

# The Horseshoe Molar Derotator

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**D**erotation of the upper molars is often needed in nonextraction treatment to gain arch space and improve Class II molar relationships.<sup>1-4</sup> This article describes a simple buccal appliance for molar derotation.

## Appliance Fabrication

The Horseshoe Molar Derotator (HSMD) is made from .018" × .025" stainless steel or .017" × .025" TMA\* wire. Segment A is bent back to allow insertion into the distal end of the molar tube (Fig. 1). Segment B, the straight distal portion of the wire, ends in segment C, a closed vertical loop that provides flexibility. At each appointment, the appliance is reactivated with a three-prong plier by placing a toe-in, asymmetrical V-bend close to the molar, between segments B and C. The HSMD does not have to be removed for reactivation.

## Case 1

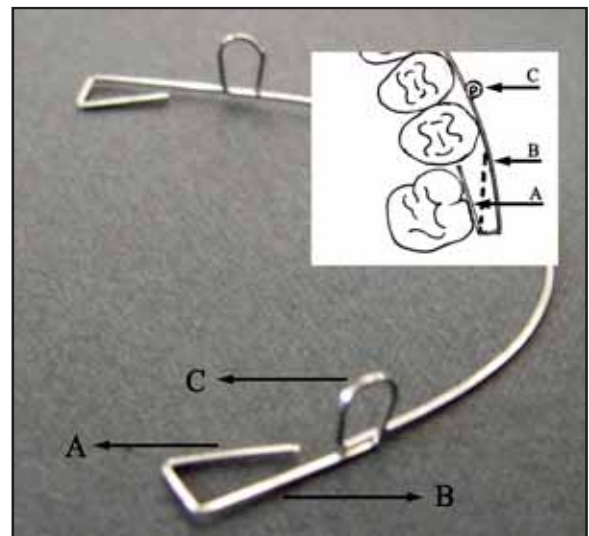
An 18-year-old female presented with the chief complaint of missing teeth (Fig. 2A). She had generalized microdontia, hypodontia of both maxillary lateral incisors and second molars, and missing mandibular incisors. The maxillary arch was constricted, with a posterior crossbite, a midline diastema, and severe mesiopalatal rotations of the first molars. Cephalometric analysis revealed a skeletal Class III malocclusion.

A bilateral HSMD appliance was fabricated from .018" × .025" stainless steel wire for derotation of the maxillary first molars (Fig. 2B).

Although the right first molar was corrected in two months, little derotation of the left first molar was achieved because the molar band loosened between appointments (Fig. 2C). After the band was re cemented, the left first molar was derotated in another 1½ months (Fig. 2D).

## Case 2

A 23-year-old female presented with the chief complaint of backward-tipping upper front teeth. The maxillary right first molar was rotated mesiopalatally, and the molar relationship was Class I on the left side and Class II on



**Fig. 1** Bilateral horseshoe molar derotator (HSMD). A. Segment A bent back for distal insertion into molar tube (dashed line = preactivation. B. Segment B. C. Segment C, with closed vertical loop.

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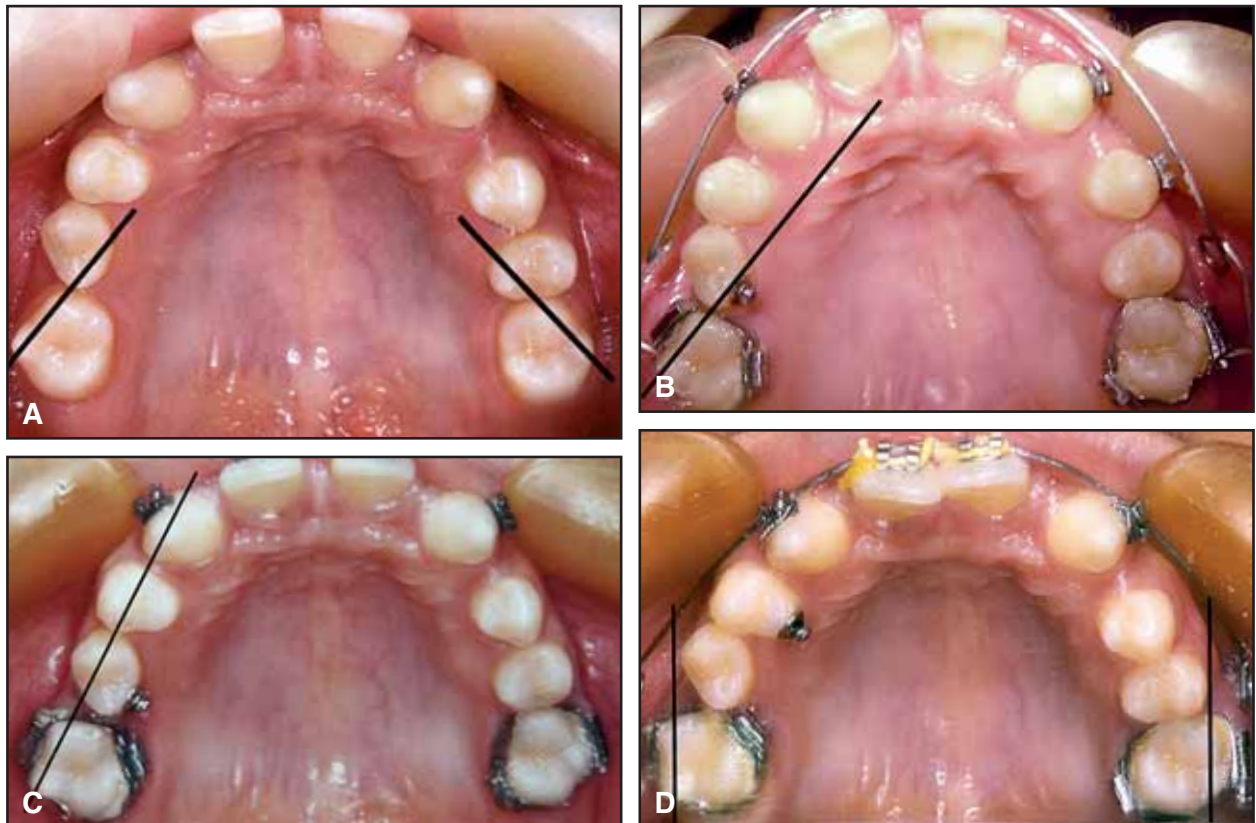
the right (Fig. 3A). Localized gingival recession was seen in the lower anterior region due to a deep bite.

The unilateral HSMD is a simple, 1st-order cantilever spring placed on the side where derotation is required (Fig. 4). The closed vertical loop is not needed; the free end of the cantilever is tied to a segmental wire in the canine region. In this case, a unilateral HSMD was fabricated from .018" × .025" stainless steel wire (Fig. 3B). Complete

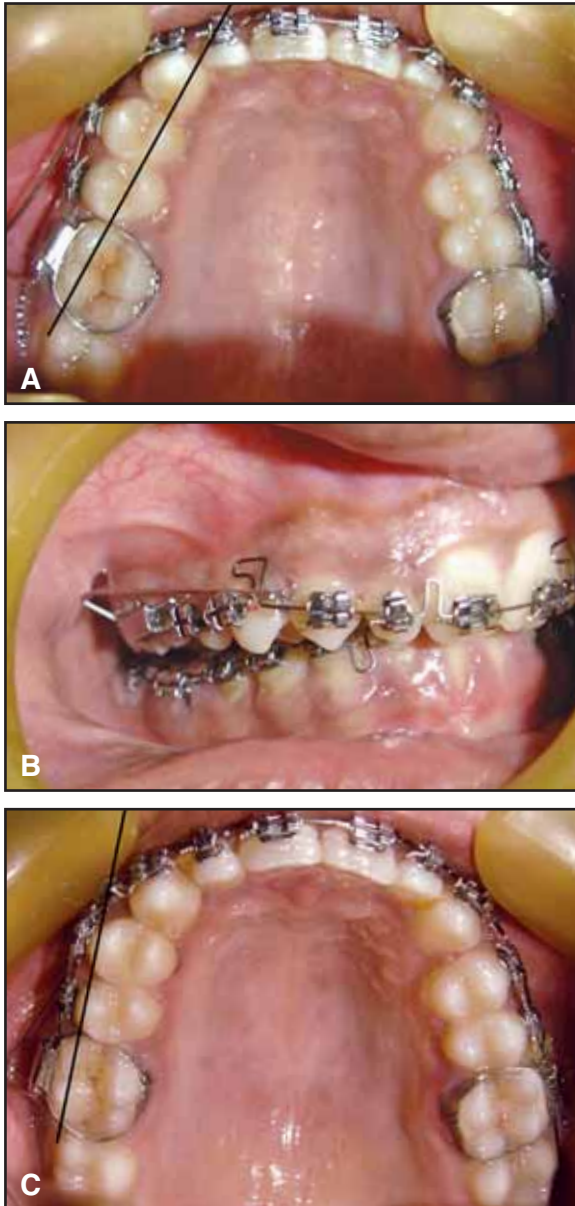
derotation of the maxillary right first molar was achieved in less than 1½ months (Fig. 3C).

### Discussion

Biomechanically, this appliance produces a counterclockwise rotational moment and a palatal force in the canine region (Fig. 5). A clockwise moment derotates the molar, while a buccal force tends to increase the intermolar width. If a light

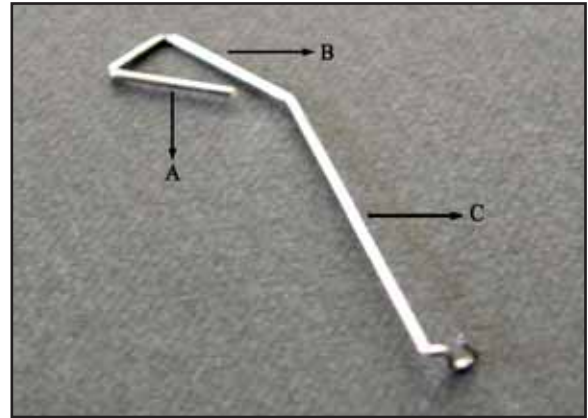


**Fig. 2 Case 1.** A. 18-year-old female patient with mesio-palatal rotations of maxillary first molars before treatment. B. Bilateral HSMD. C. Right first molar derotation after two months of treatment. D. Subsequent derotation of left first molar in 1½ months after band recementation.

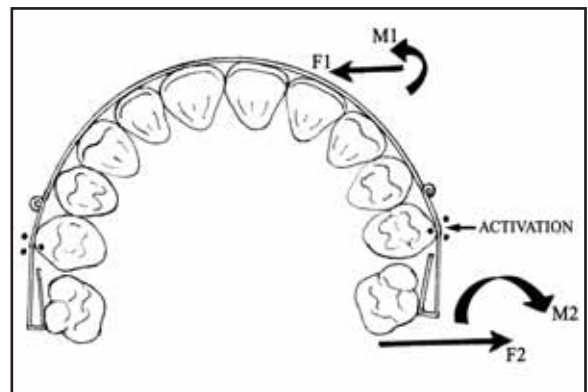


**Fig. 3 Case 2. A.** 23-year-old female with mesio-palatal rotation of maxillary right molar before treatment. **B.** Unilateral HSMD. **C.** Derotation of first molar in less than 1½ months.

anterior wire is being used with the unilateral HSMD, counter-rotation ties may be needed on the canines.



**Fig. 4 Unilateral HSMD: first-order cantilever spring without closed vertical loop.**



**Fig. 5 M1, F1: counterclockwise rotational moment and palatal force in canine region; M2, F2: clockwise rotational moment and buccal force acting on molar.**

The HSMD facilitates molar control in all three dimensions. Appropriate torque can be added to segment A, and the vertical dimension can be managed by adjusting the height of the mesial and distal legs of the closed vertical loop.

Conventional palatal appliances used for molar derotation can be uncomfortable, sometimes causing a gag reflex and difficulty in speech. The simple appliance described in this article is both comfortable and cost-effective, and can achieve significant molar derotation in a short period.

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