigmented gingiva.
Fig. 2: Wide band of heavily pigmented attached gingiva with passive eruption of the anterior teeth.
Fig. 3: Vacuform stent that has been scalloped at the desired gingival height to act as a surgical template.
In addition, the average interproximal bone height is 3 mm coronal to the facial crest of bone. Because the soft-tissue topography is usually determined by the underlying hard tissue, this osseous “scallop” usually results in a gingival scallop of 3 mm.

Examination of the peri-apical radiographs or periodontal vertical bite-wings will allow the clinician to ascertain the position of the alveolar bone relative to the CEJ of the teeth to determine whether the crest of bone (COB) is 2 to 3 mm apical to the CEJ, allowing for biologic width.

However, where the COB is coronal to the CEJ, a condition results that is referred to as APE. In this situation, the gingival margin will usually be located, on average, 3 mm coronal to the level of the crest of bone, being more coronal on the body of the tooth and creating the appearance of a short, clinical crown. These visual findings are coupled with the clinical information obtained by “bone sounding.”

Bone sounding involves using a periodontal probe to locate the CEJ and determine whether it can be felt within the gingival sulcus or only when the probe penetrates through the base of the sulcus. Additionally, the periodontal probe is also used to feel for the COB. This value is expressed as a numerical distance in millimeters, revealing the distance between the COB and CEJ to ascertain whether there is sufficient biologic width.

In addition to the gingival margin on the facial aspect of the teeth, in non-diseased dentition, the interproximal papilla between teeth with no bone loss due to periodontal disease is approximately 4.5 mm coronal to the interproximal crest of bone. The mid direct facial is about 1.5 mm more coronal to the COB.

This additional 1.5 mm, with the 3 mm average osseous scallop from the CEJ, results in the tip of the papilla being an average of 4.5 mm coronal to the facial free gingival margin, where there is a “normal” periodontium, with no loss of bone or periodontal attachment due to periodontal disease.

Anatomic considerations act as parameters when practitioners perform aesthetic gingival recontouring. A useful guide can be fabricated by modifying the mounted diagnostic casts so that the waxed modification reflects the ideal tooth proportions desired in the final result, based on the guidelines previously published by Chiche and Pinault.

These guidelines suggest that the average length for esthetically pleasing maxillary central incisors is 10–12 mm. These guidelines for the length of the central incisors, along with the recommended width-to-length ratio of 75 to 80 percent, should be kept in mind when recontouring the gingival tissues so as not to leave the teeth too long or too short.
After proportions are achieved on the central incisor proportions, practitioners should focus on the height of contour of the gingival margin on the centrals (zenith). The proper placement of the gingival zenith should be at the peak of the parabolic curvature of the gingival margin, which for the central incisors, cuspids and bicuspids, should specifically be located slightly distal to the middle of the long axis on these teeth. This gives the centrals, cuspids and bicuspids the subtle distal root inclination, which is paramount for the scaffold of a beautiful smile.

The zenith for the lateral incisors is located at the midline of the long axis of the tooth. Furthermore, the height of the gingival crest for the lateral incisors should be 1 mm shorter than the gingival margins of the adjacent teeth (centrals and cuspids).

Finally, the gingival tissues should be manipulated to have a resulting “knife-edge” gingival margin. When the presence of short clinical crowns and crestal bone levels approximating the CEJ has been determined, a diagnosis of APE can be made through the maxillary arch.

The practitioner can then fabricate an esthetic guide that can be placed over the patient’s existing teeth to enable both the practitioner and patient to visualize what the smile would look like with the gingiva in a modified, more esthetic position. The central incisors should demonstrate midline symmetry, as well as the correct 75 to 80 percent width-to-length ratio. In addition, the incisal smile line follows the curvature of the lower lip.

The newly established periodontal smile line should show a reduction of the gummy smile and make the smile more esthetically appealing and harmonious with surrounding facial features.

Gingival levels should be assessed relative to the projected incisal edge position. A predictable method of determining the proper gingival positions is to determine the desired tooth size relative to the projected incisal edge position. The practitioner should remember that the incisal edge should not be positioned using the relative position of the gingival margin to create the proper tooth size. This is because the gingival margin can move with eruption or recession.

It is also paramount when establishing the proper position of the maxillary anterior teeth for an optimal cosmetic outcome to assess the levels of the interdental papillary tissues and their position relative to the crown length of the maxillary incisors.
Gingivectomy and gingivoplasty for esthetic soft-tissue correction

Traditionally, scalpels and periodontal knives (Orban and Kirkland) were utilized to sculpt soft tissue when gingivectomy was the treatment being used to improve esthetics. These provided precise incisions, but the resulting raw, bleeding surfaces complicated postoperative healing. Monopolar electrosurgery, another option, requires a dry field during treatment, which may increase tissue inflammation during the initial healing period and subsequent tissue shrinkage.

“Charring” of the tissue margins at surgery has also been reported with monopolar electrosurgery and may be a result of the need for operating in a dry field and the high wattage needed to overcome resistance between the cutting tip located intraorally and the grounding plate located a distance away on the body. Bipolar electrosurgery was developed to overcome the obstacles associated with monopolar electrosurgery.

True bipolar electrosurgery as used today in dentistry is a crossover from neurosurgery, which requires delicate incisions in wet fields with no lateral heat generation. The Bident Bipolar surgical unit (Synergetics, King of Prussia, Pa.) transfers those neurosurgical requirements to the dental environment, allowing intraoral soft-tissue surgery in wet fields with char-free, non-bleeding incision margins. This eliminates marginal shrinkage related to tissue inflammation and provides a more comfortable postoperative period for the patient.

When using the bipolar surgical unit, because the tips have two electrodes that are either straight wires or loops, one must remember that the first electrode to touch the tissue acts as the return and the second electrode does the cutting or coagulating, depending on which foot pedal is depressed. Because the bipolar surgical unit is fully isolated from ground, unlike monopolar electrosurgical units, a ground is not required. Additionally, as no grounding plate is required and resistance through the body is not an obstacle to be overcome, wattage is one-quarter of that used with monopolar electrosurgery.

It is also advised by the author that when you are cutting tissue, your assistant is constantly spraying water from the air/water syringe to keep the field wet while using the high-volume evacuation. This improves efficiency with the handpiece and prevents charring.

Another benefit of the bipolar surgical unit is that even during cutting there is some coagulation that occurs, so the wound edges that result do not ooze and interfere with any restorative procedures being performed during the same appointment.

Case No. 1: Passive eruption

A 32-year-old female patient presented for treatment of excessive gingival display in the anterior region and requested a restorative option that would provide improved esthetics (Fig. 1). Initial clinical examination revealed a wide band of attached gingiva in the maxillary and mandibular anterior with associated passive eruption (Fig. 2).

Periodontal probing indicated that the depth of the sulcus on the facial of the maxillary anterior teeth was coronal to the CEJ, supporting the presence of passive eruption.
Also noted was the presence of peg-shaped laterals bilaterally, which were tipped both mesially as well as palatally.

A gingivoplasty was scheduled to move the gingival margin to be equal or apical to the CEJ, and perform restorative correction of the lateral incisors.

To aid in the treatment planning, the preoperative smile image was modified using Adobe Photoshop (Adobe, San Jose, Calif.) to indicate the proposed location of the modified gingival margin. This was performed to determine if sufficient attached gingiva would remain following gingivoplasty.

Next, the cervical area of each of the teeth to be treated in the maxillary anterior was altered on the photograph to simulate the cosmetic change in a photographic mock-up.

The patient indicated that the suggested correction of the excessive gingival display would meet her esthetic concerns and she would consider placement of porcelain veneers on the maxillary lateral incisors in the future.

As the mandibular passive eruption of gingiva was not apparent when smiling, the patient declined treatment of that gingival tissue.

Surgical procedures

A line was drawn on the maxillary master model indicating the intended position of the gingival margin based on width-to-length criteria.

A sheet of 0.30-inch vacuform material (Raintree Essix, Metairie, La.) was thermoformed over the cast using a Drufomat pressure former (Raintree Essix, Metairie, La.).

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After cooling, the thermoformed material was trimmed, scalloping the facial margin to follow the line that had been placed on the master model. The edge was then colored with a black sharpie marker to make it more visible intraorally during surgery (Fig. 3).

Following administration of a local anesthetic, 4 percent Septocaine with 1:100,000 epinephrine (Septodont, New Castle, Del.), a periodontal probe was used to feel the CEJ at the mesial, distal and mid-facial aspect of each of the anterior teeth and the premolars. The vacuform surgical template was inserted and the edge of the tray on the facial was visualized in relation to the mucogingival line.

A 3301 gingivectomy pen was used with a bipolar surgical unit to follow the facial edge of the surgical stent from teeth #4 to #8 (Fig. 4). While the clinician applied the bipolar pen, the assistant sprayed a continuous stream of water over the field, followed by high-volume evacuation to keep the tissue hydrated during the procedure.

The surgical template was removed and the outline of the proposed gingival margin was evaluated. The gingivectomy pen (Bident, Synergistics USA, King of Prussia, Pa.) was used to complete the contouring gingival cut using a semi-lunar shape, sparing the papilla. To avoid a resultant “black triangle,” the papilla was not included in the gingivoplasty cut. A periodontal scaler was used to detach the gingival tissue from the tooth surface and remove any tissue tags remaining on each site.

A 3302 Gingivoplasty pen (Synergistics USA, King of Prussia, Pa.) was used to plane back the thick tissue at the facial aspect of the papilla to achieve normal

Fig. 21. Chu proportion instrument used to match length to the width and achieve better proportions; also shown is the instrument used to mark the new zenith.

Fig. 22. Patient following gingivectomy to eliminate passive eruption and achieve better length-to-width ratios.

Fig. 23. Patient following gingivectomy and placement of immediate direct resins to length of the anterior maxillary teeth and position the incisal edge where it would be had the incisal wear not occurred.

Fig. 24. Patient one week following gingivectomy and placement of immediate direct resin veneers showing a more esthetic smile with better length-to-width ratios.
Contours and taper in the tissue. Again, water spray was used to maintain tissue hydration and improve postoperative healing. Finally, a 3102 coagulation ball pen (Synergistics USA, King of Prussia, Pa.) was used in the bipolar unit on coagulation mode to seal any bleeding over the gingivoplasty surface. The right quadrant was compared to the left to ensure proper reduction and the process was repeated on teeth #9 through #13 (Figs. 5–7).

**Postoperative instructions**

The patient was dismissed and instructed to avoid spicy foods and to use warm salt water rinses three to four times daily until she presented for the follow-up appointment two weeks later. At the follow-up appointment, the patient indicated that postoperative sensitivity and gingival irritation were not experienced, and the patient was satisfied with the improved smile (Fig. 8).

Clinical examination noted a lack of gingival inflammation except for a small spot on the papilla between the right lateral incisor and central incisor. All areas except this spot were covered with keratinized gingiva that was less pigmented than what was initially present.

At four weeks post surgery, the patient returned and healing was noted as complete (Fig. 9). The patient indicated that she had received comments from friends and family that she appeared to be smiling more. Additionally, she commented that she was no longer self-conscious about her smile and was indeed smiling more and would, when finances allowed, proceed with the recommended veneers on the maxillary lateral incisors.

**Case No. 2: Passive eruption with spacing issues**

The patient, a 40-year-old woman, presented with a history of previous direct bonding to correct moderate tetracycline discoloration of the teeth and generalized diastemas. Examination revealed an excess display of gingiva when the patient smiled, as well as bulky, chipped and discolored direct-resin restorations on the maxillary anterior teeth (Figs. 10, 11). The patient expressed a desire for a less gummy smile and an overall improvement in the esthetics.

A full series of radiographs was taken and a periodontal examination was performed. It was noted that a wide band of attached gingiva was present. Examination of the radiographs, coordinated with intraoral probing, determined that removal of 2 mm to 3 mm of gingival tissue would not encroach on the crestal margin of bone and an osseous component to the gingival surgery would not be needed.

After a consultation with the patient and a discussion using the modified photograph, treatment progressed to a wax-up phase on the casts. A duplicate cast of the maxillary arch was altered to give the teeth normal thickness and eliminate the bulky composite that was present.

This was followed by application of a dentin adhesive (Bond 1, Pentron Clinical Technologies, Wallingford, Conn.) to the cast to aid in retention of the wax-up to the cast. Next, composite (Simile®, Pentron Clinical Technologies) was applied to the cast and shaped with composite instruments so that contour and tooth proportions developed.

Material was placed over the gingival aspect of the cast to position the tooth’s cervical line where it would be positioned clinically using the modified photograph as a guide. When the contour and position of the composite were finalized, the casts were cured with a handheld curing light (Figs. 12, 13). The modified maxillary model was then placed into Futura floor wax and allowed to soak for five minutes, followed by bench drying for 30 minutes to seal the cast.

Kromopan alginate (Kromopan, Des Plaines, Ill.) was mixed to a runny consistency with more water then normally used and placed into a rubber base former. The modified cast was inserted tooth side down into the material and allowed to set. Upon setting, the model was separated from the alginate and a stone cast was poured.

After the stone cast had completely set, it was removed from the alginate and trimmed to eliminate the palatal area of the cast. This was performed to permit better adaptation of the vacuform material to fabricate stents.

Using a Druformat™ pressure-forming machine (DENTSPLY Raintree Essix, Metairie, La.), two separate stents were fabricated using Tray–Rite sheet material (DENTSPLY Raintree Essix).

The first stent was trimmed to follow the gingival margins on the cast and would act as a guide during gingival surgery. To aid in visualization during surgery, a black sharpie marker was used to color the scalloped gingival margin of the surgical stent. The second stent was trimmed to be used as an intraoral form to fabricate the functional mock-up.

After application of local anesthetic, the first step at the clinical appointment was to strip the old composite using a diamond bur in a high-speed handpiece with water. Care was taken to avoid removal of any enamel at this time. Upon removal of the old composite, it was noted that the teeth had moderate tetracycline staining with a banded appearance.

The maxillary lateral incisors were also noted to be in slight crossbite orientation (Fig. 14). The crossbite situation was mild with no negative overbite, presenting with no contact between tooth #7 and the lower teeth when the teeth were moved into lateral excursions.
The mock-up would be able to determine if during normal function, the resin at the incisal of tooth #7 would chip, which would then require consideration of a full-coverage restoration vs. a labial veneer. When the maxillary tooth is “locked” behind the mandibular tooth, the crossbite would not allow a more normal positioning of the maxillary tooth without drastic preparation of the tooth in crossbite and would require orthodontic intervention to correct.

The surgical stent was inserted and assessment of the new gingival margins was made following the black edge of the surgical stent to ensure that adequate attached gingiva would remain after gingival recontouring (Fig. 15).

Using the bipolar surgical unit, a 3304 gingivectomy pen (Synergetics) was used to follow the edge of the surgical stent while the assistant sprayed a constant stream of water spray with one hand and used the high-volume evacuation device with her other hand. This allowed the tissue to remain hydrated and eliminated any tissue charring during the procedure. This permits improved healing with the lack of inflammatory response often seen with monopolar soft tissue surgery.

Healing time for a gingivectomy is approximately three weeks before the tissue is in a stable position and all associated inflammation is concluded. The Bident Bipolar unit would permit progress to impressions or final restorations immediately, with no healing change in the position of the new margin because of the lack of heat at the cut margin and lack of inflammatory response.

Osseous surgery requires longer periods of healing because of the manipulation of the osseous crestal position and greater amounts of soft-tissue manipulation before a stable position is achieved. An additional benefit of the Bident Bipolar unit is a lack of tissue bleeding after treatment that could discolor the composite that is being placed.

The stent was removed and gingival margins were further refined with the gingivectomy pen. Tissue was then planed back to develop good papilla contours using a 3302 gingivoplasty pen (Synergetics). Completion of the gingival recontouring did not result in exposure of the crestal bone and non-bleeding gingival margins were noted (Fig. 16). The position of the crestal bone was determined through sulcular sounding with a periodontal probe.

The information gathered indicated that some passive eruption issues were present and with the wide band of attached gingiva present would allow removal of 3 mm of gingival tissue and still provide a normal sulcular depth after healing. The restoration margins were placed at the new gingival margin position.

The functional mock-up stent was tried in, and the gingival position was assessed. Teeth were isolated with cotton rolls and the facial and interproximal of teeth #5—#12 were etched with a 37 percent phosphoric acid-etchant gel for 30 seconds then rinsed and dried. Bond-1 dentin adhesive was applied to all surfaces and light cured for 20 seconds per tooth.

The patient requested a very white bleaching shade and Artiste nano composite (Penton Clinical Technologies) Super Bleach dentin shade and Bleach enamel were selected for the functional mock-up. A thin layer of Bleach enamel shade was placed into the stent in the area of the incisal edge and incisal half of the coronal of teeth #4—#13.

Next, the Super Bleach dentin shade was placed into the stent and the facial aspect of each tooth was filled with material. The stent was then carried intraorally, seated and adapted to the teeth with finger pressure. Each tooth was then light cured for 30 seconds on the cervical followed by 30 seconds on the incisal.

The stent was removed, leaving the bonded functional mock-up on the teeth, and additional light curing was performed. A needle finishing diamond (Brasseler, Savannah, Ga.) was used in a high-speed handpiece with water to remove the cervical flask and provide contours without any overhanging margins. Cervical embrasures were also opened, and definition given to the interproximal line angles.

Occlusion was checked in centric occlusion and lateral excursions and adjusted for proper anterior guidance. Polishing was accomplished using Fini™ polishing paste and a cloth buffer tip (Penton Clinical Technologies) (Fig. 17).

The patient was recalled 24 hours later to check soft-tissue healing and assess the occlusion. At this time, minor refinement of the esthetics was accomplished and the patient indicated no irritation gingivally where tissue had been treated with the bipolar surgical unit. Slight sloughing of the keratinized layers of the tissue was observed, but a lack of inflammation was noted (Fig. 18).

The patient was next seen at two weeks post-treatment. At this visit, it was noted that the soft tissue had a normal appearance in color and tone and no inflammation was observed. Further refinements in the esthetics were made in the functional mock-up, opening the incisal and gingival embrasures, shortening the incisal edges of the lateral incisors and working with the patient to achieve her view of ideal esthetics that would serve as a blueprint for the final restorations.

Figures 19a and 19b depict the patient before and after correction of the gummy smile and placement of the functional mock-up. After a period of use of the functional mock-up to verify that the anterior guidance was not causing any chipping or damage to the functional mock-up, final restorations would be planned and a determination between ceramic
veneers and full-coverage restorations would be made. The teeth would be prepared, stripping off all of the functional mock-up, and the stent used to fabricate the functional mock-up would then be used to make a temporary prosthesis while the laboratory was fabricating the final restorations.

__Case No. 3: Passive eruption with incisal wear__

A female patient presented with the complaint that her teeth appeared short and her smile was gummy. Diagnosis determined that the patient had good periodontal health, with no gingival inflammation nor bleeding and a wide band of attached gingiva (Fig. 20).

Probing depth in the maxillary anterior was within normal limits at depths of 1–2 mm. The gingival margin was positioned, in general, 2 mm coronal to the CEJ. Radiographically, the osseous crest was positioned apical to the CEJ and no bone loss was evident.

Local anesthetic was infiltrated into the buccal vestibule from the second premolar to second premolar. A periodontal probe was inserted into the facial sulcus to sound the osseous crest in relation to the CEJ and no bone was noted coronal to the CEJ on the teeth. The Chu instrument for determining width-to-length proportions (Hu-Friedy, Ill.) was used to determine where the gingival margin needed to be placed to have ideal length (Fig. 21).

The Bident Bipolar 3303 gingivectomy handpiece (Synergistics, King of Prussia, Pa.) was used to mark the zenith of each tooth to be altered. Using the gingivectomy handpiece, the gingival margin was sculpted to ideal contours (Fig. 22). The papilla is spared to avoid the potential of creating black triangles interproximally.

The resulting tissue margin after use of the gingivectomy handpiece results in a soft-tissue ledge that needs to be tapered onto the tooth. A Bident Bipolar 3302 gingivoplasty handpiece (Synergistics, King of Prussia, Pa.), also referred to as a “fishhook,” is used to plasty (taper) the gingival margin to create a natural knife edge. As the papilla following a gingivectomy is often bulky facially, the facial aspect of the papilla is planed back to debulk the papilla with the fishhook. Although the altered margins appeared red, due to the coagulation abilities of the Bident Bipolar unit, no active bleeding was noted.

The author recommends the use of constant irrigation during use of the Bident Bipolar surgical unit to maintain tissue hydration and eliminate tissue charring during treatment and post operative inflammation. As the practitioner uses the bipolar handpiece, the assistant sprays water from the air/water syringe while suctioning with the high-volume evacuation.

The teeth were then isolated and acid etched with a 37 percent phosphoric acid gel for 30 seconds then rinse and dried. Bond-1 adhesive was applied to the etched tooth surface then light-cured. Using a stent previously fabricated to the desired incisal length, Artiste nano composite (Pentron Clinical, Orange, Calif.), the length was built using an enamel shade of resin and light cured. The stent was removed and each tooth was then built to full contour of the new length created by lengthening both gingivally and incisally with dentin and enamel shades of Artiste nano composite. Following finishing and polishing of the direct resin restorations, occlusion was checked and adjusted to maintain the anterior guidance that was present before treatment (Fig. 23).

The patient was dismissed and instructed to avoid any alcohol or peroxide containing mouthrinses for the first week and to rinse with warm salt water three to four times daily for the first three days. Additionally, the patient was instructed to continue oral hygiene including brushing the area with a toothbrush and her regular toothpaste. At 24 hours, the patient was called to check on her comfort level, and she indicated no postoperative discomfort nor irritation during normal daily activities.

At one-week post surgery the patient returned for a postoperative examination where a lack of inflammation was noted (Fig. 24). A four-week postoperative examination demonstrated a more esthetic smile with better width-to-length proportions with elimination of excess gingival display.

__Conclusions__

Practitioners frequently tend to ignore the gingival tissues’ position relative to the tooth’s incisal edge, and also in relation to the adjacent teeth, when evaluating the cosmetic aspects of patients. Passive eruption appears to be infrequently recognized and can affect the final cosmetic result when not addressed as part of the overall treatment._

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**_Case No. 4: Esthetic reconstruction of the anterior dentition_**

A female patient presented with the complaint that her teeth appeared short and her smile was gummy. Diagnosis determined that the patient had good periodontal health, with no gingival inflammation nor bleeding and a wide band of attached gingiva (Fig. 20).

Probing depth in the maxillary anterior was within normal limits at depths of 1–2 mm. The gingival margin was positioned, in general, 2 mm coronal to the CEJ. Radiographically, the osseous crest was positioned apical to the CEJ and no bone loss was evident.

Local anesthetic was infiltrated into the buccal vestibule from the second premolar to second premolar. A periodontal probe was inserted into the facial sulcus to sound the osseous crest in relation to the CEJ and no bone was noted coronal to the CEJ on the teeth. The Chu instrument for determining width-to-length proportions (Hu-Friedy, Ill.) was used to determine where the gingival margin needed to be placed to have ideal length (Fig. 21).

The Bident Bipolar 3303 gingivectomy handpiece (Synergistics, King of Prussia, Pa.) was used to mark the zenith of each tooth to be altered. Using the gingivectomy handpiece, the gingival margin was sculpted to ideal contours (Fig. 22). The papilla is spared to avoid the potential of creating black triangles interproximally.

The resulting tissue margin after use of the gingivectomy handpiece results in a soft-tissue ledge that needs to be tapered onto the tooth. A Bident Bipolar 3302 gingivoplasty handpiece (Synergistics, King of Prussia, Pa.), also referred to as a “fishhook,” is used to plasty (taper) the gingival margin to create a natural knife edge. As the papilla following a gingivectomy is often bulky facially, the facial aspect of the papilla is planed back to debulk the papilla with the fishhook. Although the altered margins appeared red, due to the coagulation abilities of the Bident Bipolar unit, no active bleeding was noted.

The author recommends the use of constant irrigation during use of the Bident Bipolar surgical unit to maintain tissue hydration and eliminate tissue charring during treatment and post operative inflammation. As the practitioner uses the bipolar handpiece, the assistant sprays water from the air/water syringe while suctioning with the high-volume evacuation.

The teeth were then isolated and acid etched with a 37 percent phosphoric acid gel for 30 seconds then rinse and dried. Bond-1 adhesive was applied to the etched tooth surface then light-cured. Using a stent previously fabricated to the desired incisal length, Artiste nano composite (Pentron Clinical, Orange, Calif.), the length was built using an enamel shade of resin and light cured. The stent was removed and each tooth was then built to full contour of the new length created by lengthening both gingivally and incisally with dentin and enamel shades of Artiste nano composite. Following finishing and polishing of the direct resin restorations, occlusion was checked and adjusted to maintain the anterior guidance that was present before treatment (Fig. 23).

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**_about the author_**

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*Editorial Note: A complete list of references is available from the publisher.*
Changing the face of dentistry

Author: Louis Malcmacher, DDS, MAGD

Dentistry is not just about teeth any more, as will be demonstrated in this case presentation article. In the past few years, with thousands of dentists being trained in the use of non-surgical, minimally invasive facial injectables, such as Botox and dermal fillers, dental esthetic and functional treatment has changed for the better.

This article seeks to demonstrate how the use of facial injectables in the oral and maxillofacial areas directly relates to the teeth in terms of function, smile lines, lip lines, phonetics and esthetic dentistry, thereby clearly showing the totality of this oral and maxillofacial treatment is indeed dental treatment.

Case study

This patient’s story starts a few years ago when she had two all-ceramic crowns on the upper right and upper left central incisors as well as veneers placed on the upper and lower teeth (Fig. 1). One day, she noticed that her upper left central incisor crown seemed loose. A radiograph was taken and you can clearly see in Figure 2 that a horizontal fracture is present. This tooth is obviously non-restorable and so it was extracted and an implant was placed, as shown in Figure 3.

The implant was restored with a Procera crown and the patient is enjoying the newfound stability of this tooth. What she does not enjoy is the creation of deficient interdental papilla known as black triangles (Fig. 4). This is one of the most frustrating esthetic challenges that can happen in any kind of implant or crown and bridge procedure.

A new innovative procedure that I have pioneered in conjunction with the American Academy of Facial Esthetics (www.facialesthetics.org) is using dermal fillers (Juvederm Ultra XC) to plump the interdental papilla to eliminate these black triangles, which was successful, as seen in Figure 5.

A few months later, the patient was interested in retreatment of her crowns and veneers because she wanted whiter teeth and a fuller smile. Some of the issues that she complained about with her current smile are seen in Figure 6: the new crown on the upper left central incisor is a slightly darker shade than the other teeth and when she goes into a full smile, she does not show as many teeth as she would like.

She also requested that all of the teeth be whiter. She has also exhibited over the past few years a number of chips on the veneers, especially on the lower teeth (Fig. 7), and an occasional veneer has pop-off that had to be recemented from time to time. This has resulted in making the lower teeth look “very short and stubby,” as she explained. This patient also has a very deep overbite, as demonstrated in Figure 8.

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It is important to consider the facial esthetics, let me give you my perspective as to what I look for now in this kind of case and why the facial conditions here are part of her dental esthetic treatment. Let’s take another look at this patient in a full-face picture and in a pre-operative full smile, as shown in Figure 6.

Here in a full smile, she does not clearly show the buccal corridors, which would give her a fuller looking smile. As dentists, in the past, we would never think about why she is unable to deliver a fuller looking smile, thinking incorrectly that there was nothing we could do about it. We would just assume that we should place veneers on the bicuspids and that will be enough when, in most cases, it will not provide the desired result because other factors are at play here.

In addition, please notice in this photograph that in her present full smile, the upper lip is not in an aesthetic relationship with the teeth. Ideally, for aesthetic lip lines and smile lines, when the patient goes into a full smile, the bottom of the upper lip should straddle the gingival margins of the central incisors and cuspids, which should ideally be at the same heights.

Facial aging happens to everyone

This patient clearly demonstrated a very typical scenario with facial aging, which is usually present after the patient reaches age 50. Dermal collagen and facial fat are lost in the oral and maxillofacial regions and the midfacial tissues begin to sag and drop. This results in patients showing less of their upper teeth and more of their lower teeth. This patient reports, and clearly demonstrates by pictures of her in her youth, that she had higher cheekbones and more volume in her face. At that point in her life, she had a much fuller smile.

You can clearly see in the full-face photograph (Fig. 6) that she has lost some of the volume in her face and try as she might, she can’t pull her upper lip higher in a full smile because of the loss of volume in the zygomatic areas of her midface. As a result of this facial aging and loss of support, she also has deeper nasolabial folds, which again puts more pressure on depressing the upper lip in a full smile.

All of these factors together result in a dental esthetic challenge and are easily treated with Botox and dermal fillers, by properly trained clinicians, in addition to the use of veneers. The main point here is this: With her loss of facial volume as it was at the time, you could put a whole mouth full of veneers and she still wouldn’t show the bicuspids and buccal corridors because her full smile is not a function of her teeth but rather of the oral and maxillofacial structures.

Figure 9 shows the patient post facial injectable treatment with Botox and dermal fillers, and you can see the desired result of showing more teeth and proper lip and smile lines before the re-treatment of the veneers. Take a close look at her cheeks and you will find significantly more volume as well as much less prominence of her nasolabial folds.

When she goes into a full smile, she shows a lot more teeth than before because her upper lip now has greater support from the added volume in the midface. This was accomplished by using a calcium hydroxyapatite dermal filler (Radiesse) with 1.3 ml used in the left zygomatic area and 1.1 ml in the right zygomatic area. A hyaluronic acid dermal filler (Juvéderm Ultra XC) was used in the naso-labial folds with 1 ml used in the left nasolabial fold and 0.9 ml in the right nasolabial fold.

You can now see when she goes into a full smile in Figure 9 that she has the proper lip lines and smile lines, and the bottom of her upper lip straddles the gingival margin of the upper central incisors and cuspids. This clearly shows the direct relationship between dermal filler procedures in the nasolabial and zygomatic areas as dental esthetic and therapeutic treatment.

New face, new smile

Once this patient could see her teeth better and showed more teeth when she smiled, she wanted new veneers to make the teeth whiter. Now we could address the challenges discussed above and proceed with veneers. One other issue that the patient was concerned about due to her broad smile was the upper left central incisor having a higher gingival
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margin than the upper right central incisor because that is the area where an implant was placed (Fig. 10). Once we had addressed the underlying cause of her deficient smile, we were ready to proceed with new porcelain veneers.

The treatment plan consisted of 10 new veneers on the upper teeth and 10 new veneers on the lower teeth. The upper central incisors, however, did produce somewhat of a challenge. Cutting off a Procera crown on a tooth with an implant is no dentist’s idea of fun in the office. In fact, significant damage can be done to the implant abutment and it is not a wise choice if other options are available.

In this case, we chose to bond a porcelain veneer onto the existing upper central incisor crowns instead of trying to remove them. The system we chose was Cristal Veneers by Aurum Ceramics. Cristal Veneers is the next generation of no/minimal preparation veneer systems with veneers that can be made as thin as 0.3 mm and exhibit very high strength and excellent esthetics. Cristal Veneers can also be made as thick as any other veneer.

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This case had multiple thicknesses of every type of veneer possible. In Figure 11 you may see the teeth after preparation. All of the previous veneers were removed on the upper and lower teeth. A hard- and soft-tissue laser (Waterlase iPlus, Biolase) was used on the upper right central incisor to perform not only a gingivectomy, but also a closed sulcus crown lengthening procedure to match the gingival height of the upper left central incisor. The closed sulcus crown lengthening procedure at this point is a very well established procedure and can be done very precisely and conservatively with an erbium laser, such as the Waterlase iPlus.

As a matter of fact, at this same veneer preparation appointment we performed this closed sulcus crown lengthening and because of its predictable nature, we were able to take the final impression on the very same day.

Figure 12 shows the prep guide created by Aurum Ceramics and demonstrates the very minimal preparation on the two upper central incisor crowns so that the Cristal Veneers on these teeth will be approximately 0.3 mm in thickness while the veneers on the lateral incisors will be anywhere between 2.5 mm to 3 mm in thickness.

All of the other veneers were of various thicknesses as well, as you can imagine by looking at the lower no/minimal veneer preparations of the lower teeth in Figure 13.

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**Challenges with veneers**

Let’s talk about this issue for a moment because this is a challenge when seating a veneer case such as this one. Every dentist knows that when he or she is seating veneers with different thicknesses, the biggest challenge is trying to match up the final shade. Many times seating these veneers is very time consuming and can be a challenge for even the best dental technician.
Consuming in the office as the dentist is trying to use different resin cement shades and even different values of the resin cement shade to achieve a color match of all of the veneers.

Personally, I have always believed that this should not be the dentist’s problem but it should be the laboratory’s responsibility if it has the esthetic expertise necessary and the technicians know the porcelains that they are using. Cristal Veneers porcelain was developed by Aurum Ceramics and they have the esthetic expertise to understand the optical qualities of the porcelain they are using, as well as the different opacities that will go into a challenging veneer case such as this one.

This case then came back to my office with all of the different thicknesses of porcelain veneers (sometimes there are even different thicknesses on the same porcelain veneer), and because of this laboratory’s expertise in producing these veneers, I was able to seat all of these veneers with one shade of cement.

It is a huge advantage to have such a talented laboratory, and here is where your choice of laboratories can make all of the difference in the world in terms of the ease of cementation, saving time and producing an esthetic result that you and the patient are proud of.

Figure 14 shows the veneers cemented into place. The veneer shade is 020 and the corresponding cement was used. Note a few of the challenges presented above have been addressed completely. Look at the gingival margin of the upper right central incisor and notice that now it exactly matches the gingival margin of the upper left central incisor. Remember that the veneers on the central incisors are approximately 0.3 mm and the rest of the veneers are anywhere from 1 mm to 3.5 mm in thickness, and all of these veneers are the exact same shade.

There was absolutely no need to try to use different shades of cement to achieve a final matching shade, but only one shade of cement was used. Notice also that the lower veneers now restore the proper height to the teeth and they are no longer short and stubby as the patient complained about before.

Bonding veneers to existing porcelain crowns includes the use of a number of agents and a sequenced approach. Please go to my website www.commonsensedentistry.com for a full step-by-step technique as how to bond a porcelain veneer to an existing porcelain crown.

_Total facial esthetics results in happy patients_

Figure 15 shows a very happy patient who has been treated with total facial esthetics and we have addressed all of her concerns. The final dental esthetic and therapeutic result is a combination of each of the oral and maxillofacial treatments in and around the mouth.

This article sought to demonstrate how the use of Botox and dermal fillers in the face are as much responsible for the success of dental esthetic cases as are porcelain veneers, crowns and implants.

_About the author_

Louis Malcmacher, DDS, MAGD, is a practicing general dentist and an internationally known lecturer, author and dental consultant known for his comprehensive and entertaining style. He is president of the American Academy of Facial Esthetics. His website is www.commonsensedentistry.com, where you can find information about his seminar schedule and live patient hands-on Botox and dermal filler training, download his resource list and sign up for a free monthly e-newsletter. He may be reached at (800) 952-0521 or at dlouis@facialesthetics.com.

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**Fig. 13** Lower, minimal veneer preparations.

**Fig. 14** Final Cristal veneers (Aurum Ceramics); note the even gingival margins on central incisors.

**Fig. 15** Total facial esthetics completed with Botox, dermal fillers and veneers to lift the lower face so patient can show her beautiful smile.
Esthetics, caries control and gingival health with a versatile giomer composite system

Author: Jack D. Griffin Jr., DMD, MAGD

There are many direct composite materials that have the strength to be used in the posterior and a level of esthetics acceptable in the anterior dentition. Direct anterior composites must meet the minimum cosmetic demands of the patient while posterior restorations must provide resistance to mechanical forces.

In patients with questionable hygiene, dietary habits and a history of caries, we must also choose materials that have properties such as fluoride release and high polishability to decrease the effects of a less than ideal oral environment.

A composite system has been developed with a surface pre-reacted glass ionomer (S-PRG) that has shown to have high esthetic properties as well as significant release of fluoride ions into the dentin and rechargeability.

"Beautifil II and Beautifil Flow Plus (Shofu, San Marcos, Calif.) are universal nano-hybrid composites with the durability and esthetics to satisfy the demands of the profession while also providing long-term tissue health by sustained fluoride release from the S-PRG filler particles." A potential reduction of secondary caries and maintenance of surface luster has been shown long-term with this material.

The small nano-sized filler has a mean particle size of just 0.8 μm, along with a filler load by weight of 83 percent, making it suitable for almost any clinical situation, including incisal edge replacement and posterior restorations in occlusion.

The versatility of these products, coupled with the giomer technology, make them unique in the dental marketplace and a strong choice in almost any clinical situation.

The flowable comes in two viscosities with a varying degree of flowability, each with similar physical properties strong enough to withstand occlusal forces in posterior restorations. The zero flow, F00, is a stackable flow with almost no movement or slump when syringing. The low flow, F03, is a great universal flow material with handling similar to other more viscous flowables on the market.

Fig. 1. Patient concerned with swollen gums and holes in teeth.
Fig. 2. He had braces removed the previous year and said he never smiled.
Fig. 3. He had generalized sensitivity to sweets and cold. Composites were to be done on 23 teeth over three appointments.
Fig. 4. He did not brush "very often" and really liked soda and energy drinks. He seemed committed to improving things in his mouth.
Fig. 5. Diode laser gingivoplasty was done after local anesthetic using low wattage and brush strokes.
Fig. 6. Preparations were done as conservatively as possible with a 330 bur, finish diamond and slow-speed round bur. Caries indicator was used to verify decay removal.
Fig. 7. Contour matrices were placed and a BAC containing 37 percent phosphoric acid etch was placed and rinsed.

Fig. 8. Several coats of a universal bonding agent were applied and air thinned.

Fig. 9. Beautifil Flow Plus was applied to cover all dentin and then cured.

Fig. 10. The contour matrices form a good gingival seal, keeping the crevicular fluids out while giving anatomical form to the material.

Fig. 11. The remaining cavities were restored with the same flowable material. Notice how the material holds its shape without running, even before curing.

Fig. 12. Light polymerization was done from facial, lingual, and incisal to insure a high level of conversion.

(Images/Provided by Dr. Jack D. Griffin, Jr.)

Will these flowable materials replace each of the more viscous composite materials? No. The sculptability and layering potential of conventional composites will always have a place in esthetic dentistry. Another advantage of a non-flowable material is void reduction in posterior composites as uncured flowable is followed by a more viscous material pushing out and displacing the flowable as the viscous composite material is injected.

Patient exam and planning

A 15-year-old male came to the office with an “unpleasant” smile after having orthodontic treatment the previous year (Fig. 1). His primary concern was the hypertrophic tissue around his incisors and his cold and sweet sensitivity (Fig. 2). There was rampant decay, enlarged gingival tissue, poor hygiene and decalcification areas (Figs. 3, 4).

A full series of radiographs and photographic images were taken for treatment planning, marketing and case documentation. These images were studied, along with clinical exam notes, before treatment so that a basic plan was formulated.

A treatment plan was made to do 23 direct composite restorations over three appointments after a prophylaxis, oral hygiene education, and tray-delivered home topical fluoride delivery. The plan included laser gingivoplasty followed by restorations with Beautifil II because of its esthetics, ease of use, fluoride release and versatility.

After several weeks of maintained oral hygiene improvement, the surface of the anterior teeth would be re-contoured and enhanced at no additional charge.

Soft-tissue enhancement

Lasers have become a critical component of smile rehabilitations, and if done with respect to periodontal tissues and biologic width, results can be a great enhancement to cosmetic treatment. Diode lasers offer excellent control of tissue sculpting with very predictable healing and tissue tolerance as long as sound biologic principles are followed. These principles must be understood during treatment in order to prevent possible chronic periodontal inflammation and unwanted gingival responses, such as redness, bleeding and irritation.

On the first restorative appointment, a local anesthetic (Septocaine, Septodont, Lancaster, Pa.) was given and retractors (See More, Discus, Culver City, Calif.) were placed to keep the lips out of the way and to provide some isolation from saliva. An 810 mm diode laser (Odyssey, Ivoclar Vivadent, Amherst, N.Y.) was used on a relatively low wattage, 2.0, to sculpt the tissues and remove hyperplastic gingival tissue (Fig. 5).

Clean up and removal of the charred tissue was done with a microbrush and hydrogen peroxide. It is expected that the new soft-tissue location would be maintained or even improve with properly contoured restorations, good surface polish and continued plaque control.

Giomer composite technique: maxillary

The goal of this one-hour restorative appointment was to provide improved esthetics and an environment to promote tissue recovery on the maxillary anterior. Tooth preparation was done with a 330...
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technique

A contoured anatomical matrix (Contour Matrix, Ivoclar Vivadent, Amherst, N.Y.) was placed and wedged loosely. The matrix extends slightly, providing a “sulcular seal” aiding in marginal integrity. These matrices not only increase restoration longevity, but also greatly increase placement efficiency.²⁴

The teeth were etched with 37 percent phosphoric acid (Etch 37, Bisco, Schaumburg, Ill.) for 10 seconds, rinsed thoroughly and left damp (Fig. 7). This etch contains benzalkonium chloride (BAC) for a continued antimicrobial effect. A universal bonding agent (All Bond Universal, Bisco, Schaumburg, Ill.) was applied in several layers, air thinned and cured (Fig. 8).²⁵

Beautifil Flow Plus, low flow, was placed into the preps, covering all dentin, and cured for 15 seconds (Fig. 10). The non-runny nature of this material and the great adaptability make this a great choice for dentin replacement. The remaining preparation was restored with the same material so that the entire restoration was done in this flowable nano-hybrid composite in a single shade of A2 (Fig. 11).²⁶

Curing was then done for 20 seconds from the facial, lingual and incisal to insure complete polymerization (Fig. 12). Initial contouring was done quickly with a finish diamond (Diatech Direct, Charleston, S.C.) to provide basic anatomical shaping.²⁷

The patient was given stannous fluoride at 0.4 percent with instructions to place it in the mouth overnight two to three times per week until all restorative work was completed. At that time, re-charging of the giomer material would continue between prophylaxis appointments at once a week (Fig. 17).

Second appointment: mandibular restorations

Two weeks later, a two-hour appointment was made to restore the mandibular teeth. The gingival health on the maxilla was consistent with better hygiene on restored teeth and bacterial control (Figs. 18, 19). The patient claimed to use the fluoride trays two to three times a week and was brushing at least once a day.

The patient’s right side was done, first focusing on facial decay initially (Fig. 19). Cavity preparation, caries removal and enamel beveling as described above was completed with various burs. On the right bicuspid, a pinkish blush was noticed after decay removal with no obvious pulp exposure (Fig. 20).
A bioactive liner (TheraCal, Bisco, Schaumburg, Ill.) was placed in a thin layer to stimulate secondary dentin formation and to seal deep pulpal dentin. This material was light cured and kept 2 mm away from restoration margins (Fig. 21). All facial lesions were restored using selective etching, a universal bonding agent and Beautifil Flow Plus as described above.

The matrices used varied. In the anterior, Mylar strips were used and held in place with a plastic instrument while the flowable material was light cured. Where a strip had trouble going through the contact, a FenderWedge (Garrison Dental, Spring Lake, Mich.) was used (Fig. 22). Shaping was done with a finish diamond and flame-shaped finish bur.

In the posterior, the teeth were isolated with a suction/light/bite-block system (Isolite, Santa Barbara, Calif.). Conservative preparations were done with a 330 bur and sectional matrices placed with a wedge and 3-D ring system (Garrison Dental, Spring Lake, Mich.) to insure tight, broad contacts (Fig. 23).

After etching and bonding, a 0.5 mm layer of the giomer flowable was placed on the pulpal floor and cured, creating a good polymerized layer protecting the pulp. A small amount of flowable was added again, left un-polymerized and the more viscous Beautifil II forced the flowable into all areas of voids leaving a dense fill (Fig. 24).

Shaping was done with a #6 round bur and a football-shaped finish bur, leaving excellent margins and contacts (Fig. 25). All restorations were completed on the right and then the Isolite unit was moved to the left side and restorations done in the same manner (Fig. 26). _Final restorative appointment: maxillary enhancement_

Three months after the initial flowable placement on the maxillary teeth, the patient returned still showing soft-tissue and hygiene improvement. This 1.5 hour appointment was completed to enhance the maxillary anterior teeth and complete several posterior maxillary restorations.

Using a finish diamond with water on a high-speed handpiece, the surfaces were roughened in an irregular way to provide depth to the re-surfacing (Fig. 27). All preparation was done about 3 mm away from the gingiva and the surface left wavy (Fig. 28). The materials used on the anterior were a universal bonding agent and etch, and both versions of the giomer material (Fig. 29).

The surfaces were etched with 37 percent phosphoric acid for 10 seconds, rinsed well and dried. This left a roughened, frosty appearance to the Beautifil Flow (Fig. 31).

The All Bond Universal has a high bond strength to polymerized composite without an air-inhibited layer and was applied in several coats and air thinned. (Fig. 32) Mylar strips were placed and the Beautifil Flow Plus low flow was placed in the center of the tooth and left uncured. This material helps to wet the surface and decrease void as the more viscous material was applied directly over it. A1 Beautifil from a compule was applied to each tooth, sculpted and cured using a free-handed technique.29 Most of the less viscous flowable was wiped away with the plastic instrument. The
lighter surface shade brightens the smile while giving vitality to the restorations that were placed over the darker A2 shade from the first restorative appointment. Initial contouring was done with a finish diamond on high speed with water.30–32

Shaping and polishing was completed with a flexible disk system (Super Snap Rainbow, Shofu, San Marcos, Calif.). This system features a sequence of very thin, flexible disks that are very efficient at shaping embrasures, final shaping and high polish without metal in the center that may gouge or scratch the restoration surface (Fig. 34). The giomer material is easily polished and rivals many nano-hybrids on the market today.33

_Results_

Obviously, a great improvement was realized for a boy who said he “never smiled until now” (Fig. 37). It would be naïve to think that these restorations will last him his entire life without the need for more definitive porcelain restorations or other cosmetic procedure. However, the improvement in self-esteem, the decrease in sensitivity and the feeling of better oral health may help to stimulate him to be committed to better oral care. After six months, the improvement in soft- and hard-tissue health is undeniable (Fig. 38). The attached tissue stippling and lack of bleeding clearly shows how well the soft tissues tolerate these materials.

The giomer materials have excellent esthetics and strength, which combined with the high long-term fluoride release make these materials a strong consideration in most all direct restorative cases. The patient has continued fluoride treatments at home on average about every one to two weeks, as often as he can remember. Now, if we can just keep him from losing his trays for the third time.

_References_

8. Itota T, Carrick TE, Yoshiyama M, McCabe JF.
American Academy of Implant Prosthodontics
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AIC Basic Dental Implant Training

COURSE OBJECTIVES
Upon completion of this 5-day comprehensive implant education program, the clinician will be able to accomplish the following:
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2. Diagnose and establish a treatment plan for preservation and restoration of edentulous and partially edentulous arches.
3. Demonstrate competency in placement of single tooth implants, soft tissue management and bone augmentation.
4. Obtain an ideal implant occlusion.
5. Work as a part of an implant team with other professionals.
6. Incorporate implant treatments into private practice with quality results, cost effectiveness and profitability.

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10. Valeria V. Gordan, DDS, MS; Eduardo Mondragon; Ronald E. Watson, DDS, MAE; Cyndi Garvan, PhD; Ivar A. Mjör, BDS, MSD, MS, Dr.odont. JADA, Vol. 138, May 2007.

Jack D. Griffin Jr., DMD, MAGD, has a practice in St. Louis county, Mis., where he and his staff have maintained a 50 to 55 percent overhead for 20 years while doing all phases of general dentistry, from high-end cosmetic procedures to everyday restorative and preventive care. Griffin, who has a passion for sharing what he has learned, was awarded diplomat status with the American Board of Aesthetic Dentistry (ABAD), accreditation with the American Academy of Cosmetic Dentistry (AACD) and mastership in the Academy of General Dentistry (AGD). He has published many articles in professional journals and lectured for a variety of dental groups. You may reach him at esmilecenter@aol.com or online at www.eurekasmile.com.
Atraumatic extractions with Luxator Periotome

Instrument can help the dentist divide and conquer the forces retaining a tooth

By Dr. Simon Jones

The extraction of a tooth is probably the most traumatic event a patient can experience in the dental office, and if the extraction doesn’t go smoothly, things can become quite stressful for the dentist as well. When the use of a simple surgical instrument can make the extraction process infinitely easier for both patient and dentist, I find it surprising not all dentists reach for a Directa Dental Luxator as their first instrument of choice.

To understand how best to remove a tooth, it helps to appreciate the structures and forces that are holding the tooth in position. It is only by overcoming these forces that the tooth can be removed.

First, consider the bone structure surrounding the roots. As the bone sits intimately against the root surface, any irregularities, undercuts or curvatures of the root will provide mechanical retention. To overcome this retention, the socket must be dilated until the path of removal of the root is unimpeded by bone.

The second factor resisting the removal of the tooth is the periodontal ligament, composed of collagen fibers. Like millions of little ropes, the cumulative strength of these fibers resists the strongest of biting forces. Imagine how much force would be required to overcome this combined strength in an attempt to simply pull out a tooth.

The third force to overcome is that of atmospheric pressure. Withdrawing a tooth from its socket will create a void or vacuum at the apex of the socket, and until this void is filled with blood or an ingress of air, then atmospheric pressure will effectively push on the tooth to keep it in position. Anyone who can remember back to the Magdeburg Hemisphere experiment in school physics will know that simple atmospheric pressure resisted the force of two teams of horses pulling in opposite directions.

Little wonder then that simply using a combination of forceps and brute force can lead to unnecessary loss of alveolar bone, root fracture and subsequently more stressful experience for both patient and dentist. Dealing with the fracture of a maxillary tuberosity can certainly ruin your day!

The careful and considered use of a Luxator helps the dentist to divide and conquer the forces retaining a tooth, making the extraction process an infinitely more predictable and stress-free process.

The appropriate size of Luxator is chosen to match the diameter of the root, and the angle of the blade is chosen to give the best access.

Fig. 1 – Luxator Periotome (Photos/Provided by Directa AB)

Fig. 2 – Luxator severs the periodontal fibers and dilates the socket.
enters the periodontal ligament between the crestal bone and the root.

Once in the periodontal ligament, the Luxator is worked down the length of the root with a side-to-side rocking motion and steady axial pressure (Fig. 2). This motion first severs the periodontal fibers, and then as the blade is introduced further, the socket is dilated to allow an easier path of removal. Finally, as the periodontal ligament is severed and the socket dilated, bleeding and air ingress overcome the vacuum that resists tooth removal.

The Luxator should be inserted around as much of the circumference of the root as possible to evenly dilate the socket. Once this has been achieved, the final delivery of the tooth may be performed with forceps, although this is often not required with single-rooted teeth.

When using a Luxator, the uniquely designed handle should sit neatly in the palm of your hand, cradled by your fingers and thumb, with the index finger extended toward the tip of the instrument (Fig. 3). This allows for precise control of the tip and prevents the risk of slipping. Excessive force should be avoided; the Luxator is a surgical instrument and should be used as such, not as an elevator.

To complement its range of Luxators, Directa now produces an elevator called the Luxator Forte. Having dilated the socket using a Luxator, if it is felt that greater dilating and elevation forces are required, then the stronger Luxator Forte should be used. The Luxator Forte is easily recognizable by its black handle (Fig. 4). This sequence of luxation, followed by elevation, generally means that forceps are only ever used for the final easy delivery of the tooth.

The Swedish dental company Directa not only invented the name Luxator, but has developed this range of instruments to perfection. The use of high-grade, surgical-steel blades and a two-part moulding technique for the uniquely ergonomic polymer handle combine to provide a high-quality instrument that will give years of reliable service and will endure countless cycles of washing disinfection and autoclaving.

Having used Luxators for more than 20 years, I cannot imagine undertaking the extraction of any tooth without first severing the periodontal fibers with my trusty friend. It would be the equivalent of struggling to remove my boots without first undoing the laces.

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**_about the author_**

Dr. Simon Jones is a leading U.K. dentist with a practice in Middlesbrough, northeast of England. He qualified in 1985 and has worked mainly in the British National Health Service since then. For the past six years, he also served as a vocational trainer for the Northern Deanery of Newcastle University Dental School.
The Canon Rebel T4i is the first SLR camera to feature a touch-screen LCD screen. The new touch-screen LCD allows you to control your camera just like a smart phone. In playback mode, you can "swipe" side-to-side to view your images as well as "pinch" to zoom in and out on an image. The touch screen also works when choosing menu options.

The Rebel T4i gets some substantial technological upgrades over the previous model (Rebel T3i): touch-screen LCD, a new processor (six times faster than the T3i), an improved autofocus system, a stereo microphone (for video capture) and a faster continuous shooting mode.

The T4i features a built-in wireless speedlight controller. The wireless speedlight controller allows the built-in flash to act as a transmitter and it can control wireless flashes such as the Metz MS-1 (as shown in the image) or the Canon 270EX II flashes.

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PhotoMed is located in Van Nuys, Calif., so please call for an appointment if you are in town. The company also exhibits at more than 20 dental meetings and seminars each year where you can view a live demonstration of their equipment and get your questions answered.

For more details about the Canon Rebel T4i system configurations, please visit www.photomed.net. Alternatively, you may call (800) 998-7765 for more information or write info@photomed.com.
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Bringing the study club online allows interaction to occur across the globe. Suddenly, various cultures and fresh perspectives enhance the educational mix. Online learning allows everyone to benefit from C.E. courses without incurring the usual travel costs or without the down time away from the practice. DTSC offers dentists an entire online community, including an exciting mix of possibilities:

- C.E. lectures that are live and interactive, as well as archived ones, bringing local events to national audiences.
- Focused discussion forums that allow practitioners to stay informed.
- Product reviews with recordings of opinion leaders’ first impressions.
- A growing database of case studies and articles featuring topics that are important to today’s practitioners.
- Networking possibilities that go beyond borders to create a “Global Dental Village.”
- Contests with chances to win free tuition for ADA CERP C.E.-accredited webinars.
- And much more.

The goal of Dental Tribune Study Club is to become the standard practice for dentists worldwide, not only in continuing education but in communications of all kinds.

Through its membership, the club seeks to inspire new possibilities and create higher expectations. Join DTSC to expand your networking possibilities on a global basis; and given the extensive archive, you also gain access to local and global events at a time that is convenient for you.

Considering all the new concepts emerging in dentistry, it is not surprising that many practitioners are finding it difficult to stay up to date. The assessment of new products and techniques is a major challenge facing dentists. This may be especially true for those in a single dentist practice, with time for only occasional communication with other practitioners.

Study clubs can help increase this interaction, thus providing you with the opportunity to gain knowledge about such products through your colleagues’ experimentation and analysis, or even from respected opinion leaders directly.

The C.E. quiz for the article in this magazine is accessed through the DTSC website. You can take the quiz and print your C.E. certificate from the website in the same day. Please visit www.DTStudyClub.com to explore the many additional courses in the area of cone-beam education.

Fig. 1 Dr. Howard Glazer
Fig. 2 A full house in the DTSC Symposia room at the Greater New York Dental Meeting.
Fig. 3 Dr. Gregori Kurtzman

Fig. 1
Fig. 2
Fig. 3
Four years of dental school is enough to charge a graduate with the responsibility to continue to stretch and learn and grow, but the challenge is in finding a course of learning that allows the dentist to become more and to offer better care to his or her patients. Most of the programs offer training in particular treatments and an opportunity to add new treatment options to the mix offered in the practice. While that certainly is an essential course of education, the most critical and fulfilling training that can be done is that which leads to being able to see the patient in a new light.

The ability to see the bigger picture and to create a focus on the full breadth of the impact of improper form and function is one of the most empowering skills a dentist can develop, and unfortunately it is exceedingly rare to find. The X-ray is perhaps a limiting diagnostic tool as it can become a crutch and detract one’s focus from the things that truly will make a difference. Exceptional outcomes are from a shift in focus to the health history and an evaluation of the soft tissues as well. This obviously would include periodontal soft tissue, but the forgotten or ignored markers are found in the muscles, structure and function of the body outside the confines of the mouth.

It has been shown that 90 percent of pain in the body is muscle pain in origin and engaging in a healing profession that treats based on pain, dentists are often sent down the wrong path by their reliance on X-ray based diagnosis.

A review of symptomology as well as muscle palpation of the supporting tissues is critical in creating a proper diagnosis. This will help to paint the picture of the interconnections between the skeletal support of the bite and the muscles support of the bite, and the wide array of symptoms that could potentially arise from an improper bite relationship. Given this perspective, the patient can decide for himself or herself which course of action is most appropriate, but the key is that he or she can discover solutions to problems that generally were thought to be unfixable. In some cases, issues such as bruxism or grinding, are simply accepted as being something patients have to live with. No discussion of a cure or way to end the grinding is offered and the patient is given options to minimize the damage, but no option to correct the underlying problem.

Other issues such as a migraine are managed with medication and the treatment focuses on mitigating symptoms rather than eliminating the root cause. There are literally hundreds of symptoms that patients suffer and that arise from an improper bite, and the challenge for those in the field of dentistry is that the vast majority of these symptoms can also be the result of something unrelated to the mouth. It is in the health history and clinical examination of the patient that the dots are connected. Employing a cranial nerve evaluation, muscle palpation examination and a signs and symptoms review along with properly mounted dental models allows both the dentist and the patient to see that bigger picture.

This process gives the dentist the chance to appreciate the micro-occlusion or tooth gearing, but more importantly, it allows for an analysis of the macro-occlusion or the relationship of the upper and lower teeth.

The LVI building in Las Vegas
(Photo/Provided by LVI)
lower arches. That perspective, combined with the more global health history and a clinical exam, has created an evolution in dentistry that has gathered momentum over the last several decades, which has been referred to as neuromuscular dentistry.

However, in reality it is simply comprehensive evaluation leading to comprehensive care. Dentists who practice neuromuscular dentistry routinely seek to resolved idiopathic and incurable problems for their patients. They eliminate grinding and end decades of patients suffering from chronic headaches and neck pain.

These dentists are seeing lower back issues resolved and numbness in the fingertips disappear. In addition, these dentists watch their patients return to enjoy a quality of life that they had given up on by providing care that goes so far beyond the act of restoring proper form and function and esthetics to teeth. Dentists who practice neuromuscular dentistry deliver care that changes their patients’ lives for the better forever.

As the continuing growth of our understanding connects with various aspects of healthcare, dentists are increasingly indispensable. The oral cavity is the gateway to the airway, and the proper macro-occlusion will support a proper airway. On the other hand, an over-closed or collapsed bite leads to macro-occlusion that is limiting the flow of air and the consequence is obstructive sleep apnea (OSA). Optimal patient management of OSA includes support from a trained dentist to protect the airway through the night, and the neuromuscular dentist can also manage the daytime consequences that are causing grinding or headaches.

As a dentist, there is nothing more rewarding than to eliminate chronic pain and manage OSA, and literally save the lives of your patients. There are dentists around the world who are objectively and strategically managing their patients and seeing predictability and success in their care. However, this requires a more complete understanding and more comprehensive care.

Education that focuses not just on clinical tips but also on diagnosis is essential to becoming the best dentist you can be. While there are many options in dental education, the Core I program at the Las Vegas Institute is routinely reported to have given attendees a totally new and more complete perspective.
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The American Association of Implant Prosthodontics (AAIP) will hold its 30th annual meeting on Saturday, Nov. 3, in Carefree, Ariz., at the Carefree Resort & Conference Center, in association with the Dental Implant Clinical Research Group and Midwestern University College of Dental Medicine.

The theme of the meeting will be “Implant Update: 2012” and will feature well-known dental clinicians. Podium speakers at the meeting are Drs. Robert J. Braun, Edward M. Feinberg, Jack Hahn, Leonard I. Linkow, Paul M. Mullasseril, William D. Nordquist, Robert Weiner and Christopher Torregrossa.

Dr. M. Joe Mehranfar will be general chairperson of the meeting and Dr. Mahmoud F. Nasr will serve as moderator. Alternate speakers are Drs. Charles S. Mandell, Mike Shulman and Sheldon Winkler. Major dental implant manufacturers and several dental laboratories will exhibit at the meeting.

Linkow, considered by many of his colleagues as the “Father of Oral Implantology,” will speak on “Five Decades of Dental Implants.” In 1992, New York University College of Dentistry created the first and only endowed chair in implantology in perpetuity with Linkow as the recipient.

Braun, the professor of oral and maxillofacial pathology, medicine and surgery at Temple University School of Dentistry, Philadelphia, Pa., will speak on “Systemic Implications of Oral Disease and its Relation to Oral Implantology.”

Feinberg, director of the Westchester Academy of Restorative Dentistry, will speak on “The Precision Attachment Case for Implants.”

Hahn, a well-known pioneer in implant dentistry who has developed numerous implant devices and techniques used worldwide, will speak on “The ‘Emergency’ Implant — Immediate Extraction Replacement.”

Mullasseril, associate professor and chairperson of the division of restorative dentistry at the University of Oklahoma Health Sciences Center, will speak on “Mini Dental Implants — Where Are We Today?”

Nordquist, who lectures worldwide and performs live-surgery seminars in the United States and Asia, will speak on “Saving Ailing and Failing Implants.”

Torregrossa, director of the Dental Practice Group at Price Kong CPAs and Consultants, will speak on “Protecting Your Practice From Theft and Embezzlement.”

Weiner, who has lectured extensively throughout North and South America and Europe and taught at the University of Pennsylvania and Temple University, will speak on “Ridge Preservation and Site Preparation for Optimum Implant Esthetics.”

Founded by Dr. Maurice J. Fagan, Jr., in 1982 at the School of Dentistry, Medical College of Georgia, the objective of the AAIP is to support and foster the practice of implant prosthodontics as an integral component of dentistry. The academy supports component and affiliate implant associations around the world, including organizations in Egypt, France, Jordan, Kazakhstan, Israel, Italy, Jamaica, Paraguay and Thailand.


The academy holds an annual convention, international meetings in cooperation with its affiliate and component societies, offers continuing education courses and sponsors a network of study clubs in the United States. The AAIP website is www.aaipusa.com. A meeting program can be downloaded from the website.
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