Case Report

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Non Surgical Management of Severe Dento-Skeletal Class II Maloclussion - A Case Report

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ABSTRACT

ABSTRACT: The purpose of this case report is to show that even though a case could seem to be a surgical one but it's not mandatory to operate it that way, rather shift towards the conservative treatment, as per the requirement of the patient.

A 13 years old female patient who had severe dento-skeletal class II malocclusion with ANB 8ºindicative of orthognathic surgery. Since the patient was adamant for not undergoing any surgical procedure, we decided to go for fixed functional therapy after functional decompensation with extraction of all first premolars.

The result of this case is an example that the surgical cases could be treated using camouflage. The dental as well as the skeletal discrepancies were very well addressed and treated to the ideal relation.

KEYWORDS- class II sub division 1, severe skeletal discrepancy, deep bite, fixed functional appliance (FFA), nonsurgical treatment and camouflage, functional decompensation.

INTRODUCTION

One of the factors for successful orthodontic treatment is the patient compliance [1]. However, there can be various treatment modalities for a particular case and every orthodontist may have different treatment plan for the same. The most appreciated plan would be the one comfortable to the patient along with attaining ideal dento skeletal and soft tissue parameters. In fact, for over 40 years, the noncompliance of the patient has remained a major concern for the orthodontists. [1]

Furthermore, the objective of modern orthodontics is not only to achieve the dental corrections but also correcting skeletal and soft tissue relation as well. [2]

Class II malocclusion poses maximum challenges to orthodontists, as it has several methods for treatment [3].Treatment depends on patient's facial profile, skeletal pattern, growth potential, and severity of the malocclusion[3].Class II malocclusion is generally recognized by the presence of posteriorly positioned mandibular dental arch, deep overbite and proclined/retroclined maxillary incisors.

The possible approaches for the treatment of skeletal and dental Class II malocclusion are:

(1) In pre pubertal cases, growth modulation is the best to reduce or eliminate the jaw discrepancy

(2) For post pubertal cases, functional decompensation followed by jumping the bite is the option to camouflage the skeletal problem.

(3) Surgical treatment, which involves repositioning the jaws, either by advancement of mandible in cases of recessive lower jaw or maxillary posterior repositioning in case of protrusive upper jaw.

Previous studies depicts that the mandibular growth can be extended even after puberty, and minimal residual growth can be stimulated with fixed functional appliance (FFA) [4].

Gero Kinzinger et al [5,] conducted a study comparing camouflage, dentofacial orthopedics and orthognathic surgery. Results of which stated that each group achieved a reduction in overjet with their respective treatment. They observed the advancement of the bony chin and an increase in mandibular length in the sagittal direction in both the surgical and functional orthopedic groups.

Moreover, if the treatment outcome is almost similar then opting for a non-invasive line of treatment should be primarily chosen over the invasive one[6].

HISTORY

A 13 years female patient came with the chief complaint of forwardly placed upper front teeth. The patient gave no relevant medical or habit history and attained menarche a year before.

DIAGNOSIS

The extra oral examination showed typical characteristics of Skeletal Class II malocclusion i.e., convex profile, posterior divergence, positive visual treatment objective, mandibular retrognathism with 10 mm of incisor and 3mm of gingival exposure during smiling (Figure.1, A and 1, B) The patient was mesocephalic and mesoprosopic with no gross facial asymmetry. Incompetent lips were evident with lower lip trap and deep mentolabial sulcus.

Temporomandibular joint (TMJ) assessment showed no pain or clicking on maximum opening or closing. Functional examination revealed the presence of oro-nasal respiration.

On intra oral examination Class II molar relation bilaterally was observed with class II canine relation on both sides (Figure-1, A and 1, B). Further intraoral examination revealed all permanent dentition with 13mm overjet and complete bite. Occlusal features displayed symmetrical U shaped maxillary and mandibular arch with rotations irt 14, 33, 34 and 44. In addition to these 14 and 24 were in scissor bite, whereas, 45 was in crossbite. Ellis class II fracture was present in 21 which was non tender on percussion.

The patient depicted poor facial profile and unpleasant esthetics:

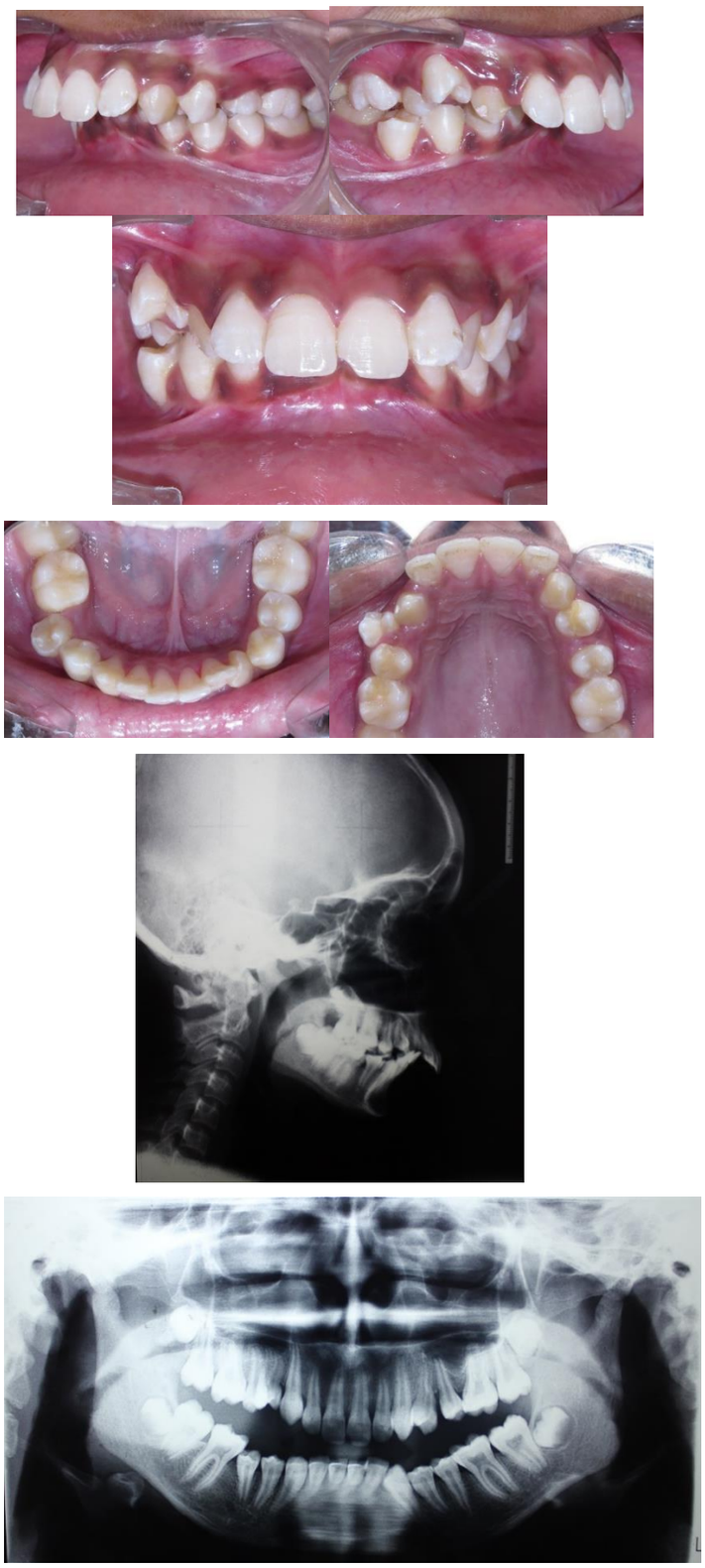

Figure 1, A- Pre Treatment records

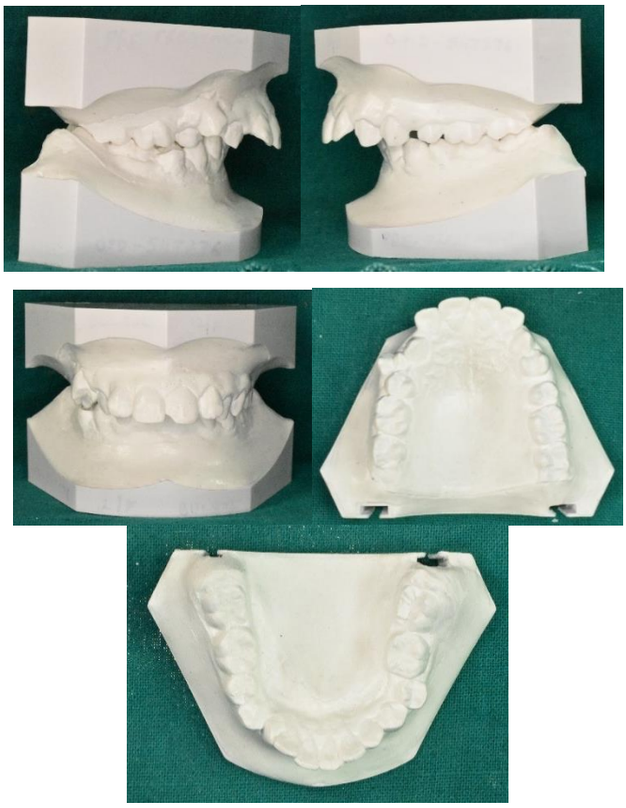

Figure 1, B – Pre Treatment Models

OPG AND CEPHALOMETRIC ANALYSIS

The panoramic radiograph illustrated adequate bone support for the orthodontic therapy. Moreover, the tooth germs of all the third molars were visible with no anomaly. TMJ revealed normal size, shape and position of the condylar heads.

Cephalometric Analysis revealed prognathic maxilla and retrognathic mandible with 83ºSNA, 75ºSNB and 8º ANB. The patient had proclined upper and lower incisors, since, UI-NA was 31º and IMPA was 97º respectively. Wits appraisal was -5.5mm confirming Class II malocclusion.

MODEL ANALYSIS

Arch perimeter analysis showed 1.5mm excess space in maxillary arch, whereas, Carey's analysis exhibited 11.8 mm space requirement in lower arch.

Bolton's analysis revealed 0.7mm overall mandibular excess and 2.1 mm mandibular anterior excess.

TREATMENT OBJECTIVES

Treatment objectives were:

1) To correct class II skeletal relationship.

2) To attain class I molar relation.

3) Achieve ideal overjet and overbite.

4) Relieve the crowding in lower anterior teeth.

5) Correction of scissor bite irt 14, 24 and cross bite irt 45.

6) Composite buildup of fractured 21.

7) Reduce the facial convexity and procure an esthetically pleasing soft-tissue profile.

TREATMENT PLAN

1. Surgical decompensation after extraction of all first premolars followed by mandibular advancement (BSSO).
2. All first premolar extraction for functional decompensation followed by jumping the bite via fixed functional appliance.

Since the patient was reluctant for surgical line of treatment and insisted for a conservative option, we decided to go for the second alternative.

TREATMENT PROGRESS

The patient was referred for all first premolar extraction. Preadjusted Edgewise Appliance with MBT prescription of 0.022" slot (3M UnitekTM Gemini Metal Brackets) was bonded. TPA(0.032" Elgiloy)was placed for anchorage. Leveling and aligning of upper arch was commenced on 0.012" NITI wire and gradually reached to thicker wire i.e., 0.019"x0.025" SS in 8 months.

Alignment of lower arch was also initiated with 0.012" NITI which was gradual reached to 0.019"x0.025" SS in 7 months.

Minimal curve of spee in the upper arch was incorporated and retraction was commenced with type 1 active tie back (MBT) in both the arches. (Figure 2, A)

Class II corrector(Leone America) was placed with labial crown torque in the upper wire and lingual crown torque in the lower wire to prevent upper incisor retroclination and lower incisor fanning(Figure 2, B).3mm activation was done after 3 months of the appliance wear followed by 2mm activation for every 2 months. The total duration of appliance wear was 10 months.

Further, 0.016" AJ Wilcock intrusion arch (with 15º anchor bend, mesial to first molar) was piggy backed on the base arch wire to open residual deep bite and maintain torque in upper incisors (Figure 2, C).Final settling was done using short class II elastics (4 ½ ounce) bilaterally on 0.014" upper and lower NITI arch wire .

The presence of scissor bite in relation to 14-44 and 24-34 did not pose a problem in the treatment plan as all the first premolars were extracted prior to the commencement of the treatment.

The extraction of 44 provided rapid correction of crossbite in respect to 15-45 by using the phenomenon of Periodontally Assisted Osteogenic Orthodontics during leveling and aligning.

The case took 32months to achieve all the objectives and attain ideal occlusion.

Figure 2, A- Retraction using class I active tie back (MBT)

Figure 2, B- class II correctors applied bilaterally

Figure 2, C- Intrusion arch applied

TREATMENT RESULT

The results gave us dramatic changes in the appearance of the patient. The convex profile changed to orthognathic with competent lips with adequate incisor exposure on smile (figure 3, A and 3, B). Class I molar relationship was achieved bilaterally with good intercuspation along with ideal overjet and overbite. The bilateral scissor bite was taken care of automatically with appropriate extraction plan. Buildup of fractured 21(Ellis class I) was done after the completion of treatment.

The dento skeletal and soft tissue changes are shown in the superimposition (Figure 4).

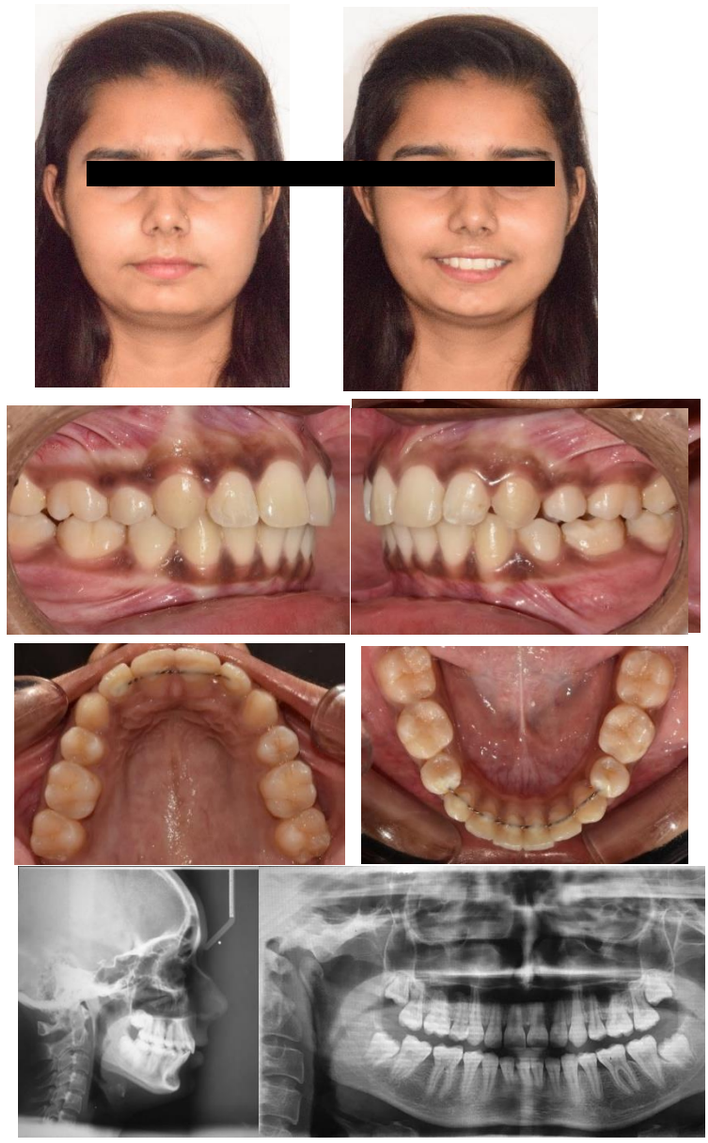

Figure 3, A- Post Treatment records

DISCUSSION

Fixed functional appliances are usually used in growing patients for growth modifications. However, some literature poses evidence that they can be used in post pubertal patients for

dento alveolar changes[7,8]. Though skeletal changes are not expected by these appliances but condylar growth and remodeling for glenoid fossa have been reported.[9-13]

Figure 3, B-Post Treatment Models

Kabbur et al conducted a study which appears to be the only one so far, which compares the efficacy of surgical orthodontic treatment in adult patients to Forsus appliance. It's result states that although surgical patients had a better mandibular advancement, profile and soft tissue changes, but the fixed functional therapy too had very impressive results and marked improvements.[11]

Ravindra Nanda et al, performed a study on identical twins which suggested that though surgical treatment led to superior skeletal result as compared to the nonsurgical treatment. However, the soft tissue profile was remarkably similar in both patients suggesting that soft tissue profile changes may not necessarily follow bony skeletal structures. [6]

Hans Pancherz et al[7], conducted a study in 1998 on patient with class II malocclusion using Herbst appliance. The cases were divided into two groups, one being the young adults and other was of the early adolescent. The cases were treated to class I occlusal relationship with improved sagittal incisors and molar relation, more by dental changes than by skeletal ones. Soft tissue facial and skeletal profile convexity was reduced in both the groups. This study also emphasized on the statement that the fixed functional therapy could be an alternative to orthognathic surgery in borderline cases.

Though, our case also belonged to the surgical group but we followed the alternative treatment by using fixed functional appliance (class II corrector) which dramatically changed the soft tissue profile of the patient and also the skeletal discrepancy.

The ANB reduced tremendously from 8º to 3º, N prep to Pog changed from -8mm to -3mm and SNB increased by 3º during treatment. Moreover, Wits appraisal came to -2mm from -5.5mm. These parameters show the skeletal changes. Similar changes were seen by Joby Paulose et al [13], in a case with class II skeletal discrepancy treated by FFA (Power Scope)

Lower incisor to mandibular plane angle increased from 97º to 105º subsequent to FFA. Even the interincisal angle became 117º from 115º(Table 1).

The soft tissue changed drastically. We could achieve all the soft tissue parameters in normal range which contributed to pleasing profile. The H angle, Ricketts E line and lower sulcus depth were within normal range.

CONCLUSION

- Proper diagnosis and treatment planning plays the major role in success of any treatment along with the knowledge of various treatment alternatives.
- Moreover, treatment should be chosen very cautiously for the skeletal cases.
- Fixed functional therapy can be used in young adults for correction of severe class II malocclusion.

DECLARATION OF PATIENT CONSENT

The author certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity can't be guaranteed.

Table 1- Pretreatment and post treatment cephalometric analysis			
SKELETAL PARAMETERS	**NORMAL VALUE**	**PRE TREATMENT**	**POST TREATMENT**
SNA angle	82º+/-2	83º	81º
SNB angle	80º+/-2	75º	78º
ANB angle	2º+/-2	8º	3º
N prep to pt. A (mm)	0-1mm	0mm	-1
N prep to Pog (mm)	-4 to 0mm	-8	-3mm
Mandibular plane angle	25º	30º	25º
Lower anterior face height (mm)	61mm	50mm	53mm
WIT's appraisal	-4.5 to 1.5mm	-5.5mm	-2mm
Occlusal plane to mandibular plane	14º	30º	15º

DENTAL PARAMETERS	NORMAL VALUE	PRE TREATMENT	POST TREATMENT
U1 to NA angle	22º	31º	24º
U1 to NA linear	4mm	8mm	2mm
L1 to NB angle	25º	25º	27º
L1 to NB linear	4mm	4mm	6mm
L1 to A Pog mm	1+/-2mm	3mm	1mm
L1 to MP angle	90º	97º	105º
Interincisal angle	131º+/-5º	115º	117º
UI to NF(⊥NF)	27.5mm	29mm	26mm
U6 to NF(⊥NF)	23mm	19mm	21mm

SOFT TISSUE PARAMETERS	NORMAL VALUE	PRE TREATMENT	POST TREATMENT
'S' line mm- Upper **Lower**	0mm 0mm	3mm -1mm	1mm 2mm
Nasolabial angle	94º-110º	106º	103º
Lower lip to E line	-2mm ± 2mm	-4mm	-2mm
H angle	7º-15º	24º	15.5º
Lower sulcus depth(Inferior labial sulcus to H line)	5mm±2mm	11mm	5.5mm

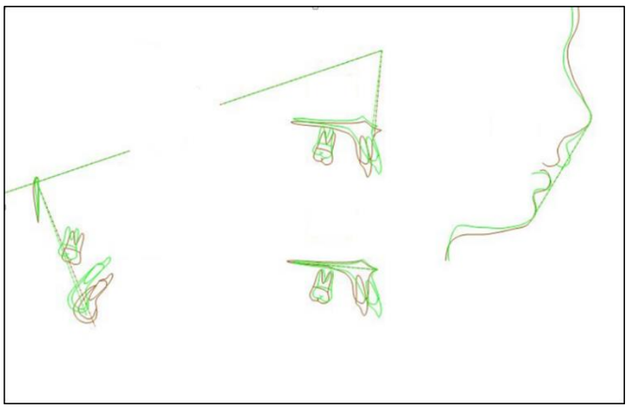

Figure 4- superimposition of the pretreatment and post treatment lateral cephalogram.

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