

# Elective Cosmetic Dental Treatment: One Dentist's Philosophy Concerning "When to Treat"

Robert A. Lowe, DDS, FAGD, FICD, FADI, FACD, FIADFE

## A "MORAL DILEMMA?"

It is a wonderful time to be practicing dentistry! As advances in dental materials and techniques continue to unfold, the benefits to the end user, the patient, are greater now than at any time in the history of our profession. Dentistry is evolving from a "reactive profession" with the mindset "it can't be fixed it until: 1—the disease has progressed far enough, 2—it breaks" to a "proactive profession" where prevention and minimally invasive techniques are prevalent.

Conservatism as a philosophy of treatment has also come "full circle." As Shavell<sup>1</sup> once said, "Many teeth are sacrificed upon the alter of false conservatism." That statement was never more true than today. We no longer have to remove healthy tooth structure for the structural requirements of the restorative material as we did for cast gold and dental amalgam. Adhesive technology has advanced so far

that we can micro-mechanically bond a "jig saw puzzle piece" of tooth colored restorative material to tooth substrate that will wear favorably and support remaining natural tooth structure. So, where is the dilemma?

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The ability to predictably bond very thin pieces of tooth colored restorative material to teeth and expect excellent long term results has created a new area in the practice of dentistry — that of elective cos-

metic treatment. Over the last 20 or so years, materials and technologies have continued to improve such that today, many procedures whose longevity was felt by the "old school" to be a



**FIGURE 1**—A full face view of a twenty-one year old female with an unesthetic smile due to a congenital malformation known as "microdontia."



**FIGURE 2**—An unretracted view of the patients' smile. She rarely smiles in this fashion since she feels her teeth look like "baby teeth."



**FIGURE 3**—A retracted view of maxillary and mandibular arches. The patient has a Class 1 malocclusion and is congenitally missing her maxillary left permanent lateral incisor. The maxillary left permanent cuspid has migrated into the lateral position and the patient also has a limited interarch distance.



**FIGURE 4**—A view of the maxillary arch from the incisal/occlusal aspect. Note the even distribution of spacing, lack of rotational problems and the normal arch form that exists preoperatively.



**FIGURE 5**—A view of the mandibular arch from the incisal/occlusal aspect. Even spacing and ideal arch form exists in this arch also allowing for minimal tooth preparation.



**FIGURE 6**—This is a view of the completed laboratory wax up for the case creating proper tooth form and occlusal relationships for the teeth to be treated. A duplicate of this model will be made in dental stone so that a clear stent can be made for provisional restoration fabrication.



**FIGURE 7**—This view shows the teeth in maximum intercuspation after tooth preparation. Note that the molar teeth are in centric contact and that a minimal amount of space has been created for the addition of porcelain to the prepared tooth surfaces. The case will be completed without any change in occlusal vertical dimension.

compromise, have proven to be excellent, clinically viable, long term treatment options. Teeth can now be "resurfaced" with tooth colored restorative materials requiring very little tooth preparation. The "lamination effect"<sup>2</sup> by virtue of adhesive bonding technology allows the dentist to add a brittle restorative material of minimal thickness to the surface of the tooth which will not break under normal masticatory function.

Hence, patients who are not happy with the smile "mother nature" provided can elect to have a "smile makeover", correcting esthetic problems associated with tooth shape, position, size and

color. For many years, patients had to live with esthetic problems that were tooth related. Orthodontics can straighten teeth, but cannot alter malformation or problems associated with tooth color. The psychologic ramifications to the patient of an unesthetic smile are only beginning to be understood and validated.

Some dentists still believe that it is a "violation of the Hippocratic Oath" to disturb "healthy" tooth structure, even if the patient is unhappy with their esthetics, and that we should "talk them out of elective treatment". In this day and age, such backward thinking is unnecessary. Just ask the thousands of happy patients who have

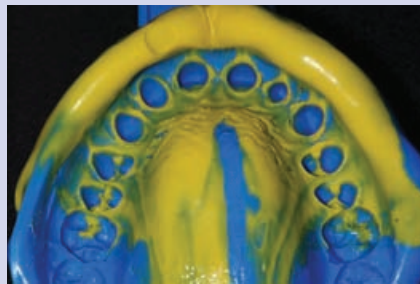
"sacrificed" a few tenths of a millimeter of tooth structure whether the dramatic esthetic changes achieved were worth the risk. And, that is exactly what it comes down to: "risk versus benefit." Is the risk associated with the minimal loss of tooth structure worth the benefit of a long-term cosmetic change for the patient? For many patients, elective cosmetic dentistry can be a life altering experience altering those who were not fortunate enough to be born with "perfect teeth" the smile they have always wanted. The following is just such a case.

**PATIENT HISTORY:  
THE ANATOMY OF A SMILE**

The patient was a twenty-one



**FIGURE 8**—A diode laser (Twilight: Biolase Technologies) was used to create space in the soft tissues interproximally for the ceramist to create more natural emergence angles when closing the spaces between the preparations. This was done in free gingiva only so as not to disturb the biologic width. The goal is to simulate papilla by “squeezing” the tissue between adjacent porcelain surfaces.



**FIGURE 9**—Preparation margins were made at the gingival crest facially and interproximally, while staying slightly above the gingival crest lingually. A view of the maxillary final impression taken without gingival retraction is shown.



**FIGURE 10**—The provisional restorations are shown in this full arch retracted view after bonding them to place using filled adhesive resin (OptiBond 2FL: Kerr Corporation). Note the maintenance of occlusal vertical dimension in the molar region, yet the tooth forms anterior to the molar region have proper esthetic contour and occlusal interrelationships.



**FIGURE 11**—A full smile view of the patient with provisional restorations. Compare to the preoperative smile in Figure 2.



**FIGURE 12**—The preoperative study models are shown in centric occlusion.



**FIGURE 13**—The laboratory models with the ceramic restorations are shown in centric occlusion. Compare with Figure 12 preoperative models to see the change in esthetics and function.

year old female who, for her entire life as she remembers it, was ashamed to smile. She had a congenital condition called “microdontia” which caused much of her permanent dentition to be malformed and so small that she had diastemata between most of her teeth from the molar region forward. The buccal cusps of her canine and premolar teeth appeared to be very sharp and pointed. Facially, this young woman appeared to have the teeth of a child (Figs. 1-3). As far as her occlusion was concerned, she had a Class I molar relationship and functioned in a very non-destructive chewing pat-



**FIGURE 14**—This is a view of the maxillary anterior preparations at the delivery appointment after removal of the provisional restorations. Notice the “papilla” that formed as a result of the provisional emergence profiles. The marginal tissues are still immature and the sulcular environment is such that bonding restorations could be difficult.



**FIGURE 15**—Expasyl (Kerr Corporation) is placed around each preparation and is allowed to sit undisturbed for two minutes.



**FIGURE 16**—After rinsing away the Expasyl with air-water spray, notice the tissues have been deflected away from the margins. Also the hemostatic agent in Expasyl dries up all sulcular fluids and creates a good environment for bonding of the ceramic restorations.



**FIGURE 17**—The maxillary anterior ceramic restorations are shown from the facial aspect three days after placement. Although the patient requested “Hollywood white” restorations, the natural tooth anatomy, cervicoincisal polychromatic effect and incisal translucency create a bright, but natural appearance.



**FIGURE 18**—This is a view of the mandibular incisor region from the facial aspect. Note the natural mammelon development and translucency created in only .5 millimeters of ceramic material. A high value restoration has been created for the patient with little use of white modifiers, which can create a “dead, opaque” appearance.



**FIGURE 19**—A full arch retracted view is shown at three days post-cementation. Compare to the full arch preoperative view in Figure 3. The change in this patient’s life and esthetic appearance as a result of two all-day dental visits is immeasurable.



**FIGURE 20**—A maxillary arch view of the completed restoration from the incisal/occlusal aspect. Note how the restorations on the premolar teeth wrap around to the linguoproximal line angles to avoid ledging and the creation of poor interproximal contours.



**FIGURE 21**—A view of the completed mandibular arch from the incisal/occlusal aspect. The premolar preparations incorporate the “Lebda modification” to the facial veneer allowing for interproximal decay removal without preparing the occlusal surface in the functional centric contact areas.

tern. She exhibited no muscle tenderness or temporomandibular joint dysfunction. Aside from a few small direct dental restorations, her dental health history was unremarkable. Most dentists would consider that she had “good teeth” from a disease perspective. However to the patient, her teeth were anything but “good.” The maxillary and mandibular arch form was good and the spacing was well divided (Figs. 4 & 5). It was almost as if the teeth had been orthodontically positioned to equalize the spacing. The interarch distance was minimal, which meant the preparation for any full coverage restorations would yield a stump

with minimal axial height and retention after occlusal reduction. The problem was to restore esthetic beauty with as little tooth reduction as possible and without altering the occlusal vertical dimension. To complicate things further, the patient had to travel from Texas to North Carolina for her treatment.

After a local dentist in Texas had taken a full mouth set of radiographs and preoperative study models, it was determined that all teeth from the premolar region of both arches would require treatment. The maxillary and mandibular molars would remain

untreated and maintain the preoperative occlusal vertical dimension. Due to the short cervicoincisal height of the clinical crowns, it was recommended that the patient have surgical crown lengthening by a local periodontist to gain as much axial height as possible. The tissues were allowed to heal for six months prior to the commencement of restorative therapy. The operative plan was to prepare the anteriors and bicuspids on both maxillary and mandibular arches, take master impressions, interocclusal records, a facebow transfer, and fabricate chairside provisional restorations based on a preoperative laboratory

wax up (Fig. 6). One month later, the patient would return for delivery of the restorations, with a three-day follow up and necessary occlusal adjustment prior to returning to Texas. A local dentist planned to follow the case and provide necessary follow up care.

### SMILE TRANSFORMATION: HOW IMPORTANT ARE TEETH?

The methodology of tooth preparation was to create 360° “minicrowns” for the six maxillary anterior teeth. It was felt that in order to maximize the gingival esthetics and to create proper facial and lingual embrasures, 360° preparation of these teeth would be necessary. However, the amount of tooth reduction incisally and axially would be minimal, about five tenths of a millimeter. In actuality, one merely needed to remove the heights of contour and create a finish line for the laboratory in a similar fashion to preparing pedodontic teeth for stainless steel crowns. The mandibular anterior teeth, being more closely spaced, would be prepared for three quarter “wrap around” porcelain veneers.

Preparation design for the premolar teeth needed a bit more “creativity”. The plan was to have functional contacts on enamel and not to reduce the occlusal surfaces. Yet, some interproximal caries existed in some areas and veneering only the facial surfaces would leave poorly contoured lingual embrasure areas (shelves) with the potential to trap food. A modification of the onlay veneer preparation<sup>3</sup> was planned that would restore lingual embrasure contours, remove decay and create resistance to facial displacement, yet leave the occlusal enamel surface intact. This has been termed by the author the “Lebda Modification” for the onlay veneer (named for the first patient on whom this design was used).



**FIGURE 22**—A full smile three-day post delivery view is shown in this slide. Refer to the preoperative smile in Figure 2 to see what a dramatic morphogenesis this patient has gone through...from having the smile of a child to that of a young lady in two visits via elective dental aesthetic reconstruction.

The distance (diastema) between the premolar teeth was equally divided and closed by the adjacent proximal restored surfaces. The prepared teeth are shown in Figure 7. Following tooth preparation, a periodontal probe was used to measure proximal sulcus depth of the maxillary anterior teeth. About three millimeters of sulcus depth was measured on average. A diode laser (EZ Lase:

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Biolase Technologies) was used interproximally to create small triangular spaces in the soft tissue to give an illusion of facial interdental papillary tissue (Fig. 8). By creating this space and slightly lowering the interproximal margin, the ceramist could create an emergence profile that could push the interproximal tissues together slightly and close



**FIGURE 23**—A three-day full-face postoperative photograph is shown in this figure. Compare to Figure 1 and ask yourself if this elective treatment was worth the risk for the patient. You know what her answer would be!

the space. Also, this procedure would help the ceramist prevent “ledging” of the ceramic material to eliminate “black triangles.” Aside from these interproximal areas, all finish lines of tooth preparations were positioned at the crest of the gingival tissue, or slightly supragingival. Master impressions (Fig. 9) were made of both arches without the need for gingival retraction or hemorrhage control.

A hard acrylic index (Luxabite: Zenith/DMG) was taken in the anterior region with the molar teeth in proper centric position. A facebow transfer was also made relating the positions of the upper preparations to the patient’s maxillary base. Bisacrylic provisional restorations were fabricated with temporary material (Venus Provisional Material: Heraeus Kulzer) using a clear stent derived from the stone model replica of the laboratory wax up. The provi-

sional restorations were luted in place using flowable resin (Venus Flow: Heraeus Kulzer) and the “spot etch” technique<sup>4</sup> excess resin was cleared away using a #2 Keystone brush (Paterson Dental) prior to light curing. The margins were finished with a high-speed 30-fluted composite finishing bur (Brasseler USA). Polishing of the bisacrylic provisional restorations was performed using rubber abrasives followed by a polishing brush (Enhance Points: Dentsply/Caulk) and Occlubrush: Kerr-Hawe). The final provisional restorations are shown in Figures 10 & 11. Note the incredible transformation of this “little girl” into a grown woman. The esthetics of a beautiful smile is indeed empowering.

### DELIVERY OF THE CERAMIC RESTORATIONS: THE MOMENT OF TRUTH

The patient had requested like so many other patients these days to have a “white and bright” smile. The challenge with these cases is to create natural shape and contour that is brighter in value than natural teeth, yet has the same optical properties, incisal translucency, and polychromacity as teeth in the natural range of color. The ceramic restorations were fabricated from Venus Porcelain (Heraeus) (Figs. 12 & 13). The manufacturer reports that the patented synthetic quartz from which Venus Porcelain is made creates dental restorations with the natural elegance of natural tooth structure.<sup>5</sup>

The patient was scheduled for delivery of her restorations approximately four weeks after the preparation appointment. Upon removal of the provisional restorations, the soft tissue environment was “less than ideal” for bonding restorations. Generalized sulcular reddening of the epithelium was noted with some tissue migration over marginal areas (Fig. 14). Creating a suitable envi-

ronment for bonding was simply accomplished through the use of Expasyl (Kerr Corporation). Expasyl was syringed around each preparation and gently packed apically with a moist cotton pledget (Fig. 15). It was allowed to sit for two minutes, and then rinsed away with an air-water spray (Fig. 16). The combination of sulcular drying, hemostasis, and tissue deflection now created a perfect environment to bond ceramics without the risk of fluid contamination. The maxillary ceramic restorations were tried in individually for marginal evaluation, then collectively for fit and contact verification. Next, they were all luted using a clear, dual cured resin cement (NX3: Kerr Corporation).

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The same regimen was performed for the mandibular restorations as well. After cementation centric occlusion was adjusted, as needed, using articulation paper (Accufilm 2: Parkell) to identify occlusal contacts. Next, lateral and protrusive excursions were checked and adjusted. All adjusted areas were then polished using porcelain polishing points. (Brasseler USA) The patient was restored with anterior guidance and canine disclusion (Figs. 17-21).

### EPILOGUE

#### *Conservative elective cosmetic dentistry and the right of the dental patient to seek and receive treatment*

The case that has been presented is clearly one that has made a

major life altering change for the patient. The positive psychological ramifications of her new smile will be enjoyed for many years to come. We all have the same potential to profoundly impact our patient's lives by improving self-image and self esteem through the delivery of cosmetic dental procedures.

There are some in our profession however, that view elective cosmetic dental procedures as “unethical” and “unnecessary.” Who really should decide when such treatment is justified? How wide must the diastema be, or how unesthetic the smile? In this modern era of dentistry, we now have the responsibility to not only diagnose and treat dental disease, but to offer solutions for cosmetic dental problems as well. Remember, it's only “a good tooth” if the patient is happy. As a profession we must remember, we treat not only teeth, but also the person to which they belong (Figs. 22-23). **OH**



*Dr. Robert Lowe maintains a private practice in Charlotte, NC. He received fellowships in the AGD, ICD, ADI, ACD, received the 2004 Gordon Christensen Outstanding Lecturers Award, and in 2005, Diplomate status on the American Board of Esthetic Dentistry. Dr. Lowe can be reached at boblowedds@aol.com.*

*Oral Health welcomes this original article.*

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