



Short Communication

Amalgamation of Forsus spring module and MSE for distalization : A novel hybrid approach

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Abstract

Molar distalization is a commonly employed method for gaining space in the treatment of class II malocclusion. Several approaches are employed in molar distalization, however, it was accompanied with few unwanted effects. To overcome these, a novel hybrid approach is used the Maxillary Skeletal Expander (MSE) and Forsus spring module for molar distalization in class II malocclusion treatment. This method aims to simplify procedures and enhance clinical outcomes by effectively transitioning patients from class II to class I occlusion.

Keywords: Distalization, Maxillary skeletal expander, Forsus spring module, Class II malocclusion

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1. Introduction

Class II malocclusion is one of the most frequent malocclusions encountered in orthodontics and often presents challenges in orthodontic treatment, necessitating innovative strategies for successful corrections.¹ In the treatment of class II malocclusion, Maxillary molar distalization has been successfully implicated for more than a century. This method of treatment relieved crowding and utilized the gained space to reduce the increased overjet.²

An array of approaches to distal molar movement with different appliances and biomechanics have been routinely used.³ Nonetheless, due to concerns about aesthetics and the extended duration of treatment, many patients find molar distalization using headgear unacceptable.^{4,5} Consequently, there is a preference for intra-oral distalization appliances that require minimal patient cooperation. However, traditional non-compliance maxillary molar distalization devices often lead to undesired side effects, such as anchorage loss, especially when distalization forces are applied buccally.^{6,7} Loss of anchorage during orthodontic treatment can extend treatment time and undermine the

overall effectiveness, which may result in poor treatment outcomes.⁸

One approach to mitigate these effects is the use of palatal acrylic pads (Nance buttons). But their partial coverage of palatal tissues can impair oral hygiene. To reduce or prevent anchorage loss associated with the anterior teeth during distalization, skeletal anchorage has been incorporated into appliances.^{9,10} Mini-implants have gained popularity due to their versatility, minimal surgical invasiveness, and cost-effectiveness.¹¹

The maxillary skeletal expander (MSE)¹² appliance used for expansion has been repurposed with a Forsus (FRD) spring module¹³ (3M Unitek) to a custom-designed approach for molar distalization. When used individually, both MSE and Forsus spring provided better results in the treatment of class II malocclusion. The present hybrid model combines the application of both Maxillary skeletal expander and Forsus spring (FRD). This innovative approach harnesses the structural integrity of MSE devices by using skeletal anchorage, while adapting the Forsus spring module to facilitate controlled distalization of molars. By adapting existing devices and methods, this innovative combination

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not only simplifies treatment but also offers improved results in transforming class II into class I occlusion.

2. Technique

The MSE device, used for maxillary expansion,¹² has been repurposed in this case for molar distalization to correct class II to class I molar relation and to gain space for impacted canine and second premolar.

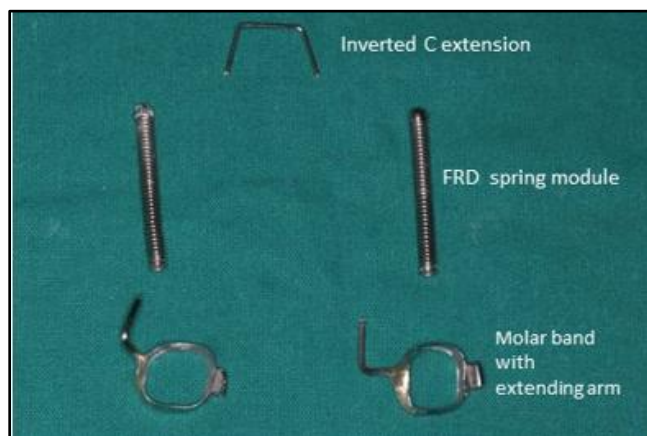


Figure 1: Parts of the hybrid appliance



Figure 2: Appliance fabricated in model

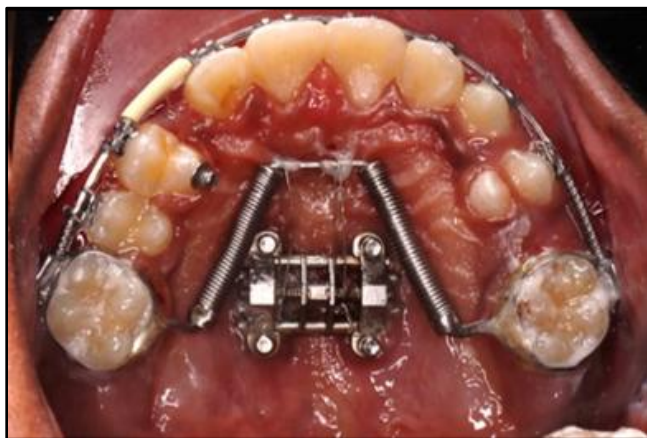


Figure 3: Pre distalization occlusal view

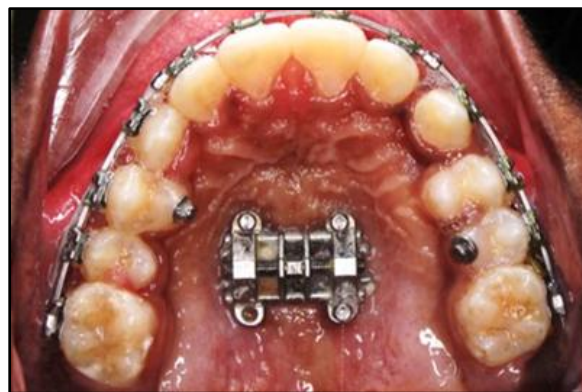


Figure 4: Post distalization occlusal view

Fabrication: A customized device, incorporating a Forsus (FRD)¹¹ spring module into the MSE framework was used. Maxillary molars banded, with an extending arm made up of 0.9 mm SS wire bilaterally soldered to the molar band. An inverted C extension was made which connects the spring modules to the soldered extension on the molars bilaterally (**Figure 1, Figure 2**). Activation was done with ligature ties from the inverted C extension to the MSE¹² (**Figure 3**) exerting a distalizing force (200-250g), facilitating controlled molar movement. Stability was ensured by .019" x .025" SS archwire and an Niti open coil springs are placed buccally on each side between the premolar and first molar.^{5,6} This configuration prevents mesio-lingual rotation of molars and enhances the efficacy of molar distalization. Remarkably, within two months, class I molar relation was achieved bilaterally, with the creation of space for impacted canine and premolar.^{7,4,8} This novel amalgamation of MSE anchorage and Forsus spring module offers a promising approach for comprehensive dental class II correction.

3. Discussion

The present model provides better Clinical Outcomes. The maxillary skeletal expander (MSE)¹² appliance and the Forsus (FRD) spring module¹³ (3M Unitek) were modulated and a custom-designed approach for molar distalization were designed. Maxillary skeletal expander are highly-effective orthodontic appliances that provide non-surgical palatal expansion for adults. MSE comprises two molar bands and body that include an expansion screw with four welded tubes. Each tube facilitates the placement of the miniscrew.¹⁴ The Forsus (FRD) is a three-piece, telescoping system, which incorporates a super-elastic nickel-titanium coil spring.¹⁴ Literature reveals that Forsus spring FRD provides one of the best treatment options for class II correction, especially for non-compliant patients, with stable long term results achieved by sagittal forward displacement of mandible and remodeling at glenoid fossa.^{13,15,16} When used individually, both MSE and Forsus spring provided better results in the treatment of class II malocclusion. The present hybrid model combines the application of both Maxillary skeletal expander and Forsus spring (FRD).

The hybrid approach combining MSE with the Forsus spring module not only simplifies treatment procedures but also offers superior clinical outcomes. By leveraging MSE's skeletal anchorage capabilities and integrating the controlled mechanics of the Forsus spring module, this approach optimizes treatment efficiency and enhances predictability in achieving desired molar distalization. Thus, this configuration prevents mesio-lingual rotation of molars and enhances the efficacy of molar distalization. Patients benefit from reduced treatment duration and improved functional and aesthetic outcomes. Overall, the present innovation can improve the patient compliance and level of patient satisfaction with better results.

4. Conclusion

Class II malocclusion is often associated with compromised facial esthetics, smile, masticatory and respiratory functions. There are recent rising trends towards more efficient yet shorter treatments and non-extraction treatment plans. In order to meet this growing need, newer treatment modalities that could increase patient compliance and offer other advantages are sought. When used individually, both MSE and Forsus spring provided better results in the treatment of class II malocclusion. The hybrid approach combining MSE with the Forsus spring module has superior clinical outcomes and has ultimately simplified treatment procedures. This in turn provides a higher patient satisfaction. In conclusion, the amalgamation of MSE and Forsus spring module represents a substantial advancement in orthodontic treatment for molar distalization in class II malocclusion. We recommend further studies that can evaluate the effectiveness of the Hybrid combination of MSE and Forsus spring module.

5. Source of Funding

None.

6. Conflict of Interest

None.

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