CASE REPORT

NON-EXTRACTION MANAGEMENT OF CLASS II DIVISION II MALOCCLUSION WITH UTILITY ARCH AND FIXED FUNCTIONAL APPLIANCE : A CASE REPORT

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ABSTRACT

Class II Division 2 malocclusion is a specific dental anomaly characterized by a distinct arrangement of the upper and lower teeth. In this condition, the upper first molars are positioned more anteriorly compared to the lower first molars, similar to Class II Division 1 malocclusion. However, a key differentiating feature of Class II Division 2 is the retroclination of the upper central incisors, often accompanied by the proclination of the upper lateral incisors.

This case report demonstrates the use of an utility arch as an effective and efficient method for enhancing the smile in patients with Class II Division 2 malocclusion. After treatment with utility arch, sagittal correction was done by placing fixed functional appliance.

KEY WORDS

Class II Division II malocclusion, Utility arch, Fixed Functional Appliance, Non-extraction management

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INTRODUCTION

Class II Division 2 malocclusion is a distinct category of Angle's Class II classification and is characterized by a unique dental and skeletal morphology. The hallmark of this malocclusion is the retroclination of maxillary central incisors, often accompanied by proclination or labial tipping of the maxillary lateral incisors. The maxillary first molars are positioned mesially relative to the mandibular first molars, as seen in all Class II relationships[1,2].

From a cephalometric standpoint, these patients typically present with a deep overbite, reduced incisor display, and a horizontal growth pattern with low mandibular plane angle. The lips tend to appear retrusive, and the smile arc is often flattened, contributing to a characteristic "tight-lipped" or "constrained" appearance[3].

Functionally, Class II Division 2 malocclusions may lead to:

- Restricted mandibular movement due to deep bite and retroclined incisors,
- Premature incisal contacts and occlusal interferences,
- Increased risk of temporomandibular joint dysfunction and associated muscular discomfort[4].

The treatment objective in Class II Division 2 malocclusion is twofold - dentoalveolar decompensation and sagittal correction. Initially, the retroclined upper incisors must be proclined to eliminate functional restrictions and unlock the mandible for forward positioning. Following incisor decompensation, sagittal correction of the skeletal Class II relationship can be achieved using fixed functional appliances which promote mandibular advancement and condylar growth modification.

This case report demonstrates the use of a utility arch as an effective and efficient method for enhancing the smile in patients with Class II Division 2 malocclusion. After treatment with utility arch, sagittal correction was done by placing fixed functional appliance.

CASE REPORT

A 13-year-old male patient presented to the department of Orthodontics in our hospital with the chief complaint of backwardly placed upper front teeth. The extra-oral examination revealed a mesoprosopic facial form, convex profile, posterior divergence and deep labio mental sulcus. The intra-oral examination revealed retroclined 11,21,slightly proclined 12,22, Class II molar and canine relation with deep and complete overbite, mild crowding in lower anterior region. The cephalometric analysis revealed a class II skeletal base, a retruded mandible (SNB=74^0) and an average maxilla (SNB=80^0) with a horizontal growth pattern (Y-axis =55^0). The upper central incisors were retroclined (UI to NA angle=16^0)

TREATMENT OBJECTIVES

Objectives of the treatment were

1. To correct the inclination and align the upper anteriors in the basal bone

2. To correct the class II molar, canine and incisor relation.

3. To attain normal overjet and overbite.

4. To improve the smile esthetics and overall appearance.

Fig 1: Pre Treatment Extra Oral Photographs

Fig 2: Pre Treatment Intra Oral Photographs

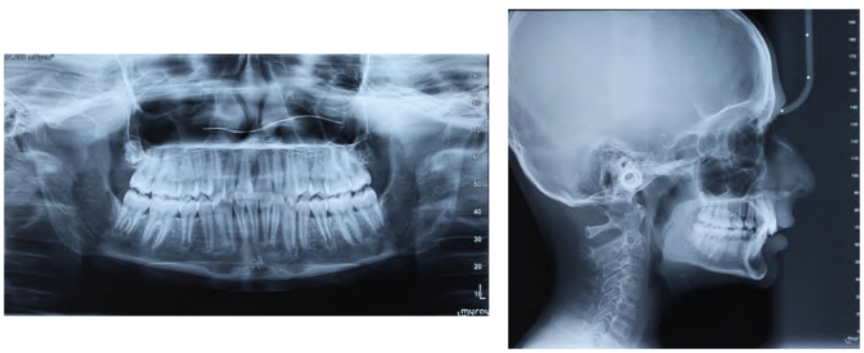

Fig 3 : Pre Treatment Orthopantomogram And Lateral Cephalogram

TREATMENT PLAN

Patient was planned to be treated with non-extraction protocol. After initial levelling and alignment of 11, 21, simultaneous protraction and intrusion of 11, 21 was planned to be done using Burstone's Utility Arch after which dentoalveolar correction was planned using MBT prescription (0.022"x0.028" slot) in continuous arch mechanics. After that advancement of mandible was planned using fixed functional appliance. Anchorage preparation was planned by using Transpalatal arch (TPA) and banding of all permanent 2nd molars. Retention was planned by using Hawley's retainer with anterior bite plane in the upper arch and Fixed bondable spiral wire retainer in the lower arch.

TREATMENT PROGRESS

Levelling and alignment of 11, 21 was done by placing segmental archwire and after reaching 0.019"x0.025" stainless steel archwire stage, the Burstone's Utility Arch was fabricated and tied with ligature wire in between 11and 21 for the correction of incisor inclination by simultaneous protraction and intrusion of 11and 21.

The Utility arch was activated at monthly intervals by giving V-bend in the buccal vestibular segment at the junction of anterior two-thirds and posterior one-third of the wire.

After the correction of incisor inclination, levelling and alignment was accomplished by using MBT prescription (0.022"x0.028"Slot) in continuous arch mechanics.

After levelling and alignment was accomplished,

FIG 4: Utility Arch

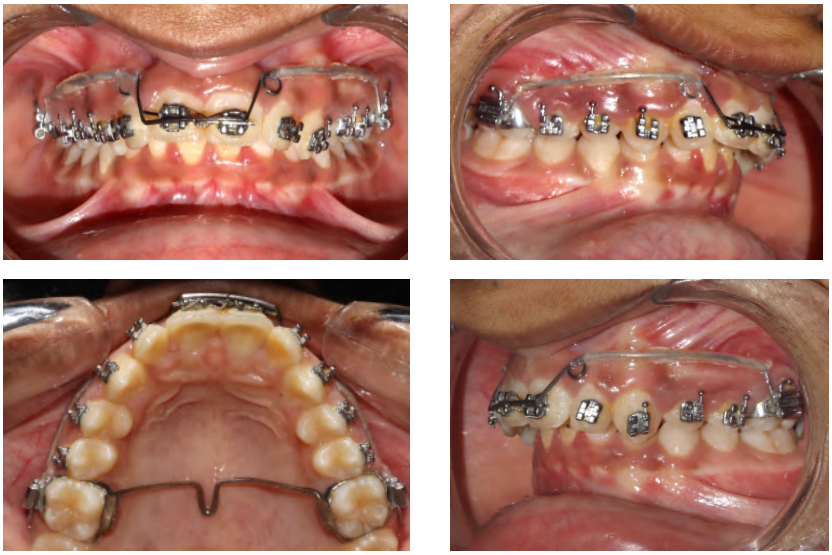

FIG 5: After Correction With Utility Arch

FIG 6: Fixed Functional Appliance In Place

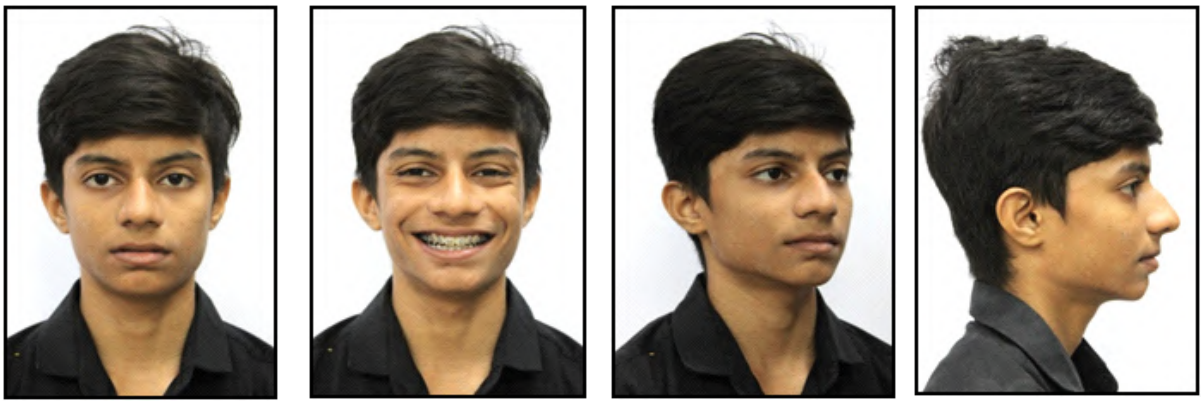

FIG 7: Extra Oral Photographs After Correction With Fixed Functional Appliance

FIG 8: Intra Oral Photographs After Correction With Fixed Functional Appliance

the mandible was advanced using fixed functional appliance (FORSUS).

TREATMENT RESULT

The most impressive aspect of the patient's treatment was the improvement in his facial esthetics and smile. With the Utility arch, the upper anteriors were correctly inclined in the basal bone. With fixed functional therapy, the mandible advanced 3 mm, converting the skeletal Class II relationship to the skeletal Class I relationship. A bilateral Class I molar relationship was established. Post treatment intraoral photographs and lateral cephalogram showed that the maxillary and mandibular incisors were inclined appropriately. The panoramic radiograph showed adequate root parallelism in both the upper and lower arches.

FIG 9: Post Treatment Extra Oral Photographs

Fig 10: Post Treatment Intra Oral Photographs

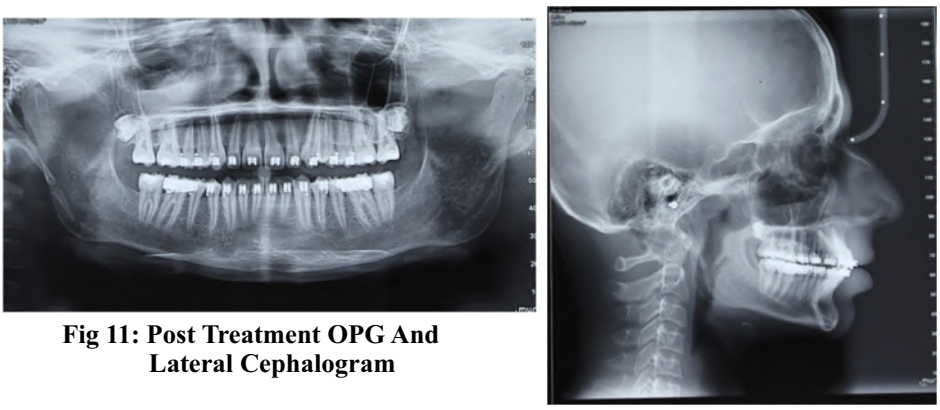

Fig 11: Post Treatment OPG And Lateral Cephalogram

DISCUSSION

Class II Division 2 malocclusion presents a distinct combination of skeletal and dental features that demand precise biomechanical control for effective correction. Characterized by retroclined maxillary central incisors, deep overbite, and reduced lower facial height, this malocclusion often leads to compromised esthetics and function[2,3].

The mandible in this malocclusion is restricted in a skeletally retruded position because of the retroclined incisors. By correcting the inclination of the incisors and placing them upright on the basal bone, facilitates the unhindered sagittal correction of the mardible. [4,5]

The use of a utility arch in such cases enables controlled proclination and intrusion of incisors by applying light, continuous forces that facilitate anterior alignment without undesired molar movement[6]. This phase of treatment effectively corrects incisor inclination and deep bite, creating favorable conditions for subsequent sagittal correction.

After achieving anterior decompensation, fixed functional appliances play a crucial role in mandibular advancement and the establishment of a Class I molar relationship[7,8]. This sequential biomechanical strategy-combining dental decompensation with functional correction-ensures improved occlusal harmony, facial balance, and long-term stability. Additionally, non-extraction management in these cases preserves arch form and facial profile while improving the smile arc and incisor exposure[9].

A thorough understanding of growth direction, incisor inclination, and functional occlusal dynamics is essential to achieving optimal outcomes in Class II Division 2 malocclusions. Individualized treatment planning remains key to both esthetic and functional success[10].

An important determinant of long-term treatment stability is retention. Class II Division 2 malocclusions exhibit a strong tendency for relapse due to the influence of tight perioral musculature and the deep bite pattern. Therefore, a well-planned retention phase is essential to preserve the achieved incisor inclination and vertical correction.

CONCLUSION

Successful management of Class II Division 2 malocclusion requires a well-sequenced approach focusing on both dental and skeletal corrections. The utility arch plays a crucial role in the initial phase by proclining the retroclined maxillary incisors, reducing deep bite, and improving incisor display.

PARAMETER	PRE TREATMENT	POST TREATMENT
SNA 82^0	80^0	79^0
SNB 80^0	74^0	77^0
ANB 2^0	6^0	2^0
Wit`s Appraisal -2mm to +2mm	+4mm	+2mm
Upper CI to NA (linear) 4mm	-1mm	+4 mm
Upper CI to NA (angular) 22^0	16^0	22^0
Lower CI to NB (linear) 4mm	2mm	5mm
Lower CI to NB (angular) 25^0	16^0	26^0
IMPA (Tweed) 76^0 - 99^0	92^0	98^0
Y (growth) axis 55^0	55^0	59^0
Nasolabial angle $102^0 \pm 8^0$	111^0	102^0
Ricket's Lip analysis (E line) upper 4mm behind lower 2mm behind	-3 mm -1.5 mm	-3 mm +1 mm
Saddle angle 123 ± 5^0	134^0	133^0
Articular angle 143 ± 6^0	140^0	134^0
Gonial angle 128 ± 5^0	120^0	124^0
Maxillary Base 45.56 mm	40mm	38mm
Mandibular Base 67.59 mm	58mm	63mm
LAFH Small 60-62 mm Medium 65-67 mm Large 70-73 mm	45mm	48mm

This establishes a favorable environment for the next phase of treatment using fixed functional appliances, which achieve sagittal correction through mandibular advancement and occlusal harmony. Non-extraction management ensures preservation of soft tissue balance and facial esthetics.With proper retention and follow-up, stable and esthetically pleasing outcomes can be achieved in the correction of Class II Division 2 malocclusions.

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