

Bite Registration & OSA Appliances: The Phonetic Bite & the Moses bite

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The right selection of an oral appliance, for the patient, is of paramount importance, as is the taking of a precise and accurate “sleep bite”.

There are various ways for taking this bite. There are different protrusion gauges on the market, with the George gauge being the most popular. I know every gauge, such as an Exactobite, has its place and everybody has their own preference. From what I've seen, however, it always comes down to what's repeatable for the patient and the doctor, as well as what gives us a natural and protrusive bite, while minimising potential TMJ problems.

The phonetic bite

Personally, I am a firm believer in Ricketts' phonetic bite. So far, the closest I've seen to this technique is the ultra low frequency TENS unit mentioned in the Part 4 of this series of articles (Australasian Dental Practice Vol. 23 No 4. July/August 2012). It relaxes the muscles to their balanced normal resting lengths and allows their function to be neurally driven, which is similar to the phonetic bite. One of the factors we must consider while taking this bite is a possible cant or angulation of the mandible. This is why a round instrument, rather than a flat surfaced one is highly recommended for anterior stabilization during the registration. The round instrument allows the clinician to brace the mandible in a three dimensionally corrected position with its natural cant. A flat surfaced instrument promotes creation of an artificial cant.

An alternative to TENSing for some patients, especially those known to have TM Joint dysfunction, is using a Cold Laser to reduce inflammation in the joints and muscles (including trigger points) (Figure 1), using an Energex[®], or simply having the patient wear an Aqualizer[®] for about a half hour, in the waiting room, before you take the bite registration.

Here are the 10 steps to take if you want to use the phonetic bite technique, in the construction of an OSA appliance.²

1. Have an assortment of round instruments, in different diameters, ready to use. We recommend a few because no one patient's vertical requirement is the same and having options is crucial. Typical instruments used are-
 - A disposable bonding micro-brush, which has a diameter of 1 mm near the bonding tip and 3.2 mm on the handle shank;
 - A round disposable air/water syringe tip, with a shank diameter of 4.5 mm;
 - A disposable saliva ejector, with a diameter of around 6.3 mm; and
 - A disposable surgical suction tip. This can be especially useful as these typically have a taper that gives you a diameter range of 4.1 mm at the tip to 10.5 mm at the thickest diameter. If you are going to need a thicker diameter on the shank, the narrow part of the suction tip will need to be cut off. Otherwise, its length would not allow placement in the patient's mouth.
1. All of the above devices are recommended

because they can be readily found in most dental clinics. Any convenient rounded instrument, of the required diameter, however, would be satisfactory.

2. Start by having the patient occlude their teeth a few times. This is so you can get a feel and mental image for the patient's natural occlusion.
3. The clinician should make a mental note of the dental and skeletal midlines as well, mainly to note whether they appear to coincide (Fig. 2).
4. While the patient is in an upright position (the natural speaking position), i.e. looking at their eyes in a mirror, have him/her count out loud the numbers 60 through 77. This is going to help find a balanced, skeletally level, yet most naturally occurring vertical opening, guided by the neurologically driven posture associated with the sibilant jaw and tongue position. Listen for what numbers they say when you see the widest vertical. Have them repeat the counting a few times to be sure. Note: 5's, 8's and 9's are usually the most common for maximum opening. The Clinician should note any midline shift.
5. After you've made a note of the vertical, you will be able to select the most appropriate round instrument (from #1) to stabilize the patient's achieved phonetic bite position, so that you can inject the bite registration material you will use to record the bite. There is a range within the patient's arc of closure that may be acceptable to use for this bite. For TMD patients only, a more minimal vertical may be acceptable, and effective, at ideally positioning the condyles in the Temporal Fossae. It is also usually more comfortable for speech and daytime function if wearing an orthotic appliance during the day. This would be the bite position during the sibilant (...SSS) sound. For many OSA patients, more vertical is desired and the bite registration would record the jaw position during a more open movement, like during the “nine” part of saying 69.
6. To do this, have the patient count as before or say a word that contains the sibilant sound, like Mississippi. Simply saying “S” does not position the mandible as effectively as speaking words that contain the “S” sound. You will see their mandible reposition, in a 3-dimensional manner. Note that in deep bite Class 2 cases, this may be hard to see, so have these patients repeat this step and take a mental note. Have the patient speak and note the most vertically open position in their arc of closure. The “nine” sound in 69 will drop their mandible vertically and give you their full natural opening. Once again, repeat this step a few times to make sure you get the same results. Take the bite registration in this position for all Class II deep bite patients. This technique may still require the use of a very small round instrument in the anterior,

helping hold the position for the bite registration. The vertical opening, in the posteriors, will look significantly larger for these deep bite patients.

7. When you feel you've found the patient's ideal, most natural, opening, use the round instrument closest to this vertical (smaller is better for TMJ patient orthotic construction, and more vertical, within the sibilant position range, is usually better for OSA appliance construction) in order to keep the mandible open and supported in the previously noted three dimensionally “corrected” position. Have him/her speak, repeating the process. Note: Place the instrument at the middle of the incisal edge of the most ideally positioned central incisor (Fig. 3). You don't want to engage any embrasure, as that seems to limit or eliminate cant correction. This positioning makes it easier for the mandible to roll on the round instrument to the neurologically guided posture. You may need to do a “practice run” of positioning the instrument, as patients tend to react by opening upon contact with their incisors. You want them to hold a position and not “help” you by biting, or reacting in any way to the instrument placement. Once the instrument is positioned, helping stabilize and maintain the phonetically-positioned mandible, the bite registration material can be injected between all the teeth, to record the ideal position (Fig. 46).
8. After taking the bite registration, have the patient lay back and try to snore. If it's hard for them to do, it's a good indicator that you have captured the correct bite. Also, make sure they feel comfortable in that position. Some doctors may use a pharyngometer to evaluate the effect this mandibular position has on the airway. For TMD patients, some doctors may image the joints, with this bite, to confirm that a positive change, in condylar position, has been accomplished (TMD patients should not be treated to a position arrived at by imaging; it is just extra information that can be used as part of a complete picture).
9. Take note that patients may have midline deviations to one side. Don't try to correct this by realigning the midline. Leave it be, as long as it is natural, as you are usually aligning the skeletal midlines by doing so. It is the proper skeletal alignment you want to register.
10. Because of the cant correction (that is needed by many patients), the vertical opening - between teeth on the left and right - may not be equal. This correction is part of what maximally opens the airway. Doctors need to remember that if they have a “positioned” appliance, when the patient first inserts it, one side will occlude before the other and seem “high”. Because this is actually a more ideal mandibular position, in which the muscles will be balanced and a more symmetrically positioned and



functioning bite, the jaw will quickly adapt. Patients will be fully occluding on both sides of the appliance shortly, most within ten to fifteen minutes. Inexperienced doctors who don't understand this concept may grind the appliance to get "balanced" occlusion upon insertion. This defeats an important mandibular position change, desperately needed by these patients.

The Moses bite

Dr. Allen Moses' bite technique is a combination between the three philosophies that I've previously mentioned i.e. AP, Phonetic and Neuromuscular (see earlier articles in this series). He uses his patented bite shims (Fig. 7) which allow him to adjust the vertical to some degree (in the progressive increments of the shims). Dr. Moses has the patient just bite to where they feel they are "straight". This actually turns out to be close to the skeletal midline, 95% of the time. Unfortunately, the way the shims are constructed, you can't get any cant correction, which is an issue with the Moses bite. For this bite, the vertical dimension is the most significant aspect and Dr Moses adjusts his appliance to allow for significant forward titration of the mandible. Dr Moses will establish the vertical position and then ask the patient "Can you comfortably keep your lips together or is it a strain?" If the patient is straining, you reduce the stack of shims, one by one, until you achieve a desired vertical. Dr Moses frequently uses Manual Muscle Testing (MMT) of the Deltoid muscle or an Applied Kinesiology (AK) determination to confirm the vertical.

Here are the steps to take to use the Moses bite technique-

1. Once you have determined the vertical, as above, remove the shims from the from the patient's mouth. On one bite shim, spread your bite registration material onto the male surface (with wavy indentation). Attach the male surface to the maxillary arch - from second bicuspid to second bicuspid. With the remaining shims stacked together - like Lego bricks, place the bite registration material on the male surface (again with wavy indentation) facing the mandibular arch. Allow bite mate- rial to set. The patient now has smooth shim surfaces opposing each other that will allow the mandible to slide forward for the protrusive registration.

2. Mark the skeletal midlines (upper and lower) with a wax pencil. Then instruct the patient to slide the mandible forward to a comfortable protrusive position (Dr Moses' sleep appliance is easily titratable, so post appliance-insertion adjustments can be made to adjust this somewhat arbitrary protrusive position). We must note if the patient has a functional shift to the left or the right. This position may be more comfortable for the patient, or necessary for TMJ function - make a note of that on the lab prescription for proper fabrication of the appliance in that position.

3. In this position, mark a line on the top surface of the lower segment of shims to record the correlation between the upper and lower segments, so that you can help the patient maintain this posture during the final bite registration.

4. Deposit the bite registration material between the posterior segments and overlap the front segment to hold it together in one piece. Be sure to record the entire arch length with registration material.

Dr. Moses doesn't TENS the patient or use Energex® or apply a cold laser to the inflamed and tender areas. Many doctors use the latter techniques as an alternative to TENSing, especially for TMD patients.

I like his Moses appliance for patients that can tolerate the upper and lower jaws being "locked" together. For TMJ patients however, this can be problematic, as it is the motion of the mandible that circulates the synovial fluid in the joint capsule. There is a lot of tongue space and for many patients, that is extremely important. Any patient that can tolerate a Damon Splint would be fine with a Moses Appliance.

Summary

There are numerous techniques to record a bite for a snoring appliance. All have their advantages and disadvantages. It is the purpose of this article and the one immediately before it to educate the dentist that not every patient will require the exact same wax bite i.e. It is based on their symptoms of TMD and/or snoring/sleep apnoea.

The next article in this series will describe adjustments of the various snoring appliances during active treatment

If you're interested in learning more about the dentist's role in the diagnosis and

management of snoring/sleep apnoea/TMD/bruxism, a one year mini residency program is starting in 2013. NB: Attending a one day introduction to sleep medicine course is essential before applying to register for the mini-residency. For more info, email info@dentaeducation.net.au or contact (02) 9700-9173.

About the authors

Dr. Derek Mahony is a Sydney-based specialist orthodontist who has been actively involved in research that links constricted maxillary archforms to nasal breathing problems, adverse facial growth and systemic health problems such as nocturnal enuresis. He has presented over 400 lectures on orthodontic topics in more than 50 countries. As a practising clinician, Dr Mahony's research interests are in the aetiology of malocclusion and the guidance of facial growth. He references the Orthopaedia manual as the source of the information contained in this 6 part series of articles. Please contact info@derekmahony.com for further information or clinical questions.

Dr. Edmund Lipskis graduated from Loyola University School of Dentistry, Chicago, USA in 1981. He joined the faculty and Department of Pediatric Dentistry at Loyola in 1982 where he became an Associate Professor. Dr Lipskis started his orthodontic training at Loyola, when the Orthodontic and Pedodontic Departments merged in 1983. Recognizing his interest in orthodontics, Dr Lipskis began a 30-year journey with over 2,000 hours dedicated to learning the broad spectrum of philosophies and techniques that orthodontics and facial orthopedics has to offer. Dr Lipskis' interests and continued education have expanded to include craniofacial orthopedics, treatment of chronic pain, TMD, and sleep disordered breathing. Dr Lipskis has been in private practice in St. Charles, Illinois for 29 years with focus on Orthodontics, TMD and Sleep Disorders.

References

1. Burnett CA, Clifford TJ (1992) A preliminary investigation into the effect of increased occlusal vertical dimension on mandibular movement during speech. *J Dent* 20:221-224.
2. Gergen D. One Technicians review of Sleep Appliances from the bench <http://www.linkedin.com/groups/One-Technicians-review-Sleep-Appliances-3763693.S.62959070>

Legends

- Fig. 1. MLS Laser application point (for trigger point).
- Fig. 2. Noting dental and skeletal midlines.
- Fig. 3. Placement of selected round instrument to help stabilize position.
- Fig. 4. Beginning to inject bite registration material while the assistant holds the stabilizing instrument.
- Fig. 5. Injection of bite registration material.
- Fig. 6. Completing the registration.
- Fig. 7. Patented bite shims.

