

Non-Surgical Treatment of Class II Div 1 Malocclusion with Extremely Large Overjet

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ABSTRACT

Class II div 1 malocclusion is one of the most common problem for which patients seek orthodontic treatment. With the advent of skeletal anchorage newer and better ways to treat it have been shown by many authors. Here we report a case with full cusp Class II div 1 malocclusion complicated due to congenital absence of lower central incisors, short upper lip and a very large overjet of 20mm, which was treated successfully with the help of tads.

Key words: Class II, Large Overjet, 20mm, Tads, Skeletal anchorage, Non-Surgical.

INTRODUCTION

Class II div 1 malocclusion presents with varying overjet different from case to case, Overjet is a direct measure of severity of the malocclusion¹, cases can be divided into mild, moderate and severe according to the overjet, it is considered a severe malocclusion when overjet is more than 9 mm². Overjet over 9mm comes under handicapping malocclusion³, here we present a non-surgical treatment of a case with class II div 1 malocclusion with an overjet of 20mm, which was successfully treated with the help of tads.

Diagnosis

A 16 year old male reported with the chief complain of forwardly placed upper front teeth and incompetent lips. Clinical Examination revealed full complement of teeth in upper arch till second molars, in the lower arch both lower central incisors were missing rest all teeth were present, there was spacing in the upper arch and mild crowding in the lower arch, full cusp class II molar relation on both side deepbite and an extremely large overjet of 20mm. He had a good oral hygiene with healthy periodontium; his teeth were affected with mild to moderate hypoplasia probably due to fluorosis (fig 1&2)

Lips were incompetent chin was deficient, lower lip trap and gummy smile were present. The VTO was negative due to deficient soft tissue drape and short upper lip

Absence of lower central incisors was confirmed on radiograph

Cephalometric analysis revealed class 2 skeletal base with

ANB of 9 degrees and average growth pattern Protruded and forwardly place upper anteriors, upright lower anterior (fig 3) (Table1).

Treatment objectives

Maxilla

Setback and intrusion along with retraction of maxillary dentition to achieve lip competence, correction of protrusion and gummy smile

	Norm	Pre
SNA	82	77
SNB	80	68
ANB	2	9
SN-MP	32	32
U1-NA	22/4	38/14
L1-NB	25/4	10/1.5
IIA	135	118
IMPA	90	90

TABLE 1: Pre Treatment cephalometric analyses

Mandibular

Decrowding, levelling of curve of spee and pre prosthetic preparation of lower arch for replacement of at least one central incisor. Achieve normal overjet over bite good posterior buccal segment relationship.

Treatment options

Surgical plan

Maxillary impaction and setback along with retraction of upper anteriors, and lower arch levelling and alignment with pre-prosthetic preparation.

Functional appliance or mandibular surgery were not considered due to very deficient soft tissue drape and negative VTO⁴

	Pre Treatment	Post Treatment	Change
SNA	77	79	+2
SNB	68	72	+4
ANB	9	7	-2
SN-MP	32	29	-3
U1-NA	38/14	8/0	-30/14
LI-NB	10/1.5	24/5	+13/+3.5
IIA	118	140	+22
IMPA	90	101	+11

TABLE 2: Post Treatment Cephalometric Analyses

Non-surgical plan

Extraction of upper first premolars and use of tads to retract and intrude maxillary dentition as much as possible, lower arch plan was same as described in first option.

As the patient was not ready for surgery we went ahead with second option.

Treatment Progress

.022 slot Preadjusted edgewise appliance was used (Roth's prescription), two tads were placed in maxillary posterior segment one on each side between second premolar and first molar and one in anteriors between the two central incisors.

Fig 1 (a-c): Pre-treatment extra oral photographs



After alignment with .016 nickel titanium (Niti) archwire, 018stainless steel (ss) archwire was placed for canine

retraction, later switched to 17x25 ss to complete the canine retraction, incisor retraction was carried out on 19x25 arch wire, direct anchorage was taken from tads 1.6x8mm⁵, elastic chain from anterior tad to the archwire was placed to prevent bowing of the arch and torque loss.

Lower arch alignment was started with .014 Niti followed by .016 Niti. After alignment, prosthesis site development was started by using Niti open coil spring between the two lateral incisors.

By the end of retraction and one incisor width prosthesis development normal overjet overbite were achieved along with correction of gummy smile and achievement of potentially competent lips.

For prosthesis patient chose to go with implant, so CBCT (fig 4) scan was done as advised by implantologist, followed by implant placement (fig 5), and pfm crown was placed after 3 months.

After debonding patient was given maxillary clear plastic retainer and mandibular fixed retainer made of .032 ss wire bonded on both canines.

Complications

As the overjet was very large the total treatment time was long, around 45 months, torque maintenance in upper arch was very critical and carried out with slow retraction intrusion mechanics, many times torque was added to 19x25 arch wire, mild apical root resorption was observed in pre debond CBCT scan, but owing to large amount of tooth movement it was within acceptable limits. Few brackets were accidentally debonded in the course of treatment they were replaced as soon as possible. In the lower arch to achieve good space for one implant placement lower anterior brackets were replaced once to achieve desirable root parallelism.

Result

Combination of upper retraction and lower flaring resulted in resolution of such a large overjet lower arch had 3 mm crowding and 2.5mm curve of spee, in addition prosthesis site was developed around 5.5mm wide, so total space needed in lower arch was 11 mm which resulted in reduction of 5.5 mm overjet.

In the upper arch 14mm space gained from extraction of first premolars and 6mm spacing was already present, plus there was some distal movement of posterior segments around 2mm on right and 3mm on left, total space in upper



arch 25mm resulted in 12.5 mm reduction in overjet.
Total reduction $12.5+5.5 = 18\text{mm}$.

Fig 2 (a-e) Pre treatment intraoral photographs

Normal overjet and over bite, super class1 canine relation on both sides, molars 2mm short of class II on right and 3mm short of class II on left, well coordinated arches , correction of gummy smile and lip competence was achieved along with a straight profile (fig6&7)

Post treatment cephalometric evaluation shows reduction in ANB and mandibular plane angle suggestive of intrusion of maxillary teeth and some autorotation⁶ , upper incisors retracted with good torque control , lower incisors have proclined due to prosthesis site development (Impa 101 degrees), which is quite acceptable⁷ in a class 2 skeletal case (Fig 8)(Table 2)



Fig 3 Pre treatment lateral cephalogram.

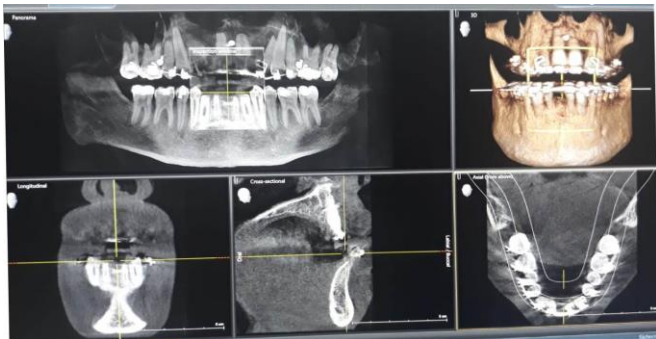


Fig 4 Pre debond CBCT scan.



Fig 5 Post Implant IOPA

Discussion

This case demonstrates that the use of tads has expanded the limits of orthodontic correction: The envelope of discrepancy has been modified⁸ by adding the skeletal anchorage range of tooth movement, the envelope for skeletal anchorage occupies a position that is greater than orthopaedic + orthodontic correction and lesser than surgical correction , this adds a very encouraging dimension to orthodontics where many surgical cases can be treated non surgically by the use of appropriate skeletal anchorage, however the authors depict this in a fuzzy outline because of limited evidence available to make estimates,

Few years back this case would be a candidate for surgery⁹; this is probably the first case report where an overjet of 20mm has been corrected by orthodontics, without the need for surgery. Overall good result was achieved with good occlusal and facial outcome



Fig 7 (a-c) Post treatment extraoral photographs

Conclusion

Tads can be used to treat more and more complex malocclusions successfully , hope this case report adds to the

limited evidence available and contributes in converting the fuzzy outline on the envelop of discrepancy to a solid line.



Fig 8: Post treatment lateral cephalogram.



Fig 6 (a-e): Post treatment intraoral photographs

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