

Case Report: Retention of a Thermoplastic-Lined Dental Sleep Appliance

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A thermoplastic appliance (Dynaflex dorsal appliance) was fabricated for a patient who became overzealous when heating the appliance to seat it intraorally. The appliance could not be removed manually. The appliance required removal with a high-speed handpiece and aggressive sectioning of the acrylic and underlying thermoplastic lining. Patients should be strongly advised to avoid overheating these appliances prior to intraoral placement.

KEYWORDS: Dynaflex, maxillary sleep appliance, retained sleep appliance, thermoplastic-lined sleep appliance

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INTRODUCTION

In patients with obstructive sleep apnea (OSA), dental sleep appliances can provide an excellent noninvasive method of treating this condition.¹ These appliances are effective and in general have a low side effect profile. There are no reports in the literature of dental appliances being retained and requiring aggressive removal.

REPORT OF CASE

A 68-y-old man was referred to the dental sleep clinic for evaluation of OSA and fabrication of a dental sleep appliance. He had a respiratory disturbance index of 32.8 events/h, Epworth Sleepiness Scale score of 14, and a 7.7 mm posterior airway space as measured on lateral cephalogram at the narrowest point. The patient has a history of type 2 diabetes mellitus, atrial fibrillation on chronic anticoagulation, hypertension, and defibrillator. A maxillary Dynaflex dorsal sleep appliance (DynaFlex, St. Ann, MO) was fabricated and was given to the patient with the following instructions:

- (1) Seat sleep appliances with hands/do NOT bite into place.
- (2) Place under warm water before seating.
- (3) Use AM Aligner (Tap AM Aligner, Patterson Dental Laboratories, Eagan, MN) for 10–15 min.

The patient followed directions and placed the appliance in warm water for 10 to 15 min, but the appliance still did not fit; he placed it under hot water for a longer period and thereafter it fit well. He experienced the best night of sleep in years. In the morning, the patient could not remove the appliance. He presented to the emergency department 6 h after being unable to remove the appliance; the emergency department staff also were unable to remove the appliance. The patient was evaluated by the oral and maxillofacial surgery service. It was noted that the appliance was very stable intraorally and that the patient had ecchymosis in the bilateral maxillary labial vestibules consistent with anticoagulation and multiple attempts at

appliance removal. The appliance was locked into the undercuts of the patient's teeth.

The providers anesthetized the patient and heated the thermoplastic lining via lavage with very warm, sterile water for 10 min; however, there was no substantial increase in ability to mobilize the appliance. This further indicated that the appliance was locked into the interproximal spaces. At this time, a high-speed dental handpiece was used to cut the appliance into five pieces (one cut on the distal aspect of the central incisors bilaterally, one cut in the premolar region bilaterally) on the buccal aspect of the appliance (**Figure 1**). Unfortunately, even though these pieces had more mobility, because of the Dynaflex material being hardened between each tooth, this required removal of the buccal acrylic around each tooth as well as the lining material between each tooth. Next, the lining was again heated with warm, sterile water and the palatal aspect of the appliance was removed from the teeth. The maxillary arch was irrigated, and the dentition was flossed to remove any remaining material. The total procedure time was 1 h.

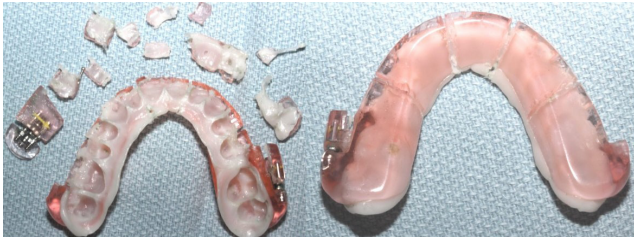
The patient was prescribed chlorhexidine to manage gingival trauma, and acetaminophen as needed. He recovered well and had a new sleep appliance fabricated that did not have a thermoplastic lining.

DISCUSSION

This case brings up an interesting point of discussion that is now being addressed with all of the patients at our institution. So often patients see the appliances heated in hot water, and when they receive instructions to use warm water to heat their appliance before seating, they may become overly zealous in their attempts to seat these appliances.

The providers attempted removal via only a few pieces, but quickly realized that the acrylic and thermoplastic material required drilling between each tooth to remove as much of the undercut material as possible. The Dynaflex is quite adherent to the acrylic.

Figure 1—Dynaflex appliance following removal.



Note the cuts in the acrylic, as well as the multiple pieces removed from the buccal aspect.

We would encourage providers to use caution in treatment planning: patients with large embrasures and undercuts in the interproximal spaces may benefit from appliances that do not have a thermoplastic lining.

We would encourage providers to instruct patients to use caution while heating appliances that have a thermoplastic lining, and if retention occurs, to plan for extensive drilling to remove the appliance without damaging the teeth.

A review of the literature did not identify any other cases where a sleep appliance was retained and unable to be removed with manual manipulation.

REFERENCES

1. Ramar K, Dort LC, Katz SG, et al. Clinical practice guideline for the treatment of obstructive sleep apnea and snoring with oral appliance therapy: an update for 2015. *Journal of Dental Sleep Medicine*. 2015;2(3):71–125.

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