

## Conservative Management of Severe Class II Division 1 malocclusion in an adolescent female patient- A case report

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**Abstract:** Case report of a 15-year-old female patient who presented with class II div 1 malocclusion with protrusion and proclination of upper and lower incisors, skeletal class II base, normodivergent growth pattern and incompetent lips. She also presented an overjet of 10mm and a 80% overbite. The objectives was correction of the proclination and protruded maxillary incisors and enhancement of facial profile. Treatment consisted in extraction of the maxillary first bicuspid and fixed orthodontic appliances with preadjusted edgewise appliance. The result showed correction of overjet and overbite, with class I canine relation and maintenance of class II molar relation and marked improvement of facial esthetics.

**Keywords:** Orthodontic camouflage, Class II div 1 malocclusion, Incompetent Lips, K-SIR Loop.

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### I. Introduction

The Class II division 1 malocclusion is considered as one of the most prevalent malocclusion. Emrich et al, has reported a 14% frequency in children aged between 12-14yrs<sup>1</sup>. The growth status of the individual and the treatment timing are essential aspects to be considered while attempting correction of Class II malocclusion. In case of adults, the camouflage treatment is the most frequently performed treatment modality for its correction; which invariably involves extractions of all four first premolars or the upper first premolars and lower second premolars or only the upper maxillary premolars.

Only upper first maxillary premolar extraction protocol is often resorted to in cases wherein there is minimal crowding or discrepancy in the lower arch<sup>2,3</sup>. In a long term follow up by Milahik et al, they concluded that the level of patient satisfaction reported with a camouflage treatment versus orthognathic surgery; such as a surgical mandibular advancement, were seen to be comparable<sup>4</sup>. Janson et al performed a study to analyze the post treatment occlusal stability in premolar extraction cases, wherein they concluded, that the two maxillary premolar extraction treatment protocol gave a better occlusal result versus the treatment results obtained with four premolar extractions<sup>5</sup>.

### II. Case Report

A 15year old female reported to the department of orthodontics, with the complaint of forwardly placed upper front teeth and a non pleasing smile.

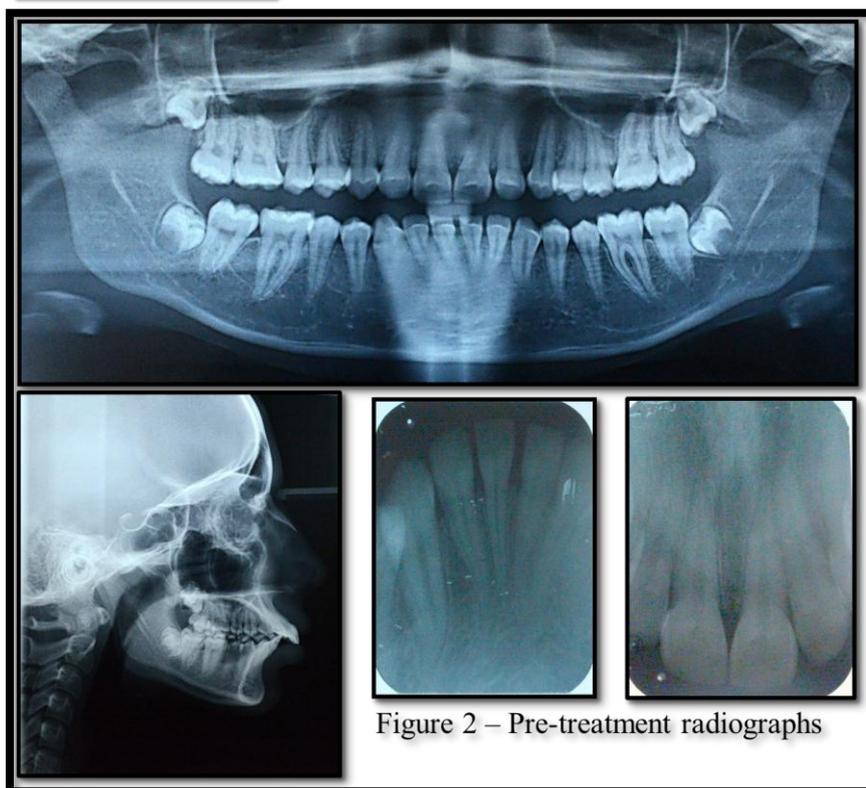
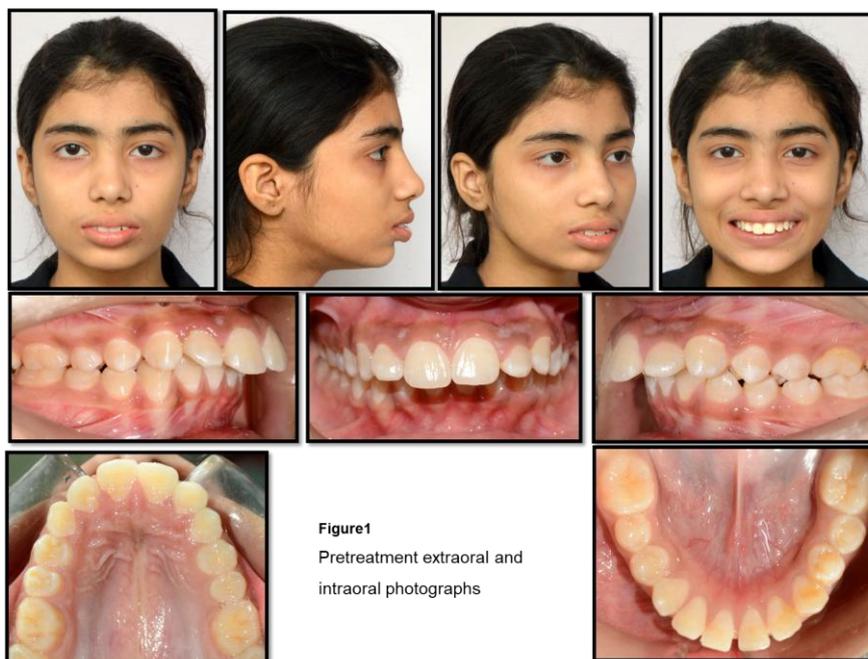
On extraoral examination, the patient had a symmetrical mesoprosopic face with convex profile, incompetent lips and a curled lower lip. Smile analysis showed a normal smile line with a non-consonant smile arc and a morley's ratio of 100%. Upon intraoral examination the patient had class II molar and class II canine relationship bilaterally, scissor bite in relation to upper and lower first premolars on the left side, an overjet of 10 mm, overbite of 80%, square shaped maxillary arch and an ovoid shaped mandibular arch with spacing in lower anterior region. (Figure 1) The periodontal tissues were found to be healthy. The functional findings revealed no signs or symptoms of a temporomandibular disorder.

Cephalometric findings presented a forwardly placed maxilla with an orthognathic mandible resulting in Skeletal class II relation (ANB=3°, Wits=4mm, APP-BPP=6mm, MM bisector=1mm). The patient had a normodivergent growth pattern (FMA=24°) along with proclined and protruded upper and lower incisors (Max 1-APog=14mm, Max 1-NA=40°, Mand 1-APog=6mm, IMPA=108°). (Figure 3)

Soft tissue cephalometric analysis revealed protrusive upper and lower lip w.r.t S and E line, increased interlabial gap; 4mm and lip strain of 3mm.

The panoramic X-ray revealed the presence of upper and lower third molars with no apparent pathologies. (Figure 2)

Model analysis revealed a total discrepancy of 12 mm in the upper arch and 2.5 mm in the mandibular arch.



**Diagnosis and Treatment objectives**

The patient was diagnosed as Angle’s Class II division 1 malocclusion with deep bite and increased overjet, Class II Molar and Canine relationship Bilaterally, on a Skeletal Class II base with normdivergent growth pattern and CVMI – VI.

The goal was to obtain a good facial balance with optimum static and functional occlusion. The treatment objective were:

- Correction of incisor protrusion and proclination
- Achieving bilateral Class I Canine relationship
- Maintaining the existing bilateral Class II Molar relationship
- Correction of the deep bite and overjet
- Achieving stable occlusal function
- Achieving lip competency and enhancing soft tissue balance.

#### **Treatment Plan**

Considering the cephalometric hard tissue and soft findings as well as the model analysis a conservative treatment plan was outlined to extract only the maxillary first premolars to achieve occlusal, functional and esthetic stability.

#### **Treatment sequence**

The maxillary and mandibular arches were banded and bonded using preadjusted edgewise appliance (MBT 0.022x0.028 slot) and an initial 0.016” NiTi wire was placed for levelling and alignment of the arches. At the end of 5 months, good levelling and aligning was achieved to place upper and lower 0.019 x 0.025-inch SS wires. Simultaneously an anterior removable bite plate was also given to the patient for bite opening. For anchorage preservation in the upper arch second molar banding was done.

Upon progression to rectangular 0.019 x 0.025-inch SS wires, extractions of upper maxillary first premolars were performed and KSIR loops fabricated using 0.019 x 0.025-inch TMA wire for simultaneous intrusion and retraction were placed in the upper arch. At the same time consolidation of spaces in the lower anterior region was done with figure of eight ligature wiring and synching of main arch wire.

After the closure of the 1st premolar extraction space, the residual overjet was corrected with the help of class II elastics which were worn for six weeks. For the settling of occlusion, 0.016 nickel titanium wire was placed with settling elastics. Following it, the case was debonded and a fixed upper and lower lingual bonded retainers were given.



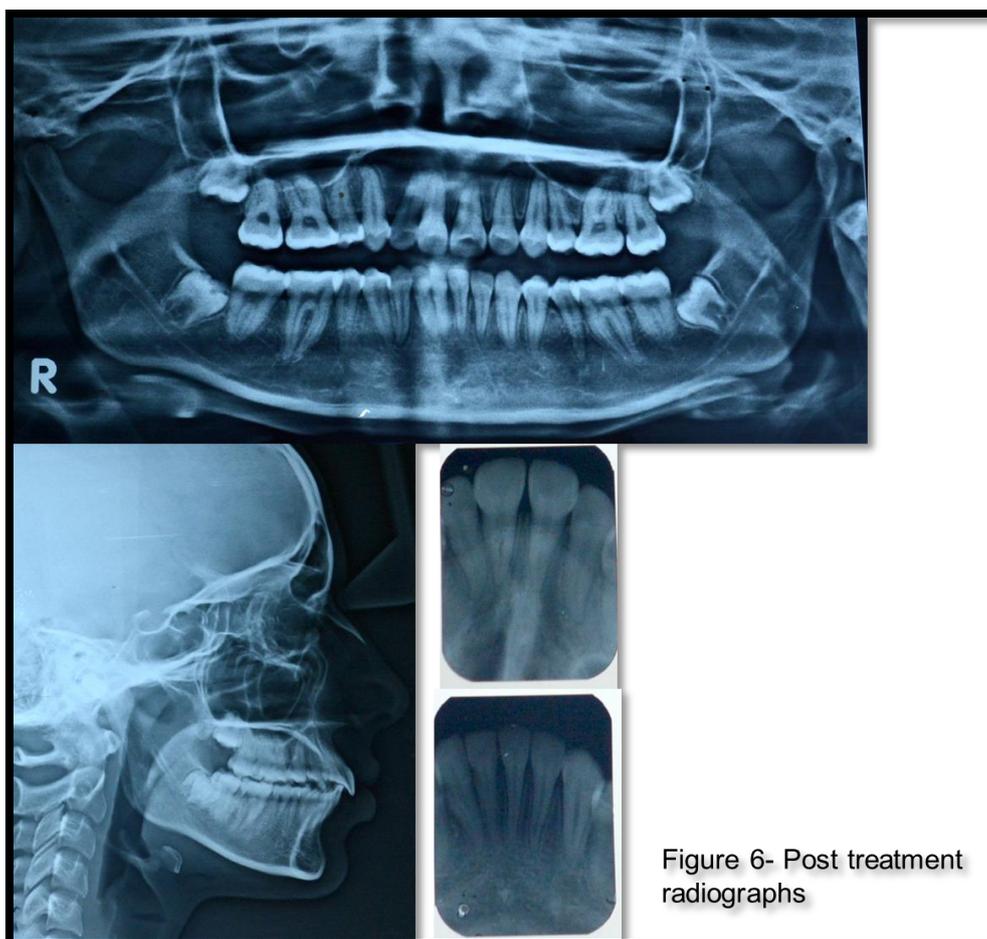
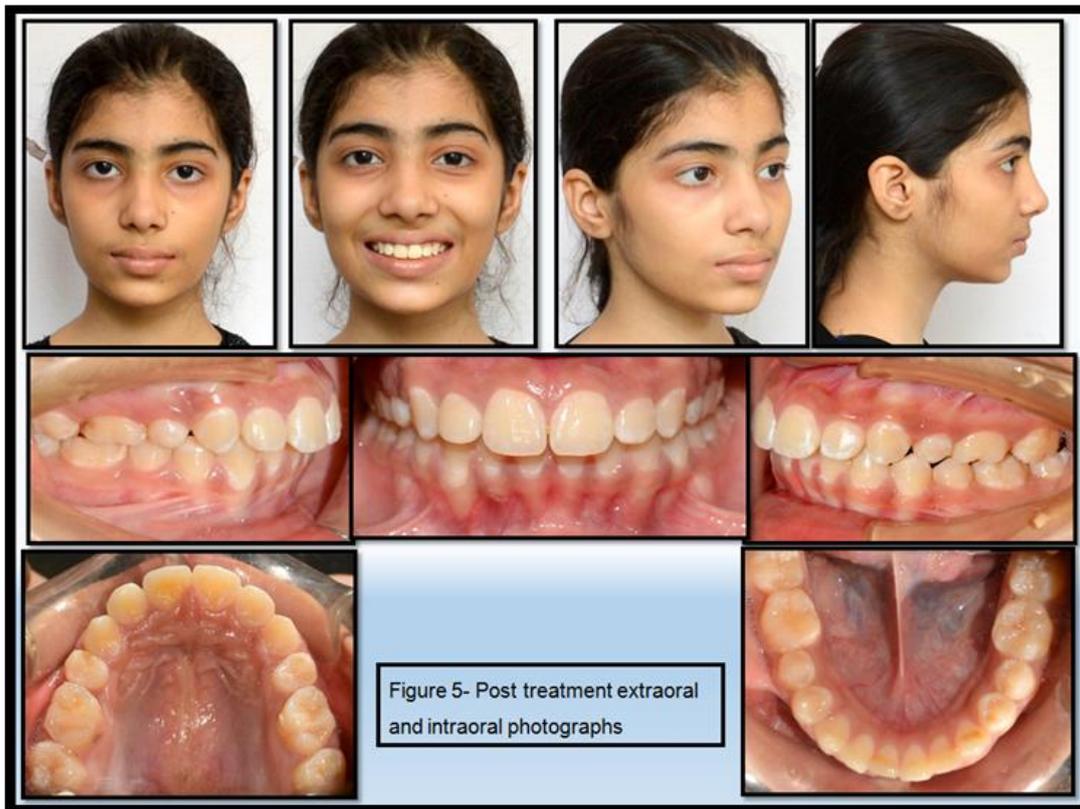
Figure 4- En-masse retraction of anteriors with KSIR loops

Cephalometric parameters	Pre treatment	Post treatment
SNA	79°	79
SNB	76°	77
ANB (3.12°±1.8°)	3°	2
N <sup>⊥</sup> to A point -4.46 mm	-2 mm	-3.75
N <sup>⊥</sup> to B point -11.03 mm	-10 mm	-9mm
N <sup>⊥</sup> to Pog -10.5 mm	-9mm	-8.25
FMA ( 23.83±2°)	24°	24
SN-MP (32-35°)	36°	36
Mx 1 to NA: 4.92±2.05mm	11 mm	5mm
Mx 1 to NA: 24.02±5.82°	40 °	30
Md 1 to NB (6±1.7mm)	9 mm	5mm
Md 1 to NB (27±4.3 °)	37 °	30
IMPA	108°	105
E – line (mm) Upper lip (-4mm)	2 mm	-1mm
E-line -Lower lip (-2 mm)	4 mm	2mm
Nasolabial angle	110°(102+/-4)	104

Figure 3- Cephalometric table

### Post Treatment Results-

Post treatment extraoral photographs revealed an improvement in the facial profile and esthetics of the patient. Lip competency was achieved and lip strain was relieved. The radiographic evaluation confirmed the good control of the upper and lower labial segments (Figure 6). The upper incisor proclination (U1 to NA) was reduced from 40° to 30° and the lower incisor proclination (L1 to NB) also decreased significantly from 108° to 105° improving the facial profile substantially. The large overjet and overbite were corrected and normal functional occlusion achieved. (Figures 5&6)



### III. Discussion

The camouflage treatment of a class II patient needs meticulous diagnosis and treatment planning which includes esthetic, occlusal, and functional considerations<sup>6</sup>. The premolars are probably the most commonly extracted teeth for orthodontic purposes. Various protocols for premolar extractions for camouflage treatment in Class II Division 1 malocclusion have been recommended by different authors for a variety of reasons depending upon the specific need of the patient<sup>7</sup>.

In our patient the upper incisors were protruded along with a large overjet of 10mm. The upper incisors were seen to be resting on the lower lip resulting in the curling of the lower lip with minimum discrepancy in relation to the lower incisors. Various studies have also shown that the extractions of premolars, when performed after careful diagnosis and treatment planning, certainly lead to effective profile changes<sup>8-11</sup>. Hence a conservative treatment plan for the correction of Class II malocclusion only by extracting the upper first premolars was executed.

A variety of loops are used for space closure; we opted for the KSIR loop for its exceptional clinical properties and performance. KSIR loop helped in achieving retraction along with simultaneous intrusion hence aiding in opening of the bite also. Also with KSIR loop, by incorporating the specific activation bends, anchorage preservation was achieved.<sup>12</sup>

Protrusion of the lips specifically of the lower lip was due to the forwardly positioned upper incisors resting of the lower lip resulting in incompetent lips. Upon retraction and intrusion of the upper anterior segment, competency of the lips was achieved leading to enhanced and balanced facial esthetics of the patient.

### IV. Conclusion

The camouflage treatment of Class II Division 1 malocclusion in adults is always a challenge to the orthodontist and it certainly demands for a specifically tailored treatment plan to achieve the most desirable results. The surest way to achieve the best possible results lie in accomplishment of a hard tissue and soft tissue balance, which in turn depends upon execution of the most appropriate and controlled biomechanics. The correction of the malocclusion was achieved along with improvement in the patient aesthetics and self-esteem with the help of a very meticulous and conservative treatment planning.

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