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Efficacy of clear retainers on intrusion of mandibular molar without skeletal anchorage

KEYWORDS
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Methods for correcting overerupted molars include orthodontic intrusion, prosthodontic reduction, and surgical impaction.[1] Conventional molar intrusion becomes more efficient with temporary anchorage devices (TADs), which require minimal or no patient cooperation. TADs are utilized when orthodontic treatment plans require reliable anchorage and vertical control.[2] However, complications such as loosening and peri-implantitis need to be considered. Additionally, a root moving towards a screw leads to crater-like damage.[3] Clear retainers, favored for their comfort and aesthetics, increase patient compliance and are more likely to be worn as instructed. When combined with elastics to provide appropriate forces, this approach has been widely adopted in clear aligner therapy (CAT) to address particularly challenging situations. CAT may offer a superiority of reducing external apical root resorption (EARR).[4]

A 60-year-old female patient visited the Orthodontics Department at Wanfang Hospital due to an overerupted lower left second molar. The patient reported having dental implants for the upper first molars at a local clinic. However, after completing the prosthetic restoration, she experienced discomfort at tooth 37. Clinical examination revealed overeruption of the lower terminal teeth (Fig. 1A1), accompanied by a dual bite and interference during protrusion movement. Initially, the use of mini-screws for molar intrusion was considered. However, the patient preferred to avoid invasive procedures. As an alternative, a treatment plan using a clear retainer and elastics was proposed. The first step involved fabricating a clear retainer for the patient to wear for one month. After this period, modifications were made to the retainer by creating a hole at occlusal surface and slit cutout on the buccal and lingual sides for elastics at tooth 37 (Fig. 1B). Treatment then began using 5/16″ 4.5 oz elastics in figure-eight shape placed on the retainer. During the treatment, a regular follow-up every two to three weeks was conducted to monitor the compliance. By the fourth month, the elastics were switched to 3/16″ 4.5 oz in box shape (Fig. 1C). By the seventh month, the patient had become fully compliant, increasing her wear time from the initial 10 h–15 h daily (Fig. 1D1). By the ninth month, the prosthodontist confirmed sufficient space had been created, and the patient entered the retention phase (Fig. 1D2). This simple treatment design achieved adequate molar intrusion without requiring TADs or other fixed appliances (Fig. 1E).

In this case, the combination of a clear retainer and elastics successfully achieved intrusion of the lower left second molar. This was made possible due to first, the interposition of the plastic material between the maxillary and mandibular occlusal surfaces, creating an occlusal pad effect,[5] which helped prevent side effects such as extrusion and tipping of the anchorage teeth; second, the

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Figure 1 Clinical photographs and data of the patient.
(A) Initial dental condition.
(B) After one month of treatment, showing the use of the clear retainer with elastics, an occlusal film of the clear retainer without elastics, and a lateral view without the appliance. (The hole is indicated by a blue dashed line, and the split cutout is marked with a red arrow.)
(C) After four months of treatment, showing the use of the clear retainer with elastics and intraoral photographs. (The hole is indicated by a blue dashed line, and the split cutout is marked with a red arrow.)
(D1) Lateral view after seven months of treatment. (D2) Orthodontic treatment results, an increase in occlusal space was observed at tooth 37, with no evidence of external apical root resorption (EARR).
(E) The intraoral models showed an intrusion of about 2.5 mm without the extrusion of teeth 35 and 36, which maintained crown heights of 8 mm and 6.0 mm, respectively. (Before treatment, after treatment and image overlay). (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

biomechanics similar to CAT minimizes the occurrence of EARR; and third, a post-treatment retention phase where the retainer was worn only at night to maintain results until the opposing prosthetic restoration was completed, preventing relapse. Ultimately, intrusion of overerupted mandibular molars no longer necessarily requires complex fixed appliances, TADs, or multiple sets of clear aligners.

Declaration of competing interest

The authors declare that they have no competing financial interests or personal relationships that may have influenced the work reported in this study.

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