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IP Indian Journal of Orthodontics and Dentofacial Research

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Short Communication

Accudeter - Controlled anchorage device

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Abstract

Preserving the position of distalized maxillary molars is essential to prevent relapse and ensure treatment efficiency. The Accudeter is a reactivatable anchorage device designed to maintain molar distalization without interfering with fixed orthodontic appliances. Constructed from a 21-gauge stainless steel wire, expansion screw, and acrylic base, it provides stable retention by engaging the lingual sheaths of molars. Its integrated screw allows for controlled reactivation when needed. Accudeter offers a non-invasive, chairside-fabricated solution for anchorage control, reducing treatment complexity and duration.

Keywords: Molar distalization, Anchorage reinforcement, Orthodontic stability, Retention mechanics, Expansion screw.

Received: 26-04-2025; **Accepted:** 28-05-2025; **Available Online**: 28-06-2025

1. Introduction

Molar distalization is a widely used approach in orthodontic treatment for correcting Class II malocclusions and resolving space discrepancies. However, maintaining the achieved distalization remains a critical challenge. Mesial relapse of molars following distalization may necessitate additional interventions, prolonging treatment duration and complicating mechanics.[1,1]

Traditional methods for maintaining molar position include Nance palatal buttons, which often fail to prevent mesial relapse effectively.[4,5] The Pendulum Appliance, while effective for distalization, requires premolar support, potentially delaying comprehensive fixed orthodontic treatment.[6,7] Implant-supported distalization techniques, such as mini-implant-supported distalizers, provide excellent anchorage but require an invasive procedure for mini-implant placement.[8,9]

The Accudeter Controlled Anchorage Device offers a non-invasive, reactivatable anchorage system to prevent molar mesialization after distalization. Unlike conventional options, Accudeter does not interfere with fixed orthodontic appliances and allows controlled reactivation through an integrated expansion screw. This article details the design, fabrication, clinical application, and effectiveness of Accudeter.

2. Materials and Methods

2.1. Materials

The fabrication of the Accudeter appliance required the following components and tools (**Figure 1**).

1. 21-gauge stainless steel wire – used to construct the main framework of the appliance.
2. Bird beak plier – employed for precise wire bending and loop formation.
3. Expansion screw – centrally integrated to enable reactivation and reinforcement of anchorage.
4. Monomer and polymer – used to fabricate the acrylic base that supports the expansion screw and stabilizes the appliance against the palate.

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https://doi.org/10.18231/j.ijodr.2025.030

2.2. Method of fabrication

The wire component follows a design similar to a transpalatal arch (TPA), with both retentive arms inserted into the lingual sheaths of the maxillary molars. A U-loop is incorporated on both sides, adjacent to the retentive arms, to enhance adjustability. The central loop is modified to be large enough to accommodate an expansion screw (**Figure 2**, **Figure 3**).

Figure 1: 21-gauge, Bird beak plier, expansion screw, monomer and polymer.

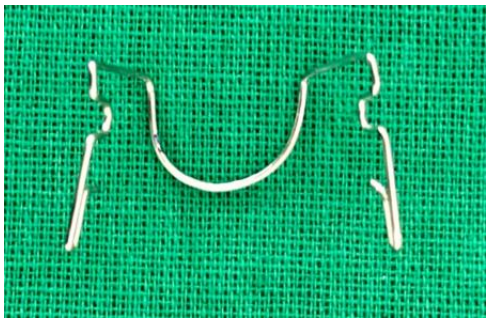

Figure 2: Occlusal view of wire component.

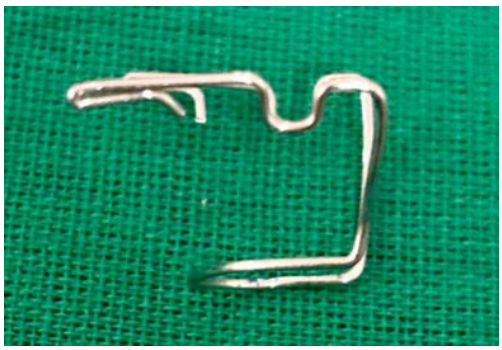

Figure 3: Side view of wire component.

The expansion screw integration is positioned centrally within the wire loop. Unlike conventional designs, the expansion screw is placed vertically rather than horizontally, ensuring reinforcement and allowing for optional reactivation.

The acrylic support is added over the expansion screw, incorporating the wire component on one side and covering the palate on the other. This structure functions similarly to a Nance button providing palatal stabilization. Once placed intraorally, the appliance engages the lingual sheaths of the molars, ensuring secure anchorage and stability (**Figure 4**).

Figure 4: Intraoral placement of the accudeter appliance.

3. Discussion

Molar distalization remains a key strategy in managing Class II malocclusions and space discrepancies. However, post-distalization relapse particularly mesial movement of maxillary molars continues to challenge orthodontic stability and prolong treatment duration. Numerous appliances have been employed to counter this, each with distinct advantages and limitations.

The Nance palatal button, while commonly used, relies on soft tissue support and often provides insufficient anchorage.[4] The Pendulum appliance offers active distalization but requires premolar anchorage and may disrupt ongoing fixed appliance therapy.[6,7]

Mini-implant-supported distalizers deliver excellent skeletal anchorage, yet their invasive nature, need for surgical placement, and potential for patient discomfort or implant failure make them less ideal for all cases.[8,9]

One of the key advantages of Accudeter is its customizable activation feature. The expansion screw remains passive unless mesialization is detected, at which point controlled reactivation can reinforce molar positioning. This feature eliminates the need for additional distalization phases, ultimately reducing overall treatment time and improving efficiency.[10]

Clinically, Accudeter has demonstrated significant benefits, including stable molar retention, ease of use, and enhanced treatment efficiency. Unlike implant-supported methods, it can provide a cost-effective, non-surgical solution while maintaining the flexibility to reactivate anchorage when necessary. These observations suggest that Accudeter can serve as a reliable anchorage reinforcement device in post-distalization cases, ensuring optimal long-term stability without disrupting ongoing orthodontic mechanics.

4. Conclusion

Traditionally, orthodontic practitioners struggled with post-distalization mesialization, often requiring additional

appliances or invasive procedures to maintain molar positioning. Accudeter tries to eliminate these concerns by offering a reactivatable, non-invasive solution.

5. Conflict of Interest

None.

6. Source of Funding

None.

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Cite this article: Kangane SK, Jadhav SR, Maroore PS, Joshi YS, Thombre SD, Honrao SS. Accudeter - Controlled anchorage device.. *IP Indian J Orthod Dentofacial Res*. 2025;11(2):161-163.