Ensuring Restorative Success With Bruxism Testing

INTRODUCTION
When it comes to restorative, aesthetic, and implant dentistry, all clinicians work hard to make sure that their dentistry is going to last a long time. Indeed, most patients think that their dentistry is going to last “forever.” This is really just a reflection of our own professional attitudes. We try to use the best dental materials and use our skills to provide the best possible care. We place our faith in our technical expertise and then let patients go live their lives.

Then a patient calls a week later and reports that his or her filling, veneer, crown, implant, or denture is broken. We can't believe it! We put in the perfect veneer, made sure the occlusion was right, followed the bonding protocol exactly, and it broke. What is going wrong? How do we ensure restorative success?

Untreated bruxism can make or break any restorative case. As a restorative dentist, it is important to consider occlusion and bruxism as 2 distinct and separate issues that need to be addressed. Occlusion is very important to the actual dentistry in terms of providing patients with a stable occlusion that does not present with too much force on any particular teeth that could damage the teeth in the short or long term. Even with the best occlusion, bruxism can be very destructive and can be the cause of restorative failure if not controlled.

Measuring Bruxism Frequency
One out of 3 patients exhibit some kind of bruxism, which makes it one of the most common dental diseases. With every other disease, dentists are taught to measure and test for the disease before treatment. You can't treat what you don't measure and you can't establish treatment effectiveness with objective data measurement. Would you treat perio without a probe or caries without a radiograph?

With a very exciting advancement in the areas of bruxism and dental sleep medicine, dentists now have the capacity to objectively and effectively collect data to measure bruxism and at the same time obstructive sleep apnea (OSA) in their patients. The STATDDS Bruxism and Sleep Monitor (Figure 1) is a very cost-effective home test that patients wear at night while they sleep. Each home test costs less than $20 to administer. I credit my good friend and well-known clinician and educator, Dr. Gordon Christensen, for strongly advocating this approach to bruxism for the last few years.

What is unique about this bruxism monitor is the exclusive software made specifically for dentistry, which translates the raw data into a measurable bruxism episodes index (BEI) in addition to the apnea/hypopnea index (AHI). The non-invasive sleep monitor is the only one of its kind that integrates the raw data into a measurable bruxism and obstructive sleep apnea (OSA).

Most patients think that their dentistry is going to last “forever.” This is really just a reflection of our own professional attitudes.
A 51-year-old male presented to the office for restorative dentistry because some of his teeth kept chipping and breaking. The patient’s occlusion had been equilibrated in the past and was within acceptable limits. The patient’s bruxism had never been addressed, even though there had been signs of obvious bruxism. Figure 2 shows some previous restorations in the anterior teeth. The lateral incisor restoration, as well as many other restorations in the patient’s mouth, had broken a number of times, frustrating both the patient and the dentist.

It was decided to measure the patient’s bruxism using a home bruxism/sleep monitor. Figure 3 shows his initial bruxism and sleep monitor test results with a BEI of 5.0/hour and an AHI of 3.5. This would give us a baseline and a direction for restorative treatment as well as treatment of the patient’s bruxism.

At the restorative appointment, the lateral incisor was prepared and etched for placement of a composite resin restoration (Figure 4). The final restoration is shown in Figure 5. The composite resin material of choice, because of the measured BEI, was a nanohybrid that includes a strong adhesive (Iperbond Ultra and Reflectys [Itena USA]), and it also delivers a beautiful aesthetic result. Once the restorative dentistry was completed, at this same appointment, 15 units of obvious bruxism.

The patient could now be restored, knowing the chances for long-term success are now excellent.

**CASE REPORTS**

**Case 1**

![Figure 2. Bruxism patient had a restoration that had fractured several times.](image)

![Figure 3. Home bruxism and sleep monitor test (before treatment) shows significant bruxism.](image)

![Figure 4. The lateral incisor was prepared and etched for placement of a composite resin restoration.](image)

![Figure 5. Final restoration with strong nanohybrid composite resin (Reflectys [Itena USA]).](image)

![Figure 6. Post-test of patient after botulinum toxin treatment, showing the absence of bruxism.](image)

![Figure 7. Patient presented with failing veneers and crowns due to bruxism.](image)

![Figure 8. Bruxism and sleep monitor test shows patient has OSA and highly destructive bruxism.](image)

![Figure 9. Testing done after botulinum toxin treatment (Xeomin) and wearing the oral appliance shows the near elimination of bruxism.](image)

![Figure 10. With bruxism under control, the patient could now be restored, knowing the chances for long-term success are now excellent.](image)

![Figure 11. Material choice based on objective data with bruxism management helps to ensure long-term success.](image)

**CASE 2**

![Figure 1. The patient’s bruxism had never been addressed, even though there had been signs of obvious bruxism.](image)
of botulinum toxin (Xeomin) were placed in each masseter muscle to reduce the intensity of contraction and control the patient’s bruxism. Impressions were also taken for a posterior occlusal coverage appliance.

Two weeks later, the patient took a second home bruxism/sleep test and the results are shown in Figure 6. The BEI number shows marked improvement because of the botulinum toxin (Xeomin). Now, the bruxism is under control. The positive effect from the Xeomin would last for 3 months, after which time it would need to be delivered again. The bruxism appliance was placed with instructions for the patient to wear it every night. The use of botulinum toxin and a bruxism appliance will ensure the long-term prognosis of the extensive restorative dentistry in this patient’s mouth.

Case 2
A patient came into the office with the chief complaint of crowns and veneers breaking due to “grinding teeth at night.” The patient had these veneers and crowns for approximately 3 years and some had already been replaced because of chipping. She reported that the dentist had repeatedly “balanced her bite” and told her that would control her “grinding.” Figure 7 shows the upper right lateral incisor with a temporary composite veneer that was placed about 2 weeks before by another dentist after the previous porcelain veneer had fallen off. The upper right central incisor presented with an unusual gingival third fracture of an all-ceramic crown, most likely related to her bruxism.

The patient was presented with a treatment plan of bruxism testing first so we could determine the extent of her bruxism and let that evidence-based information guide the rest of the treatment plan. This information would help us make decisions related to what dental materials would be most appropriate for this case based on the BEI, and what kind of appliance therapy we would use, if necessary. Figure 8 shows her initial baseline STATDDS bruxism/sleep measurements. Whenever I see test results like this, it is clear how useful this objective data would have been to the first treating dentist and how it may have changed the treatment plan. The BEI was a very high at 19.1, and the patient showed an AHI of 7.5, suggesting OSA that needed to be diagnosed by her physician. I sent this report as the primary treatment provider to the physician with a suggested treatment plan of an oral appliance for OSA that would also control the patient’s bruxism. The physician gave the appropriate diagnosis of OSA and agreed to the treatment plan for the oral appliance as that was in the best interest of this patient.

An oral appliance (TAP 3 [Glide-well Laboratories]) would be fabricated and used in this case. This appliance would be worn at night, and designed to protect the teeth while opening the airway for the patient. At the impression appointment, 20 units of botulinum toxin (Xeomin) in each masseter muscle, and 15 units in each temporalis muscle, were delivered with a 0.5-mL Comfortox syringe (STATDDS) with a dilution of 2.5 mL in a 100-unit vial. The botulinum toxin would ensure masticatory competence with less contraction intensity while the patient was not wearing the oral appliance, thereby relieving much of the bruxism stress on the teeth.

Two weeks later, after delivery of the TAP 3 appliance and one titration appointment, the patient was retested wearing the oral appliance, and the dramatic results are reported in Figure 9. The BEI and the AHI numbers are both within normal limits. At this point, the patient was ready to go ahead with restorative treatment. The long-term prognosis for this work was now excellent because the bruxism was now under control.

Figure 10 shows the preparation of the 2 central incisors for all-ceramic crowns and the lateral incisors and other teeth for minimal preparation veneers. Because we had measured the bruxism and found it to be severe, the choice of dental restorative materials needed to be made with this data in mind. Zirconia would have been a possible choice because of its great strength; however, because this patient demanded a high level of aesthetics, zirconia was not an optimal option. The treatment plan consisted of stain and glazed high-strength lithium disilicate crowns (IPS e.max Press [Ivoclar Vivadent]). The e.max crowns were cemented using a strong self-etching/self-bonding resin cement (TotalCem [Itena USA]). The e.max veneers were cemented using a light-cured resin cement (Nexus 3 [Kerr]). The final restorations are shown in Figure 11 and the patient was extremely pleased with the result. Repeated applications of botulinum toxin were delivered every 3 to 4 months, and the patient now loves her oral appliance and reports her sleeping has dramatically improved. At one year after the restorative work was delivered, the dental restorations were fully intact.

Closing Comments
We all want our restorative dentistry to last a long time. Every dentist has patients who continually break restorations and teeth, or experience loosening crowns and implants. Bruxism, an underlying condition affecting one in 3 patients to various degrees, negatively impacts the dentist and the patient. A restoration, crown, or implant is exactly placed; we adjust the occlusion again and again but it keeps failing; we blame the materials; and it all becomes a vicious cycle.

The time has come for dentists to get the necessary training to objectively measure and use data to assist in accurate diagnoses, and to develop more effective treatment plans to provide the best therapeutic pain relief and restorative outcomes.

Reference

Further Reading and Learning Resources
The website facialedentistry.org offers information about live patient Botox and dermal fillers training for dentistry, front-line dental sleep medicine, bruxism therapy, and medical insurance. You can also download Dr. Malcmacher’s resource list and sign up for a free monthly e-newsletter.

Dr. Malcmacher is a practicing general dentist and an internationally known lecturer and author. He is president of the American Academy of Facial Esthetics. He has also been awarded Mastership in the AGD. He can be reached at (800) 952-0521 or via email at dlouis@facialedentistry.org.

Disclosure: Dr. Malcmacher is a consultant for STATDDS and Itena USA.