

# Minimally Invasive Bio-Rejuvenation Dentistry: A Conservative Approach to Full-Mouth Rehabilitation

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## INTRODUCTION

Traditional full-mouth rehabilitation for most clinicians implies putting patients through the vigorous and unpleasant process of having most, if not all, of their teeth restored with crowns or onlays (Figure 1). Not only is this very expensive, making the reality of full-mouth rehabilitation cost prohibitive for many people, but it is also extremely invasive (Figure 2). Once a tooth is treated with an onlay or crown, then it is committed to this type of restoration for life. The author is not against the utilizations of crowns all together, as there are instances in which crowning a tooth is the best option. Rather, the author suggests always looking for the most minimally invasive treatment that will not only enhance the patient's health, function, and aesthetics, but also make it possible for most patients to afford the treatment. Restoring teeth with more conservative methods like direct composite resin bonding provides the patient with a minimally invasive, more affordable option. Preservation of enamel and restoration of the stomatognathic system are accomplished simultaneously.<sup>1</sup>

## Bio-Rejuvenation Dentistry

Bio-rejuvenation dentistry is based on principles first introduced by Dr. Bob Lee<sup>2</sup> in 1990 who observed and documented hundreds of patients with biologically sound chewing systems. These systems all exhibited neuromuscular harmony with unworn teeth and healthy, noise-free joints. Lee<sup>2</sup> observed nature in its optimal form and hypothesized that if these characteristics, or principles, were applied to a patient's dysfunctional dentition, then it could be made healthy and optimal once again. The author applies Dr. Lee's principles to his minimally invasive restoration process and he prefers to use the term *minimally invasive bio-rejuvenation dentistry* to describe the process.

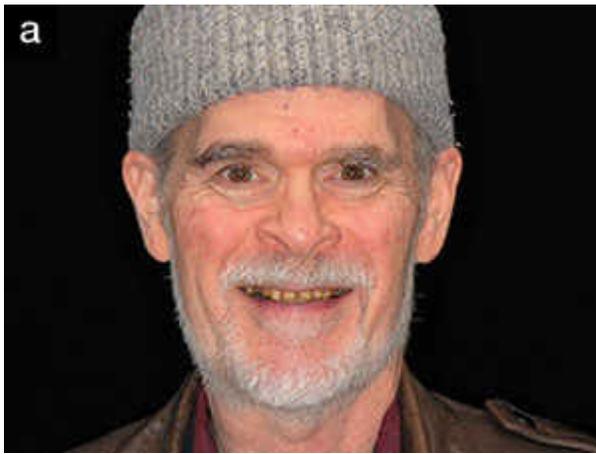


**Figure 1.** Full-mouth restorations with crowns.



**Figure 2.** Full-mouth crown preparations.





**Figure 3. (a)** Our 69-year-old male patient. **(b)** He was self-conscious about his smile.

The bio-rejuvenation approach adheres to Lee's principles of anterior proprioceptive guidance. It is imperative that the occlusion be restored at a vertical dimension that allows for both proper tooth form and appropriate form of the occluded dentition with the joints seated in their most superior, anterior, and medial position. It has been documented that the activity of the masseter and temporalis elevating muscles can be reduced only when the absence of eccentric interferences to maximum intercuspal position (MIP) is obtained by anterior proprioceptive guidance.<sup>3</sup> The characteristics of a healthy functioning condyle/disk complex are as follows:

- Physiologically correct relationship of the condyle/disk assembly with little to no enamel attrition
- Anterior teeth that occlude properly in relation to the stable condyle/disk assembly
- Noninterfering posterior teeth to this physiologically stable position of the condyle/disk assembly
- Release of the inferior lateral pterygoid muscle during elevator muscle contraction and MIP.<sup>4</sup>

## CASE REPORT

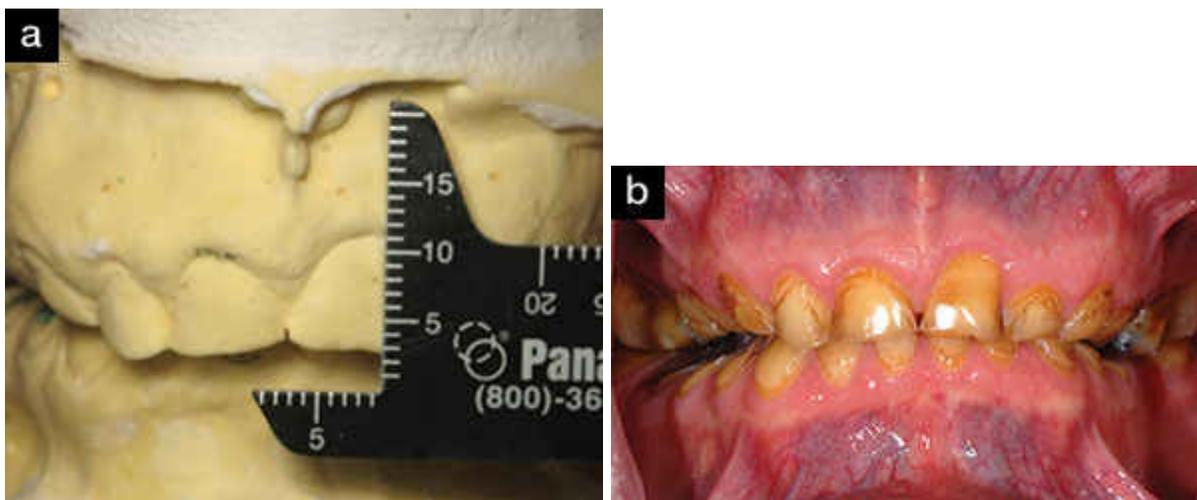
### Diagnosis and Treatment Planning

A 69-year-old male (Figure 3a) presented with the chief complaint that his teeth were wearing away. He was unhappy with the appearance of his teeth and smile (Figure 3b) and he was finding it difficult to chew and digest his food. He suffered from severe attrition and erosion resulting from years of bruxism and consumption of multiple diet sodas daily. He was concerned about his facial aesthetics and the increasing difficulty in chewing due to the amount of wear present. He also desired to have an attractive smile. The patient reported that he no longer consumed any soda or sugary drinks other than an occasional hot chocolate. He also reported that he was no longer aware of grinding his teeth. However, he did indicate some hypersensitivity to cold food and drinks. He also indicated to be free of headaches and facial pain.





**Figure 4.** (a) Severe attrition/erosion. (b) Maxillary arch pre-op. (c) Mandibular arch pre-op.



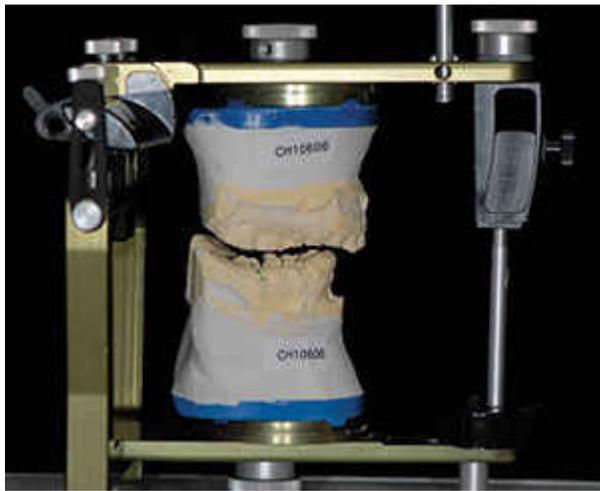
**Figure 5.** (a) Diminished vertical dimension of occlusion (VDO) = 12.0 mm. (b) Pre-op of decreased VDO.

The patient had sought several opinions from different dentists. He was basically given 2 treatment options:

- 1 Full-mouth crown and bridge, most likely requiring multiple root canals, posts, and build ups, or
- 2 Full-mouth extractions, implants with hybrid dentures attached.

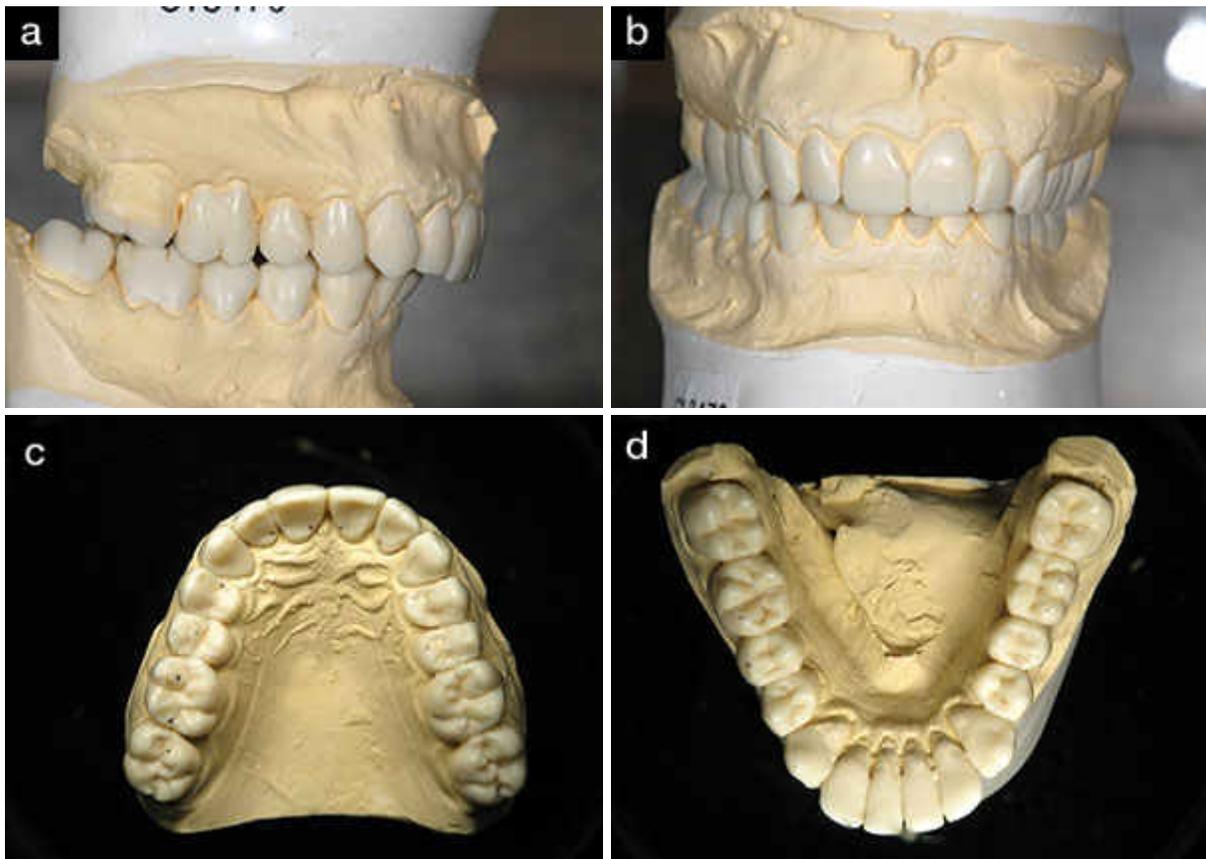
Both options were viable treatment plans; however, the fees for these treatments were cost prohibitive for the patient. Furthermore, his desire to retain as much of his natural enamel as possible was important to him.





**Figure 6.** Panoramic radiograph.

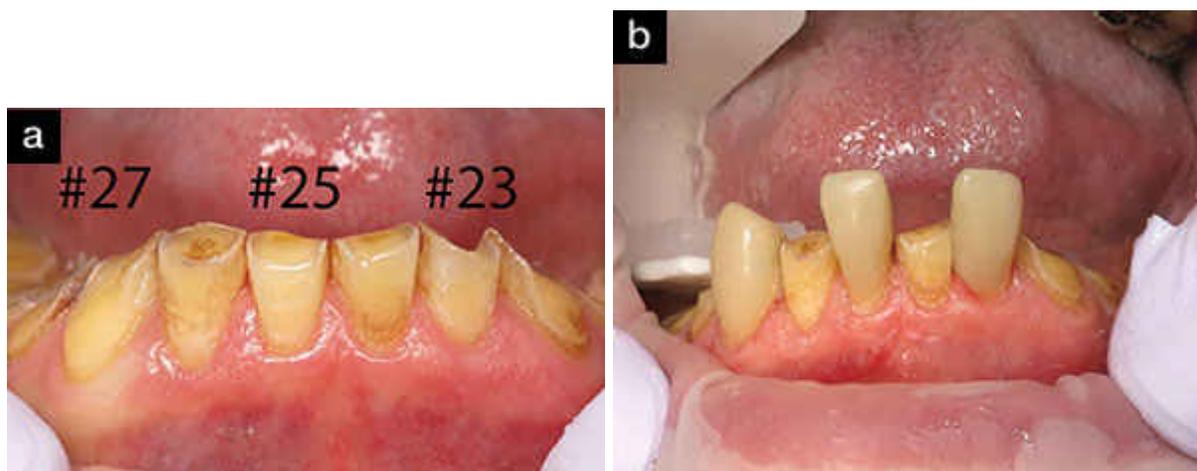
**Figure 7.** Pre-op models mounted at determined vertical dimension.



**Figure 8.** (a) Diagnostic wax-up sagittal view. (b) Diagnostic wax-up frontal view. (c) Diagnostic wax-up maxillary occlusal view. (d) Diagnostic wax-up mandibular occlusal view.



**Figure 9.** The bio-rejuvenation tool kit with Lumaloc (Ultradent Products) stint and acrylic validators.



**Figure 10.** (a) Minimally invasive preps on teeth Nos. 23 to 25 consisted of only of conservatively micro-abrading the enamel. (b) Teeth Nos. 23 to 25 completed.

After diagnostic records were taken and a comprehensive examination completed, the author recommended a bio-rejuvenation treatment plan that would restore the vertical dimension of occlusion (VDO) with the temporomandibular joints (TMJs) in the centric relation position. Additive adhesive composite resin reconstruction was recommended due to its predictability and minimally invasive nature. It was explained to the patient that by creating an occlusion in harmony with his chewing and positioning muscles with the condyles seated in the centric relation position, it would give him a functioning, comfortable chewing system and would satisfy his desire to have an aesthetic smile and improved facial features. It was also made very clear to the patient that his was an extreme case and that he should expect a certain amount of repair and maintenance throughout the years. This made perfect sense to the patient, and the fact that his mouth could be treated minimally invasively made it even more appealing to him. The fee was within his budget as well.

Examination revealed generalized severe attrition/erosion of the teeth (Figure 4) resulting in a decreased VDO (Figure 5). The TMJ exam revealed comfortable joints (Figure 6) with no noises and no mandibular deviation upon a maximum opening of 58 mm. Loading of the condyles produced no discomfort. There were several teeth with deteriorating amalgams and moderate carious lesions. Tooth No. 19 was missing, as were all the third molars. Tooth No. 30 had been treated endodontically (Figure 6). His periodontal health was excellent with all probing depths within normal limits and plaque and bleeding indices of zero percent. There were no systemic or medical issues that were barriers to treatment.



**Figure 11.** Lower anteriors completed in G-ænial Universal Flo (shade A3) (GC America). Tissues slightly irritated from trimming and interproximal flash removal.



**Figure 12.** Checking the accuracy of the lower anterior restorations with the validator. This validator is made directly on a stone duplicate of the diagnostic wax-up and is used to verify accuracy in the mouth.



**Figure 13. (a)** Maxillary anteriors completed in G-ænial Universal Flo shade A3. The slight void in the mesiofacial of No. 9 was corrected easily in the mouth (see Figure 19b). **(b)** Validation of accuracy using the maxillary anterior validator.



**Figure 14. (a)** Maxillary centric contact points. **(b)** Mandibular centric contact points.

An open centric bite record was taken with a Panadent ([Panadent](#)) bite tray at a vertical dimension that would allow the mouth to be restored with proper tooth form, horizontal overjet, overbite, and centric contacts. Accurate alginate impressions were taken and models were mounted (Figure 7) on an AD2 semi-adjustable articulator ([Advanced Dental Designs](#)) utilizing the AD2 face-bow transfer. The diagnostic wax-up (Figure 8) was completed by Dan O'Rourke, CDT (O'Rourke Dental Studio, Lantana, Texas). A bio-rejuvenation "tool kit" (Figure 9) was also included with the wax-up. The tool kit consisted of clear vinyl polysiloxane (VPS) ([Lumaloc \[Ultradent Products\]](#)) stints for accurately transferring the wax-up to the mouth in composite resin. The kit also included acrylic validators for verification of accuracy in the mouth.

### Restorative Treatment

The lower anterior teeth Nos. 23, 25, and 27 were restored first. The teeth were micro-abraded (Figure 10a). No enamel was prepped or removed. Next the teeth were etched with **Ultra-Etch (Ultradent Products)** for 20 seconds and rinsed. **Peak Universal primer/adhesive (Ultradent Products)** was applied, air-thinned, and light-cured with the **VALO light (Ultradent Products)**. **G-ænial Universal Flo (shade A3) (GC America)** was carefully placed into the Lumaloc stint and then taken into the mouth. The composite was then cured through the clear stint material using the VALO light. Next, the stint was removed, and these 3 teeth were finished and polished to completion (Figure 10b). G-ænial Universal Flo is a nanohybrid composite with excellent wear resistance, and it is easily polished. The author has found that this unique flowable composite resin material lends itself perfectly to the bio-rejuvenation technique described herein.



**Figure 15.** Lower arch completed.



**Figure 16.** Upper arch completed.



**Figure 17. (a)** Verification of occlusion. mandibular centric contact points. **(b)** Maxillary centric contact points.

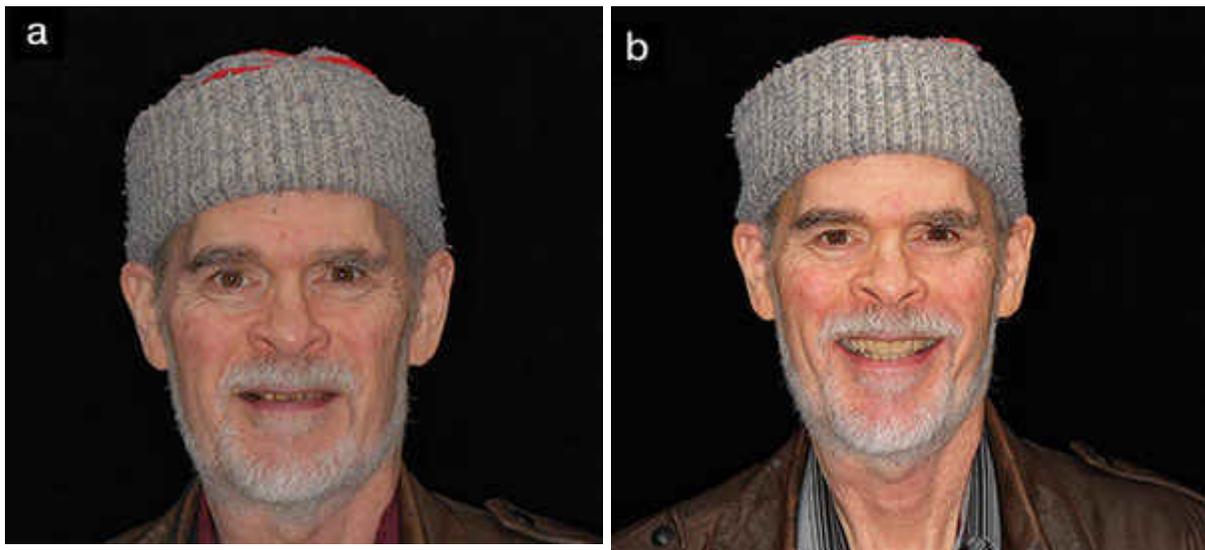


**Figure 18. Restored VDO.****Figure 19. (a) Smile post-op. (b) Retracted immediate post-op.**

Next, the rest of the lower anterior teeth were restored in this same manner (Figure 11). Upon restoration of the lower anterior teeth, the acrylic validators were used to verify the accuracy of the composite transfer (Figure 12). Then, the maxillary anterior teeth were restored in the exact same manner as the lower anterior teeth (Figure 13a). Accuracy was validated (Figure 13b) and the occlusion was then verified (Figure 14). The lower posterior teeth were then completed using G-ænial Universal Flo in the same manner with the full wax-up stint. The lower left missing No. 19 was restored with a fiber post (UniCore Post [Ultradent Products]) reinforced composite bridge utilizing the same G-ænial Universal Flo material (Figure 15). Finally, the maxillary posterior teeth were restored (Figure 16), again using the same flowable composite. The old amalgams and carious lesions were removed during this process. The occlusion was verified and adjusted on the posterior teeth (Figure 17) to preserve the VDO, as determined by the diagnostic wax-up (Figure 18). All restorations were polished to completion (Jiffy Polishing Kit [Ultradent Products]).

An acrylic guard was made and delivered to the patient to wear while sleeping to protect his restorations from the effects of nocturnal bruxism.

### The Final Restorative Outcome

**Figure 20. (a) Before bio-rejuvenation. (b) After bio-rejuvenation.**

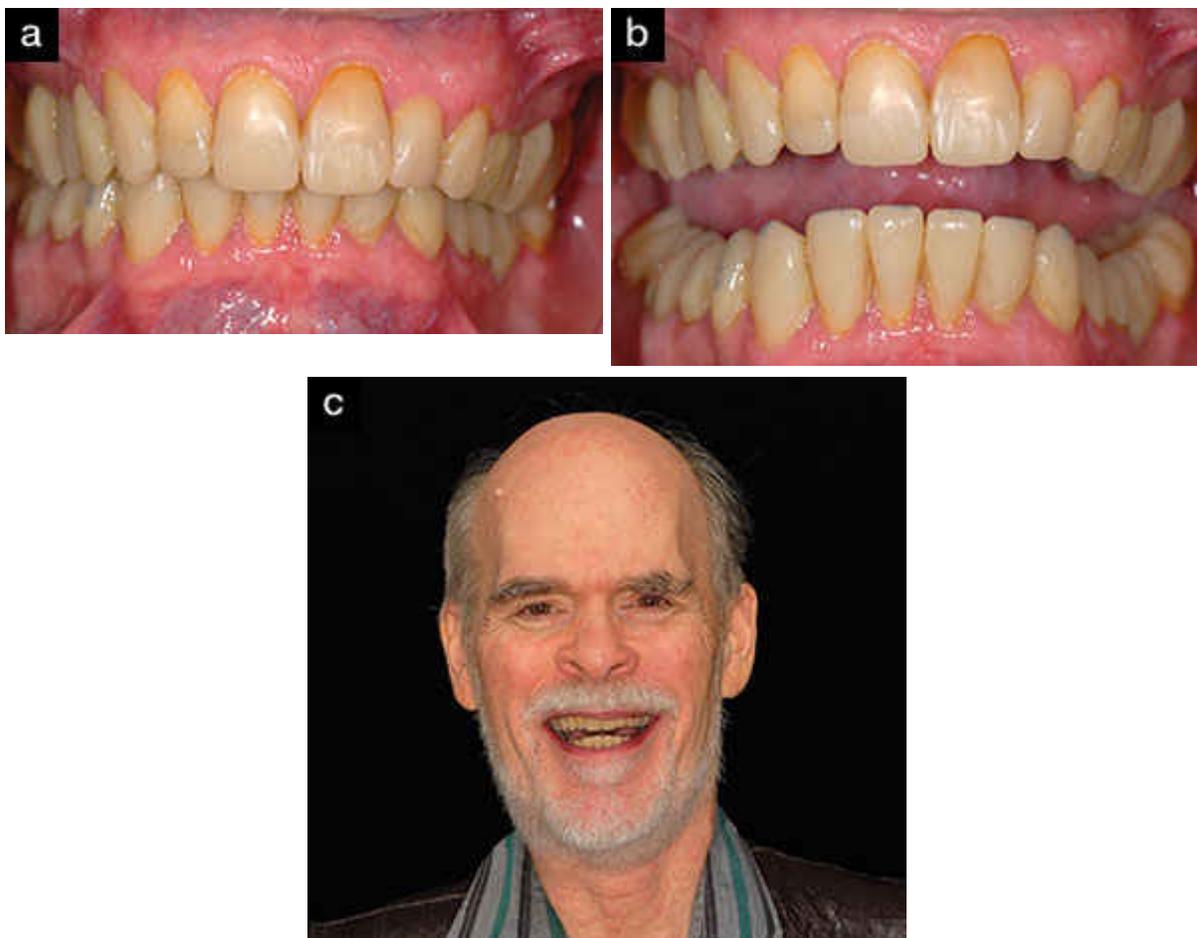
In this case, the patient was restored to have a fully functioning occlusion, a restored VDO to the face, and much improved facial and smile aesthetics (Figure 19). It is important to note the positive changes not only in the teeth, but in *the face and eyes of the patient* (Figure 20). Since the occlusion was restored to a stable condylar

position in centric relation at a proper VDO, the teeth look great and, in addition, the facial muscles and muscles of mastication are relaxed and functioning harmoniously. The pressure on the teeth is minimal due to the idealized occlusion which will result in long-term functional and aesthetic stability.

L. D. Pankey's rules of optimal occlusion<sup>5</sup> state the following:

- With the condyles fully seated in the fossa, all the posterior teeth touch simultaneously and evenly, with the anterior teeth lightly touching.
- When the patient squeezes, neither a tooth or the mandible moves.
- When the mandible is moved in any excursion, no back teeth hit before, harder than, or after a front tooth.

These rules were all met in the restorative outcome achieved in this conservative bio-rejuvenation case.



**Figures 21a to 21c.** One-year follow-up.

### **One-Year Follow-Up**

After one year, the restorations were holding up very well and the patient was very comfortable and pleased with his new smile (Figure 21). It took him a few weeks to get used to having longer teeth and to develop a more vertical pattern of chewing. He has adapted very well and has had no problems or discomfort.

### **CLOSING COMMENTS**

Preservation of natural tooth structure is of utmost importance, and every clinician should consider this when creating any treatment plan, whether it is for one tooth or for full-mouth rehabilitation as is the case here. One of the most incredible features of this type of treatment is that the patient's mouth was restored without permanently altering any tooth structure other than the removal of carious enamel and dentin in several of the molar teeth.

The author has been practicing bio-rejuvenation dentistry since 2001. Throughout that time, he has restored hundreds of patients in this manner and has found the results to be functional, durable, long-lasting and aesthetic.<sup>6</sup>

### Acknowledgment

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*Disclosure: Dr. Stewart has received honoraria for speaking for [Ultradent Products](#) and is also an unpaid speaker for [GC America](#).*

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