Masters of Esthetic Dentistry

BRIGHT AND WHITE: IS IT ALWAYS RIGHT?

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Does this smile require restoration? This might be the appropriate question to ask yourself when considering the treatment of a healthy, attractive, and even esthetic smile (Figure 1)! I have serious doubts when I look at some glossy magazines, professional or not, that show more and more frequently natural, young, and healthy smiles restored with devastating long-term results: smiles ultimately sacrificed to the desire for improved cosmetics. Is it right to sell cosmetic treatments and restorations like any other goods? Of course, we can pretend that our patients (or should we say "consumers"?) requested them, but we all know who has created this need, this elusive image of a "perfect" smile. Would we agree to have our own teeth or those of our relatives invasively prepared to receiving a set of 10 porcelain veneers just because of minor crowding or an existing natural A2 or A3 shade? I think that with very few exceptions most of us would answer this question with the same resounding response, "No!"

If every dental restoration were guaranteed to last a lifetime, the situation would be different. But we all know that after one or possibly two (in the best-case scenario) veneer generations, patients will end up with crowns and potentially other concomitant problems (endodontic treatment, periodontal treatment, or a combination), leading to even more complex esthetic concerns.[1] It is far too easy to hide ourselves behind the trend, the natural desire of patients to have a "Hollywood smile!" Clearly, the influence of the media has fostered this desire for whiter and brighter teeth. But as dental professionals, we should question the widespread conception that only teeth that are white, straight, and often artificial in appearance are desirable. We definitely should be more concerned today about the long-term dental health of our patients than about any short-term cosmetic improvement.

Creating short-term attractive smiles at the expense of long-term dental health and optimal tooth biomechanics by using cosmetic techniques should not be considered an ethical approach. The "progressive treatment concept" is a rational yet simple illustration of a more comprehensive, reasonable approach to functional, biologic, and esthetic dental problems.[2]

The aim of this article is to outline the numerous advantages of a more

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Diving, skiing

Figure 1. Would any one consider doing cosmetic dentistry in this beautiful, healthy mouth?

conservative systematic approach to esthetic dentistry, with the primary goal being conservative esthetic improvement in concert with optimal dental health.

TREATMENT PHILOSOPHY

Esthetic deficiencies can be addressed through simple, conservative procedures or more advanced, invasive restorative options, depending on the severity of the problem and the treatment philosophy. The chief point of my argument is that treatment options should *begin with the most conservative option* and progress as needed to more invasive options.

The following list outlines treatment options from most to least conservative:

- Chemical treatments (eg, bleaching)
- Orthodontics
- Basic periodontal therapy or corrective periodontal surgery
- Freehand bonding
- Veneers
- Full crowns

For each of the more conservative options from chemical treatments to freehand bonding, there are opposing more invasive prosthetic alternatives available (including veneers and crowns). Some treatment philosophies are frequently in opposition, such as the following:

- Orthodontics versus prosthetic restorations
- Chemical treatment (bleaching) and freehand bonding versus prosthetic restorations
- Veneers versus crowns
- Single versus multiple restorations

I strongly support orthodontics and chemical treatments such as bleaching and/or microabrasion to enhance dental esthetics because they are fairly conservative and represent a lower risk for dental structures (Figure 2). The proportion of patients who accept the conservative approach naturally depends on the manner in which the information and treatment options are presented. If one were to highlight the treatment duration and discomfort of orthodontics and oppose it with the expediency of a prosthetic treatment, no one would ever elect to pursue the more conservative orthodontic correction of crowding. Moreover, patients are often uninformed about the long-term consequences of indirect restorations, particularly those placed in a young mouth. This troubling approach also underscores the importance of emphasizing ethics in dental education, from undergraduate education to the highly specialized programs in cosmetic dentistry available today.

Overtreatment is another critical issue in esthetic dentistry. One can accept the challenge of restoring a single anterior tooth with either composite or ceramics, thereby saving a significant amount of healthy tissue, or one can decide to restore adjacent teeth or even an entire segment of teeth to more easily achieve shade matching and restoration integration. My philosophy clearly is in favor of a more conservative approach for correcting dental esthetic problems (Figure 3).

POTENTIAL AND LIMITS OF CONSERVATIVE COSMETIC PROCEDURES

A pleasant, light color of the natural dentition with normal tooth form and arrangement is the main desire

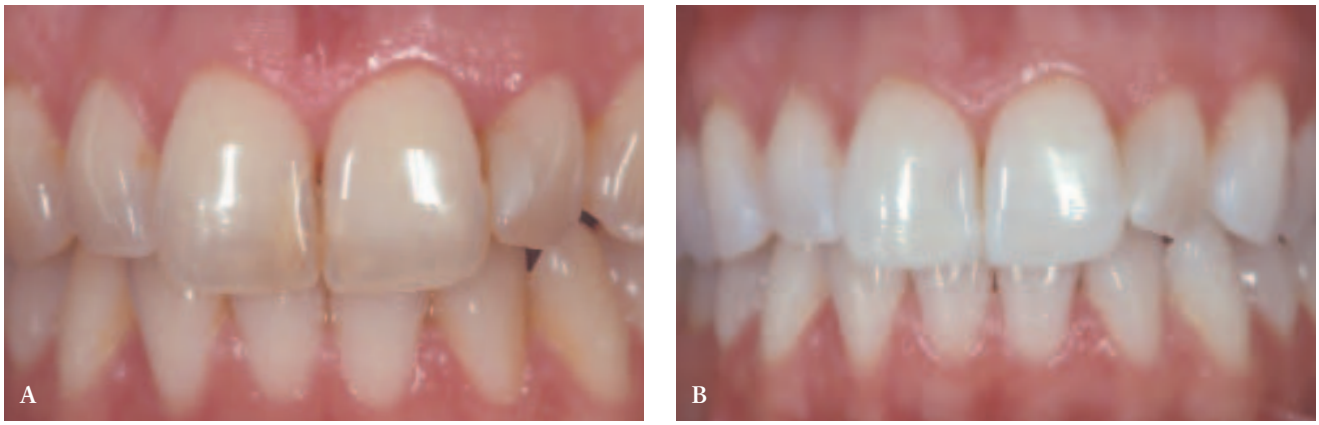

Figure 2. A combination of direct bonding and vital bleaching can lead to spectacular esthetic improvements (at least following present standards) at no biomechanical cost. Such a treatment approach undoubtedly is best to guarantee the long-term dental health of our patients. A, *Preoperative view.* B, *Post-treatment view, following home bleaching and replacement of Class II composite resin restorations.*

or wish of the majority of our patients. Of course, variations in esthetic preferences relate to patient age, culture, and financial means. If nature has not provided an individual with an ideal smile, many conservative procedures can remedy most esthetic deficiencies found in an otherwise-healthy dentition. Bleaching, microabrasion, enamel recontouring, and freehand bonding can help to create a more attractive smile with practically no tissue sacrifice. To meet a patient's esthetic expectations with minimal tissue loss is challenging and requires a comprehensive treatment plan following the completion of a thorough analysis of the patient's biologic, functional, and esthetic needs. One also should be aware of the specific indications for the various conservative treatment options and be able to integrate them efficiently into a private practice. Unfortunately, some of these procedures are simply regarded as financially less rewarding and too often are neglected in favor of faster and more profitable yet more invasive cosmetic treatments (Figure 4).

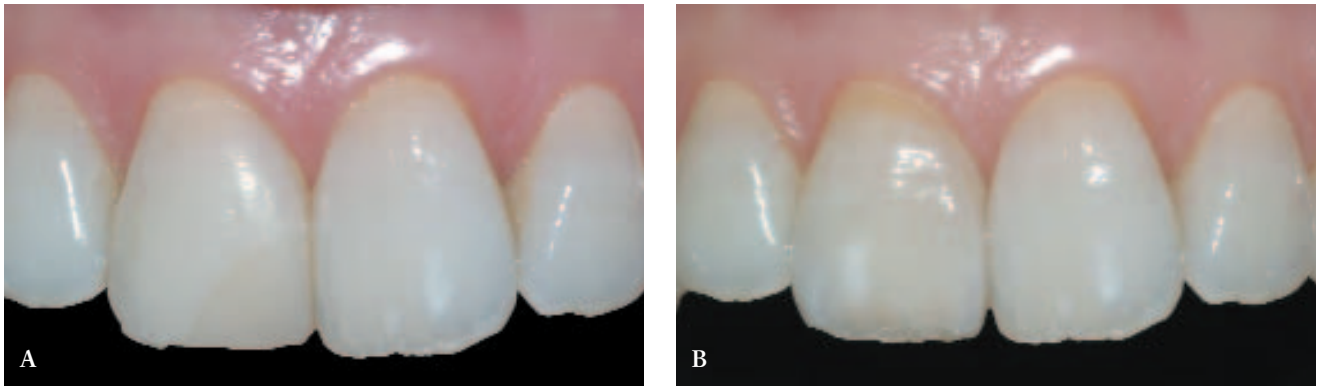

Figure 3. Restoration of a single anterior tooth is the most challenging task for dentists and dental ceramists. Well-structured teamwork can overcome these difficulties and lead to optimal esthetic results and long-term dental health. A, *Initial view showing a fractured, esthetically deficient ceramic veneer.* B, *The new restoration integrates satisfactorily with the surrounding anterior dentition.*

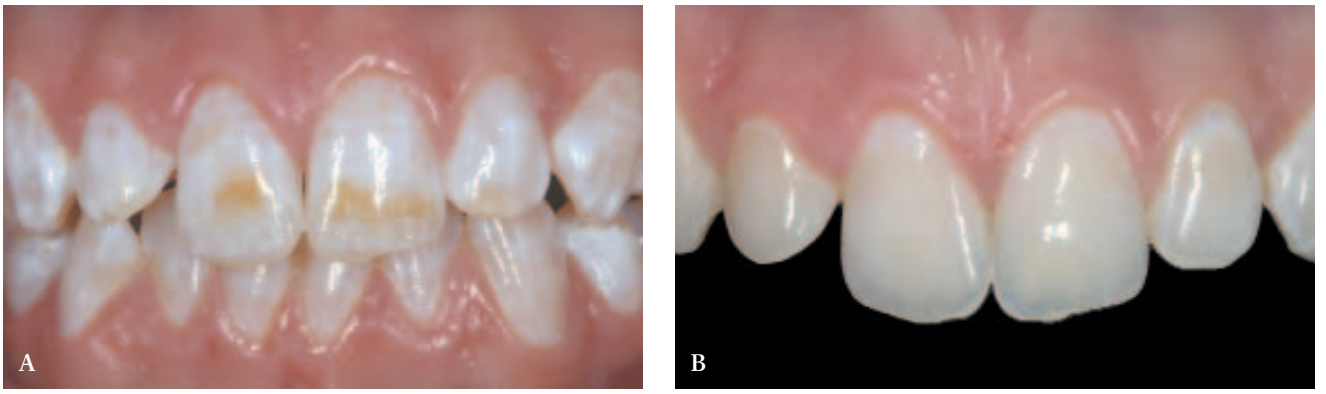

Figure 4. A, *Preoperative view of anterior teeth with mild to severe fluorosis.* B, *The patient was treated with a combination of chairside vital bleaching and microabrasion. The result is not only satisfactory but also represents a lifelong success. This conservative option was a logical approach to the problem and was preferable to placing porcelain veneers.*

This particular concern appeared recently in the field of bleaching treatments, perhaps the most popular cosmetic procedure. Despite the well-documented long-term efficacy of nightguard vital bleaching (home bleaching),[3–5] dentistry is observing a slow return to chairside bleaching techniques, which are largely based on physicochemical principles and clinical procedures established in the late nineteenth century. Has this bleaching approach become more effective or more comfortable than before owing to new technology or chemistry? In my opinion, no. In fact, independent credible research to support the strong focus of the dental industry on this treatment modality is largely missing. One can only attribute this shift in bleaching preferences to commercial motives.[6,7] Patients are often told they can obtain whiter teeth in one short in-office treatment, yet experience and research show that multiple appointments are needed with in-office bleaching to achieve optimal whitening results.

Modern composite resins have proven to be highly successful and provide long-term satisfactory clinical service in both anterior and posterior areas through improved physicochemical properties, wear resistance, and color stability.[8–13] Thanks to these qualities, composite resins should be considered the materials of choice in cases of diastema closure, localized color correction, and tooth reshaping and for any type of conservative restoration in the esthetic zone. Indications range from small cervical restorations to large Class IV restorations or incisal buildup of traumatized teeth (Figure 5).

The advantage of composite resin as a conservative restorative material is important in young patients owing to the ongoing maturation of soft and hard tissues, which practically contraindicates any prosthetic treatment. It is also of primary concern to pursue treatment options that will help to preserve tooth vitality. In fact, in addition to biomechanical concerns, a loss of vitality leads to major esthetic problems in the long term, especially in those patients with thin periodontal tissues. This observation speaks in favor of more conservative procedures. Even nonvital bleaching unfortunately cannot stabilize tooth color indefinitely owing to inevitable discoloration relapse.[14,15]

Composite resins also are regarded as possible restorative materials for indirect esthetic restorations, although this indication remains rather controversial.[16] Nevertheless, composite resins have a significant advantage over ceramics with regard to the protection of antagonistic teeth and their mechanical behavior. Composite resin does not abrade teeth as much as ceramics

Figure 5. A, *The left central incisor was fractured during a bike accident.* B, *A direct composite resin restoration (Herculite XRV, Kerr Manufacturing Co., Orange, CA, USA) was placed to restore the function and esthetics and protected the pulpodentinal complex.* B *and* C, *The views at 5 and 10 years, respectively, demonstrate the potential of modern composite resin materials. The restorations exhibit excellent mechanical properties, wear resistance, and esthetic properties as well as color stability.*

do,[13,17] and it tends to wear progressively rather than to fracture. This fundamentally different degradation pattern and behavior as a response to severe functional stresses are key advantages of composite resins and justify the use and development of these materials.[17]

LIMITS OF NONCONSERVATIVE COSMETIC PROCEDURES

Full crowns and veneers can be considered much less conservative esthetic procedures since they require varying amounts of healthy tooth substance to be removed. These techniques also should be considered inappropriate for very young patients as pulpal volume and immature gingival profile might limit their long-term biologic and esthetic integration. The dental literature reports proportions of pulpal necrosis under full crowns varying between 13.3 and 17% (with foundation) compared with 5.1 and 0.5% with partial or no restoration, respectively,[1,18] underscoring the risk of preparing young vital teeth with large pulp volume for full crowns. On the other hand, if one tries to be more conservative in preparing the tooth substrate, adequate thicknesses for the veneering porcelain might not be obtained, resulting in deficient esthetics (Figure 6).

The other problem associated with full crowns on either vital or nonvital teeth is the gingival remodeling around the margins owing to an induced inflammatory response,[1,19] impaired physiologic tissue maturation, or even soft tissue recession (see Figure 6). Another troubling concern regarding the use of prosthetic restorations is their need for their maintenance and replacement, which undoubtedly leads to more complex and invasive procedures and increased long-term treatment costs.

Regarding the success of porcelain veneers, one has to consider one important principle, which is to obtain adhesion mainly with enamel. An intraenamel preparation provides the best biomechanical behavior and long-term success for such restorations.[20] Considering the eventual need for replacement of porcelain veneers, it is unlikely that more than two generations of porcelain veneers will really bond to enamel, thus limiting the long-term use of this treatment option. An even shorter clinical longevity can be expected for veneers that have been prepared into dentin. So the next treatment option is inevitably full crowns, with additional tissue loss. The risk of failure for veneers largely bonded to dentin is potentially due to a progressive reduction in bond strength over time (Figure 7).[21,22] Of course, better results can be achieved by using intraenamel preparations, thus respecting the indications, biomechanical principles, and optimal clinical procedures for successful bonded ceramic veneers.[23,24]

Figure 6. A, *Ten-year follow-up of porcelain-fused-to-metal (PFM) crowns placed in a teenage patient. The esthetic quality of such a restoration was first limited by the large pulp volume, which reduced the space for the restorative materials. Additionally esthetic integration was limited owing to soft tissue remodeling.* B *and* C, *The long-term maintenance of full crowns is more problematic in patients with a high lip line, as is demonstrated by these photographs of a PFM crown placed on a young tooth 8 years prior.*

Among the most important principles are intact surrounding enamel walls and the exclusion of high stress areas such as lingual concavities of upper teeth. However, even extensive veneers or three-quarter crowns with large dentin invasion can be restored conservatively with a high success,[25] provided that specific procedures are applied together with an appropriate combination of composite resin and ceramic materials.[23,26]

A last point of discussion and possibly a primary reason for failures for all kinds of restorations relates to the mechanical stresses of bruxism and clenching. It appears that the incidence of parafunctional contacts has increased in the general population,[27] creating a greater need for functional and esthetic rehabilitations. Despite the spectacular outcome of such treatments, inherent mechanical risks cannot be ignored. These cases often require the patient to wear a nightguard or occlusal protective splint over long periods of time (Figure 8). Since no one can predict the real long-term biomechanical risk associated with nonconservative esthetic restorations, we should be extremely cautious when advising such restorative procedures, unless the decision is dictated by biologic and functional needs and the treatment cannot be postponed.

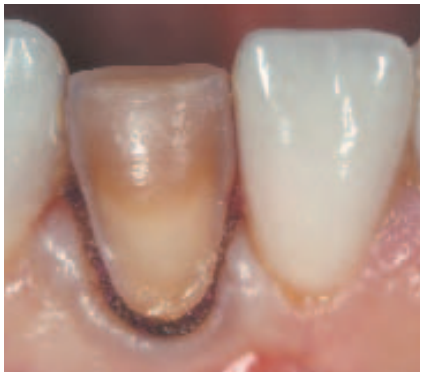

Figure 7. Clinical example of a failed veneer, resulting most probably from preparations involving mostly dentin, leaving only marginal enamel available for strong, durable adhesion. Most failures of this type are encountered when teeth are prepared into dentin or in patients with severe parafunctional habits (see Figure 8).

Figure 8. A, *Patients with parafunctional habits are good candidates for extensive esthetic rehabilitations.* B, *A conservative approach with veneers is appropriate for many of these patients and can lead to spectacular functional and esthetic improvements.* C, *However, long-term results are not guaranteed, even with the regular use of a nightguard (7-year results).*

CONCLUSIONS

Maintaining the long-term dental health and satisfaction of our patients as well as preserving their confidence in the dental profession are not goals related only to the creation of white, bright, and straight teeth. Ignoring the long-term consequences and altered tooth biomechanics resulting from some cosmetic procedures could one day have a disastrous effect on the image and credibility of our profession. If we intend to maintain our appurtenance to the medical professions and also preserve the accompanying rewards, we must have a more discerning and ethical vision of what treatments are best for our patients. We must behave as health care providers, resisting the temptation to simply generate income through "quick fix" dentistry. We can achieve excellence in all aspects of our dental profession through global care with a strong but not exclusive focus on dental esthetics. Ultimately, the challenge is to balance the patient's esthetic expectations and desires with the biologic, functional, and ethical demands that result in the best long-term care for our patients.

DISCLOSURE

The author does not have any financial interest in the companies whose materials are discussed in this article.

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