

Original Article

Usefulness of Forsus™ appliance in Class II Malocclusion: A Clinical Study

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ABSTRACT

Background: Class II malocclusion is of 2 types, class II div I and class II div II malocclusion. The present study was conducted to determine the outcomes of Forsus™ Fatigue Resistant Device used in class II malocclusion. **Material & methods:** This study was conducted on 24 patients of both genders. They were treated with the Fixed Functional appliance. Any complication arising during treatment was recorded. **Results:** There were 12 males and 12 females in present study. The results indicated statistical significant skeletal and dentoalveolar effects of the appliance. **Conclusions:** The Forsus™ showed positive effects on the maxillary incisors and first molars as well as overjet and overbite. However, multiple negative effects were reported on the occlusal plane and lower incisors that need to be considered when using such appliance in treating Class II malocclusion.

Key words: Forsus, Class II Malocclusion.

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INTRODUCTION

Normal occlusion occurs when the mesiobuccal cusp of the upper first molar falls with the buccal groove of the mandibular first molar. It is divided into Class I malocclusion, class II malocclusion and class III malocclusion. Class II malocclusion is further of 2 types, class II div I and class II div II malocclusion. A considerable number of fixed and removable functional appliances are available for management of Class II skeletal and dental malocclusion.¹

Currently, there is little doubt that measurable dental changes such as reduced overjet or molar correction occur in a favorable manner with the continuous use of functional appliances. However, the degree of skeletal versus dentoalveolar change that underlies these treatment effects is a source of debate.²

Forsus is the most frequently used fixed functional appliance for the correction of Class II malocclusion. The Forsus appliance is a semi-rigid appliance made of

superelastic nickel-titanium coil springs which is similar to the Jasper Jumper appliance and not like the Herbst appliance which is a rigid appliance. Numerous studies have found this appliance favorable for the correction of the malocclusion. A further in-depth analysis of the effect of Forsus and Herbst appliances on mandibular growth was assessed using magnetic resonance images. Apart from good results obtained from this appliance, other appliances such as Herbst has resulted in various complications during the treatment as well as postoperatively. It includes soft tissue injuries, lower splint breakage, band fracture, crown fracture, screw loosening, rod distortion and pivot breakage. Many studies by different authors have compared the complications of Herbst appliance with different designs. The present study was conducted to determine the outcomes of Forsus FRD.

MATERIAL & METHODS

This study was conducted in the department of Orthodontics. It comprised of 24 patients of both genders. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained prior to the study.

General information such as name, age, gender etc. was recorded. Treatment was carried out using the Forsus appliance with fixed orthodontic appliance only. A transpalatal arch connected the maxillary molars. The treatment was continued for 18 months. Any complication arising during treatment was recorded. Results obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

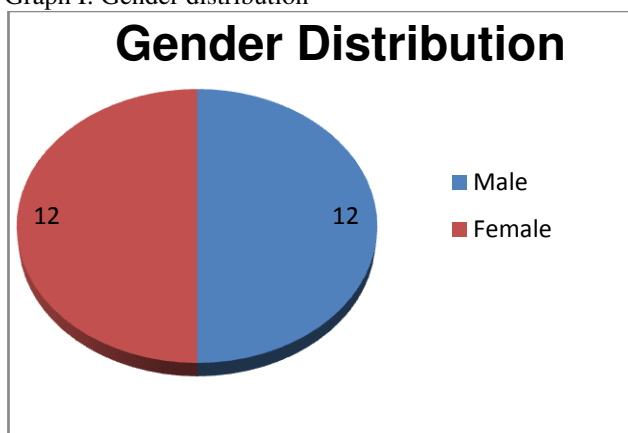
RESULTS

In the present study, there were 12 males and 12 females.

Table I Distribution of patients

Male	Percentage	Female	Percentage
12	50	12	50

Graph I: Gender distribution



Anteroposterior skeletal effects

The Forsus effect on the maxilla, as indicated by changes in SNA angle, shows no statistical significance ($P < 0.001$). This indicates that Forsus appliance significantly have no effect on the maxilla.

The Forsus effect on the mandible, as indicated by changes in SNB angle, shows no statistical significance at the study level ($P > 0.05$). This indicates that Forsus appliance have no significant effect on the mandible.

Vertical skeletal effects

The Forsus effect on the mandibular plane, as indicated by changes in MPA angle, shows no statistical significance at the study level ($P > 0.05$). This indicates that Forsus appliance have no significant effect on the mandibular plane.

The Forsus effect on the occlusal plane, as indicated by changes in the occlusal plane angle, shows a high statistical significance ($P < 0.001$) in the positive direction. This indicates that Forsus appliance have a significant effect in increasing the occlusal plane angle.

Dentoalveolar effects

The Forsus effect on the lower incisors, as indicated by horizontal movement, tipping, and vertical movement of lower incisors, shows a high statistical significance. The total effect was in the positive direction for horizontal movement and tipping, and in the negative direction for vertical movement.

The Forsus effect on the overbite was also assessed. The results showed a statistical significance at the study level. All effects were in the negative direction.

DISCUSSION

Proclination and anterior movement of the lower incisors, overjet reduction, and improvement of first molar relationship through mesial movement of the first molars, reduction of ANB angle were reported. The Forsus™ appliance is one of the non-compliance appliances used for the correction of Class II malocclusion. Hanoun *et al.*¹ were the only ones that reported a statistically significant effect of the Forsus in reducing the MPA. This was not supported by the current findings as no significant effect on the mandible in the vertical dimension was found in this study. A highly significant increase in the occlusal plane was reported by Karacay,³ Gunay,⁴ Oztoprak,⁵ and Aslan⁶ and supported by the current findings. Almost all included studies, except for Hanoun *et al.*¹ had similar appliance insertion paths from the upper first molar headgear tube to the lower archwire between the first bicuspid and canine. Thus, the increase in occlusal plane could be considered true and might be due to the effect of the appliance on the upper posterior teeth. The latter two findings in the current study indicated that the Forsus appliance had no deleterious effect on the skeletal vertical dimension.

In present study, there were 12 males and 12 females. Most of the included studies^{7,8,6,4,1,5} reported a significant decrease in overjet which was also found in the current study. The current study also reported a significant decrease in overbite in support of Karacay,⁷ Gunay,⁴ Bilgic,⁹ Oztoprak,⁵ and Heinrichs.

CONCLUSION

The Forsus appliance showed the following effects: The skeletal effects were; increasing the occlusal plane, with no significant effect on the maxilla, mandible, and the MPA

The dentoalveolar effects were; protruding, proclining, and intruding lower incisors, retroclining upper incisors, distalizing, and intruding upper molars, as well as reducing overjet and overbite. Insufficient evidence was found to

assess the following variables; maxillary/mandibular anteroposterior relationship, horizontal movement of upper incisors, and the interincisal angle.

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