

A Case for Full-Coverage Hard Acrylic Non-Sleep-Apnea Dental Orthotics

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In the context of human dentition, an orthotic device is “any removable artificial occlusal surface used for diagnosis or therapy affecting the relationship of the mandible to maxilla.”¹ Dental orthotics for the treatment of conditions other than sleep apnea, also known as non-sleep-apnea dental orthotics (NADOs), are removable occlusal appliances that completely or partially cover either dental arch. Usually made from hard acrylic, they are also called splints, dental orthotics, orthotic devices, occlusal devices, bite guards, night guards or interocclusal appliances. NADOs are widely used by most general and rehabilitative dental practitioners, as well as those who treat orofacial pain. Many practitioners believe that NADOs are effective in the treatment of temporomandibular disorders, especially of myogenous origin,^{2,3} but evaluation of the literature on NADOs has not supported this belief,^{4–6} and all too often the devices are used without any evidence of efficacy.⁷ The potential for a placebo effect must also be taken into consideration.⁸ NADOs are also used before and after oral rehabilitation as a diagnostic aid, a treatment aid or a protective device.^{9–11} They are routinely prescribed to reduce occlusal wear, as in bruxism associated with sleep disorders.^{12–15}

Numerous styles of NADOs are available, and claims of superiority in effectiveness and efficacy for some of these forms have been published.^{16,17} NADOs made of hard acrylic are available as full-coverage stabilization devices, full-coverage anterior repositioning devices, partial-coverage posterior or anterior

devices, and pivoting devices. The most common of these is the full-coverage stabilization device (Fig. 1). Devices of this form can be directly fabricated at chairside or indirectly fabricated (processed in the laboratory). Directly fabricated full-coverage hard acrylic NADOs save both time and money. However, because they are made in situ, the unpleasant aspects of the technique (e.g., taste, tissue irritation, odours) lead to an unfavourable patient response. Indirectly processed full-coverage hard acrylic NADOs require a higher degree of operator skill to ensure accurate fit, not only on the arch for which they are fabricated but also in terms of the preciseness of the interarch relationship. Indirectly processed full-coverage hard acrylic devices (Fig. 1) also potentially maximize the possible mechanism of action for NADO therapy as listed in Table 1 of all the styles available.^{7,18,19} Furthermore, not only are these indirectly fabricated devices more durable than directly fabricated hard acrylic NADOs, but they are also safe, reliable and reversible.

Partial anterior-coverage dental orthotics (PACDOs), another style of NADO, have been used by practitioners for muscle deprogramming when taking interocclusal records for decades (Fig. 2)²⁰ and have become very popular in recent years. Contact inhibition effected by these devices is one of the proposed (although unsubstantiated) mechanisms for muscle deprogramming and relaxation.²¹ These orthotics have been advocated not only for the treatment of masticatory muscle disorders but also for treatment of neurovascular



Figure 1: Indirectly fabricated full-coverage hard acrylic non-sleep-apnea dental orthotics.



Figure 2: Indirectly fabricated hard acrylic partial anterior-coverage dental orthotics (PACDO).



Figure 3: Directly fabricated hard acrylic PACDO.

Table 1 Potential mechanisms of action of full-coverage hard acrylic non-sleep-apnea dental orthotics (NADOs)

Changes in vertical dimension
Optimization of occlusion
Occlusal protection
Unloading of temporomandibular joint
Mandibular repositioning
Influences on growth and adaptation
Alteration in sensory input
Change in patient's cognitive awareness
Placebo

conditions such as migraine.^{16,17,22} Either indirectly fabricated hard acrylic appliances can be relined at chairside (Fig. 2), or direct fabrication with cold-cure acrylic can be performed (Fig. 3). Quick and easy to fabricate, hard acrylic PACDOs offer the practitioner a turnkey treatment. Nevertheless, complications can occur, such as aspiration of the appliance because of its small size. Furthermore, continuous long-term wear may cause intrusion of loaded teeth and extrusion of unloaded teeth.²³ The practitioner should also be cognizant of the potential for overloading the temporomandibular joint (TMJ).²⁴ Such overloading can be diagnostic in cases of TMJ inflammation, in which short-term application of the device causes TMJ soreness. However, TMJ overload may also exacerbate unstable situations.²⁵ I recently examined 2 new patients in which short-term nocturnal use of a hard acrylic PACDO has resulted in irreversible changes to the TMJ, associated with dysfunction and discomfort.

Case 1

An 18-year-old female with no prior history of masticatory muscle pain or TMJ noises presented with neurovascular-type headaches. She had previously sustained trauma to her right chin during a sporting event,

but no associated sequelae had been reported. Approximately 2 months after the trauma, during a stressful period (preparation for school examinations), the patient experienced a masticatory muscle disorder characterized by pain and dysfunction. The patient and her dental team recalled no joint noises after development of the disorder. Her family dentist fabricated a hard acrylic PACDO for nighttime wear. Self-help daytime therapy was discussed (including keeping teeth apart, no testing of function, application of moist heat packs, and soft diet). After approximately 2 months of nocturnal use of the PACDO, she awoke one morning with acute closed lock. Magnetic resonance imaging confirmed bilateral dislocated disks.

Case 2

A 34-year-old woman presented with continuous dull, achy, low-level left-side facial and cervical discomfort, which was associated with audible TMJ noises on the left side. Her symptoms were exacerbated with function, which also resulted in unilateral headache on occasion. She reported that she had always been aware of clenching her teeth. Approximately 3 years before, a hard acrylic PACDO had been fabricated for her, but after only a couple of nights' use, her present symptoms and left TMJ noises had developed. She was referred from another dental office seeking a better understanding of her condition and desiring to minimize any further sequelae.

Discussion

Practitioners must be aware of the indications for the use of nocturnal dental appliances and must apply that knowledge skillfully. Evidence-based care, today's standard of care, must be exercised at all times, that is to say "conscientious, explicit, and judicious use of the current best evidence in making decisions about the care of individual patients . . . including integrating individual clinical expertise with the best available external clinical evidence."²⁶ Given the ready availability of high-quality peer-reviewed information (e.g., through MEDLINE and the Cochrane Database of Systematic Reviews, both of which are avail-

able through the Internet) there is no excuse for lack of informed practice treatment or informed patient consent.²⁷ So-called “GO appliances” (“Get Out Of Our Office”) are contraindicated in today’s dental care environment. The practice of fabricating such devices for quick financial gain, without appropriate knowledge on the part of the operator, or simply to “do something” in response to the patient’s demand for treatment, must cease. Contemporary dental practice must follow time-honoured techniques with proven, evidence-based outcomes.²⁸ Techniques with the potential to cause irreversible detrimental changes and morbidity, be they anatomic, physiologic or psychologic, are contraindicated.^{29,30} An approach to care such as the Precautionary Context Clinical Practice Model is therefore recommended.³¹ Such questions as “How little harm is possible?” rather than “How much risk will be allowed?” will help the practitioner balance the best scientific evidence, apply personal experience, and incorporate patient needs and preferences to improve decision-making and minimize potential hazards.³¹

As exemplified by the 2 cases reported here, hard acrylic PACDOs have the potential not only for aspiration but also for irreversible anatomic changes; they therefore have limited value in daily practice and are indicated for judicious short-term use only. Hard acrylic PACDOs are in widespread but often inappropriate use. Learning the technical skills to fabricate a safe, reliable and reversible full-coverage hard acrylic NADO is not difficult, and techniques that can be employed by all dental teams can be easily learned with minimal training. An [article](#) describing fabrication of full-coverage hard acrylic NADOs appears on page 233 in this issue of *JCDA*. ♦

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