

# TREATMENT OF A GROWING CLASS 2 DIVISION 1 MALOCCLUSION PATIENT WITH FIXED APPLIANCES AND FIXED ANTERIOR INCLINED PLANE - A CASE REPORT

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## ABSTRACT

Class II malocclusions mostly occur due to the underdevelopment of the mandible in most cases. Functional appliances can make significant changes in correcting the position of the mandible. In this case report, the use of fixed anterior inclined plane appliance has been demonstrated along with fixed orthodontic appliance to decrowd the teeth and correct the mandibular position simultaneously.

## KEY WORDS

**Fixed functional appliance, Anterior inclined plane, Class II correction, Mandibular advancement.**

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## INTRODUCTION

Functional appliances are powerful appliances that can make significant changes in the position of the teeth and jaws. These appliances direct the pattern and direction of growth of the jaws by alteration of the forces produced by the whole neuromuscular component.<sup>1-3</sup> They are generally used for Class II div 1 malocclusions, although they can be used for the correction of Class II div 2 and Class III malocclusion sometimes. They can either be removable or fixed to the teeth, and work by stimulating the muscles of mastication and soft tissues of the face. Changes are induced by holding the mandible forward and the ensuing reaction of the stretched muscles and soft tissues, transmitted to the periosteum, bones and the teeth.<sup>4</sup> A restraining effect on the growth of the maxilla and the maxillary dentoalveolar complex is also seen along with the stimulation of mandibular growth and mandibular alveolar adaptation. Favorable changes in temporomandibular joint also occur.<sup>5-7</sup> The most common appliance used is the twin block appliance but it still has its own disadvantages. In comparison with the traditional functional appliances, anterior inclined plane appliance does not restrict the three-dimensional mandibular movement nor does it interfere with the regular physiologic activity of the oral cavity, which has a great impact on the patient cooperation, and it requires less effort by the patient to follow oral hygiene instructions. The anterior inclined appliance has shown good results in the treatment of Class II div 1 patients. In this case report of a class II div I malocclusion, we have used fixed anterior inclined plane soldered to upper molar bands along with MBT fixed orthodontic appliance.

## CASE REPORT

A 12-year-old male patient presented with proclined maxillary central incisors and retroclined maxillary left lateral incisor. There was crowding in lower jaw with increased overjet and overbite. The patient was in permanent dentition stage with a skeletal and dental Class II relationship (Fig.2). The patient showed a convex profile with lip trap. Radiographs revealed the presence of all permanent

**Table 1: Comparison of pre treatment and post treatment dentoskeletal changes**

Measurements	Pretreatment	Post-treatment
SNA	83°	82°
SNB	75°	78°
ANB	8°	4°
AB Plane to NPog	-16°	-10°
Facial angle	90°	94°
LAFH	54mm	62mm
Mand length	103mm	110mm
IMPA	97°	102°
1-SN	116°	100°



**Fig. 1- Pre-treatment facial photographs**



**Fig. 2- Pre-treatment intraoral photographs**

teeth except third molars (Fig.6). Preadjusted edgewise MBT fixed orthodontic appliance (0.022" slot) was placed to align the upper anterior teeth first and then an anterior inclined plane was incorporated in the upper arch soldered to the upper first molar bands (Fig.3). With the fixed soldered inclined plane in place, the mandible moves in the forward position during mouth closure. Simultaneously, lower teeth were decrowded with the aid of interproximal reduction (IPR) in lower anterior teeth region and a

Niti open coil spring to to create space for bringing lower right second premolar in the arch. After proper levelling and alignment, class I molar and canine relationship was achieved on both sides and normal overjet and overbite were achieved (Fig.5). There was significant improvement in the patient's profile and smile esthetics (Fig.4). After debonding, upper and lower fixed spiral wire retainers were placed and a removable Hawley's appliance with an anterior inclined plane incorporated in it was given.



**Fig. 3- Treatment progress intraoral photographs**



**Fig 4. - Post-treatment facial photographs**



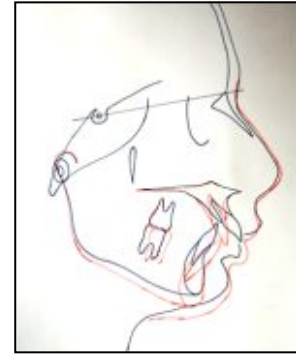
**Fig. 5- Post-treatment intraoral photographs**

**Fig. 6- Pre-treatment radiographs**





**Fig. 7- Post-treatment radiographs**



**Fig. 8- Pre-post-treatment superimposition**

## TREATMENT OBJECTIVES

This included-

1. Correction of upper and lower arch crowding.
2. Correction of upper incisor proclination and mandibular retroclination.
3. Improve lip competency for better smile esthetics.

## TREATMENT RESULTS

Comparisons of the pre-treatment and post-treatment data are shown in Table 1. The comparison of the cephalometric measurements revealed that the appliance had not much skeletal effect on the maxilla. The skeletal vertical parameters were evaluated and significant change was found as evident by increase in LAFH and Facial angle. When the measurements of the mandible were evaluated, significant changes were found. Pre –post treatment superimposition is shown in Fig.9

## DISCUSSION

In comparison with the traditional functional appliances, an anterior inclined plane appliance does not restrict the three-dimensional mandibular movement nor it interferes with the regular physiologic activity of the oral cavity, which has a great impact on the patient cooperation, and it requires less effort by the patient to follow oral hygiene instructions. Also , simultaneous correction of lower arch crowding by MBT fixed appliance along with mandibular position correction by soldered anterior inclined plane was possible. This method is more effective in growing patients of Class II deep bite malocclusion treatment, particularly to redirect the mandibular growth anteriorly and vertically by eliminating the lack of occlusion that acts as a physical barrier against the normal growth of the mandible.<sup>1,8</sup> The results showed that Class II correction was achieved mostly through dentoalveolar and skeletal changes of the mandible and revealed that the appliance had no effect on the nasomaxillary growth component. As the position of the incisors improved so did the contour of the upper lip resulting in better esthetics and improved profile.

## CONCLUSION

In comparison with the traditional functional appliances, anterior inclined plane appliance does not restrict the three-dimensional mandibular movement which has a great impact on the patient cooperation. The anterior inclined plane appliance has shown good results in the treatment of growing Class II div 1 patients. Simultaneous correction of lower arch crowding by MBT fixed appliance along with mandibular position correction by soldered anterior inclined plane was possible in this patient.

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