NON-SURGICAL TREATMENT OF ADOLESCENT PATIENT WITH CLASS III MALOCCLUSION: A CASE REPORT

Dr. Sudin Shakya, *DMD, FICCDE*
National Dental Hospital
Panipokhari, Kathmandu

ABSTRACT

The case presents the treatment protocol and mechanics used during the fixed orthodontic treatment of a girl patient aged fourteen years with skeletal and dental Class III malocclusions and with negative overjet and severe crowding. To unravel the crowding and to compensate for the skeletal discrepancy, the first premolars were extracted, Reverse Pull Head Gear (RPHG) and Class III elastics were used and proclination of upper anteriors and retroclination of lower anteriors were done using .022 Roth brackets. The post-treatment stability is good and shows no sign of relapse even after two years.

INTRODUCTION

A Class III malocclusion with significant skeletal discrepancy presents an orthodontic challenge. When the patient refuses the surgical approach and a compromised treatment approach is to be implemented, the treatment is significantly more challenging. The important steps in a successful orthodontic treatment include thorough diagnosis, correct treatment planning, effective implementation of the treatment plan, and mid-treatment assessment with OPG and Cephalogram. The patient should also be informed about the limitations of the treatment and his/her role during the treatment. For the patients who are reluctant to undergo surgery, an alternative option is to camouflage the underlying discrepancy with dentoalveolar compensation, with or without correcting the underlying skeletal discrepancy. However, the limitations of dentoalveolar compensations should not be underestimated.

CASE REPORT

A fourteen years old girl was referred to National Dental Hospital for orthodontic treatment. Her chief complaints were irregular crowded teeth and negative bite; she also wanted to improve her facial esthetics. Initial examinations showed a typical class III facial pattern, with slight mandibular prognathism and a slightly retruded upper lip. The upper midline was asymmetrical and was off towards the right side. Intra-oral examination revealed class III molar and canine relationships with anterior cross bite and the first premolars and canines were not in contact. Further, there were severe crowding in the lower and upper anterior teeth. Her lip competency was adequate and no obvious periodontal problems were seen.

Cephalometric analysis showed skeletal class III with relative mandibular protrusion and maxillary retrusion with negative overjet and with Wits

analysis of -8mm. Both the maxillary and mandibular teeth were retruded and retroclined, and the maxillary sinus level was low.

The goals of the treatment were to correct the crowding, to correct cross bite with positive overjet and overbite and to get functional and stable occlusion with canine class I relationship. The limitations assessed were the patient cooperation on wearing the RPHG and elastics, skeletal resistance and absence of favorable pubertal growth as patient had already crossed the peak pubertal period.

Based on the findings, a combined surgical and orthodontic treatment was proposed. However, the patient party refused any surgical treatment. The only remaining treatment option was through dentoalveolar compensations by using Reverse Pull Head Gear (RPHG), elastics, activation and manipulation of 'U' stops in the upper archwire along with the extractions of all first premolars to unravel the crowding. Such a treatment procline the upper anteriors and retrocline the lower anteriors which would result in a high interincisal angle at the finish. Although the risk/benefit ratio and costs of this option are lower, this protocol demanded more time and a high patient cooperation.

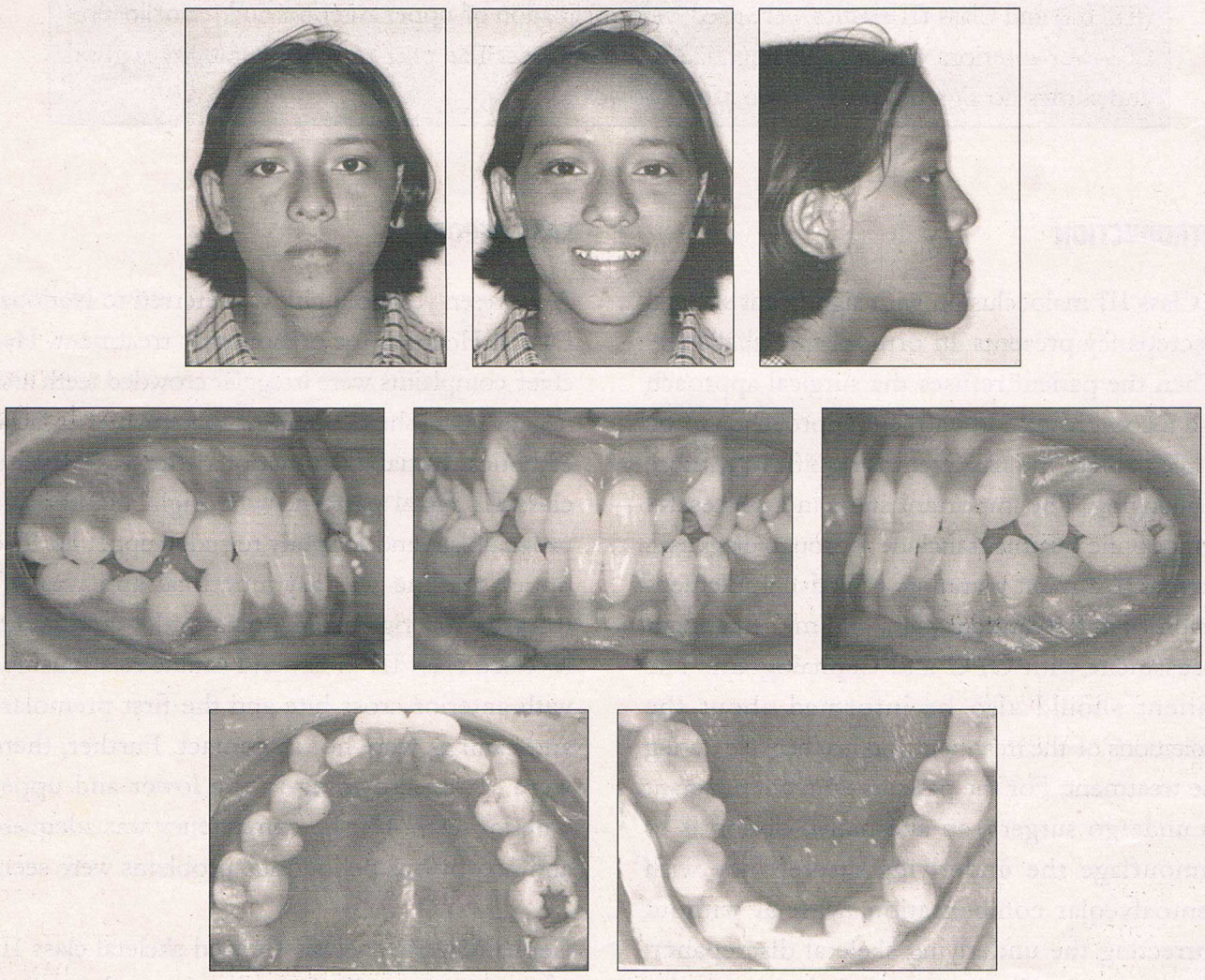

Fig 1.1 – 1.8 Pre-treatment photographs

TREATMENT SEQUENCE:

All the first premolars were extracted and bonding was done with Leone .022 mini Roth brackets. Initial leveling and alignment was started with a .014 niti arch wires on upper and lower arches with wire progression to .016 niti arch wires, then to .020 ss in both arches. At the same stage the bite was opened more in the premolar area with the leveling of the curve of the Spee. Lower canines were retracted in the extraction spaces of first premolars. 'T' loop was used to retract the lower anteriors and from the same day an RPHG was provided to the patient to wear for fourteen to sixteen hours a day. Patient cooperation was more than satisfactory. 'U' stops were incorporated on .018 ss archwire mesial to upper first molars to gain proclination effect on the upper anteriors. All second molars were also banded besides the first molars. Class III elastics were used on custom bend hooks on brackets of lower lateral incisors to further retrocline the lower anteriors. The posterior teeth were then mesialised one by one starting from second premolars then first molars.

Curve of Spee became flat with good occlusion. Last archwire progression to .019X .025 ss on upper and .020 ss on the lower arch were carried on for five months. The case was debonded on thirtieth months. A removable type of retainers were used for retention in both arches. The patient used the retainers for six months. She has now been without any retention appliance for more than eighteen months and shows no sign of relapse.

CEPHALOMETRIC ANALYSIS:

	Measurement	Standard value	Pre-treatment	Mid-treatment	Post-treatment
Skeletal	SNA	81°	74°	77°	73°
	SNB	80°	76.5°	80°	76°
	ANB	2°	- 2.5°	- 3°	- 3°
	FMA	22 °	36°	30°	33.5°
	SGn-FH	59	°67°	63°	66°
	Wits	0	- 8 mm	- 8 mm	- 4 mm
Dental	U1 to L1	130°	145°	132°	152°
	L1 to MP	92 °	77°	84°	72°
	L1 to NB	+ 4 mm	+ 2.5 mm	+ 3 mm	- 1 mm
	L1 to APo	+ 2 mm	+ 4 mm	+ 5 mm	0
	U1 to SN	103°	95°	102°	95°
	U1 to APo	+ 5 mm	+ 2 mm	+ 6 mm	+ 1.5 mm
Facial	Nasolabial Angle	100°	106°	101°	93°
	E plane Upper	- 2 mm	- 5 mm	- 5 mm	- 6 mm
	E plane Lower	- 2 mm	- 1 mm	- 1 mm	- 3 mm

DISCUSSION

Dentoalveolar changes improved the patient's profile with protusion of the upper lip and retrusion of lower lip. This is usually seen in the camouflage treatment. The use of RPHG, class III elastics and proclination bend ('U' stops) have shown dramatic dentoalveolar changes but the main concern was periodontal support. From the proclination of upper incisors, the secondary effects could include resorption of the cortical plate with subsequent gingival recession, dehiscence or fenestration and lost of height of interdental bone. With the lower incisors, the effects could have been the lengthening of clinical crown or resorption of cortical plate. However, none of these problems were detected. Periodontal evaluation showed a healthy condition even after 2 years post-treatment.

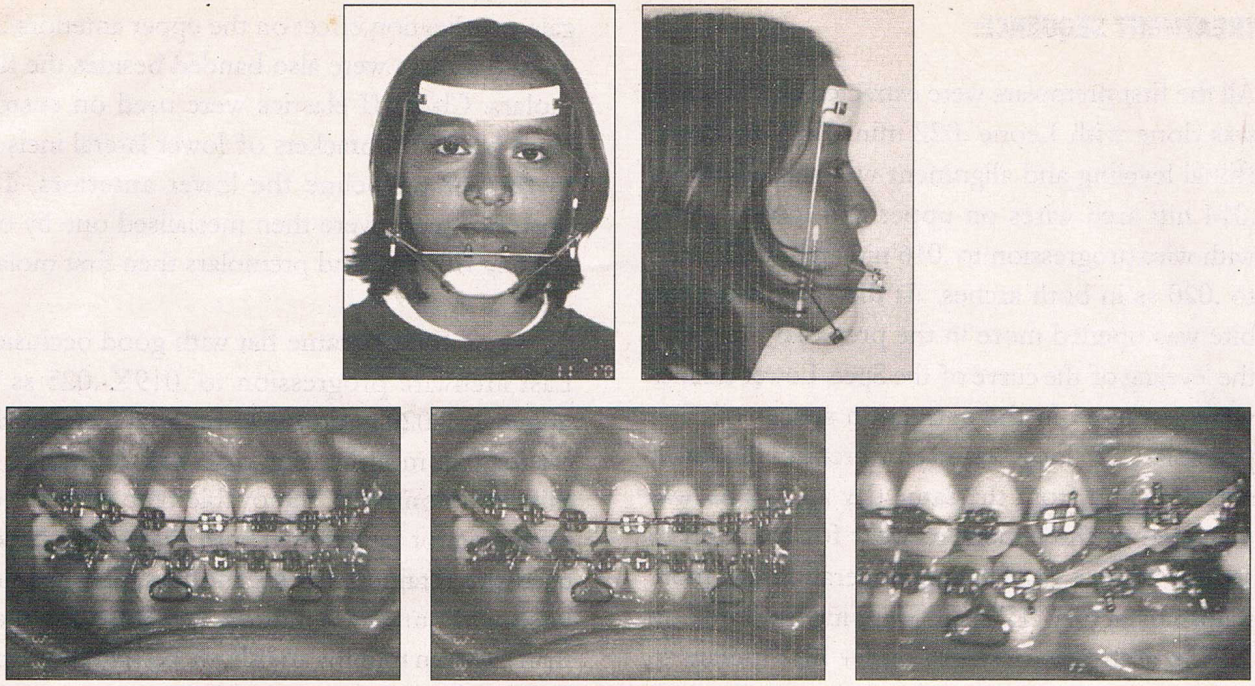

Fig 2.1 – 2.5 Mid-treatment photographs (15 months)

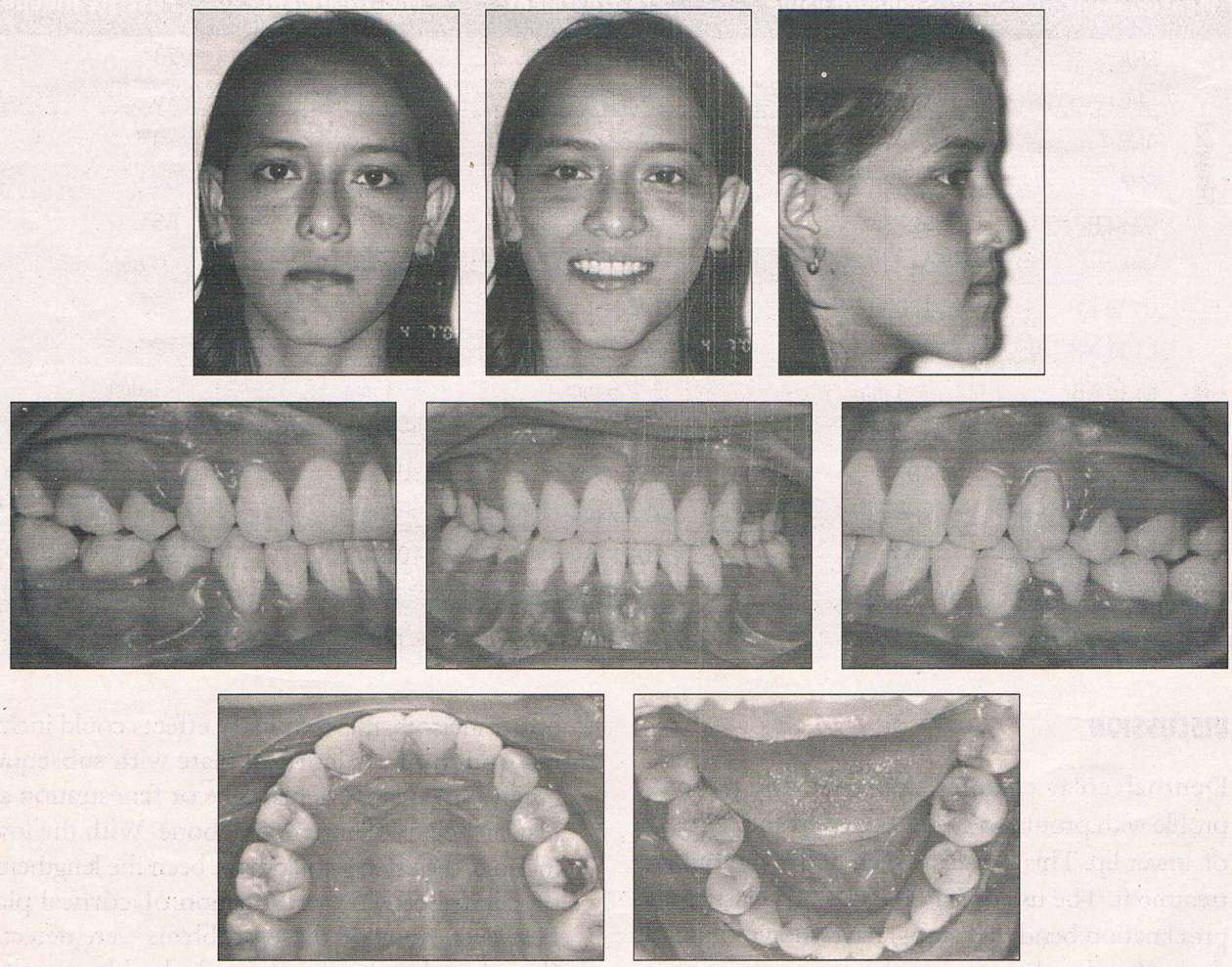

Fig 3.1 – 3.8 Post-treatment photographs at finish

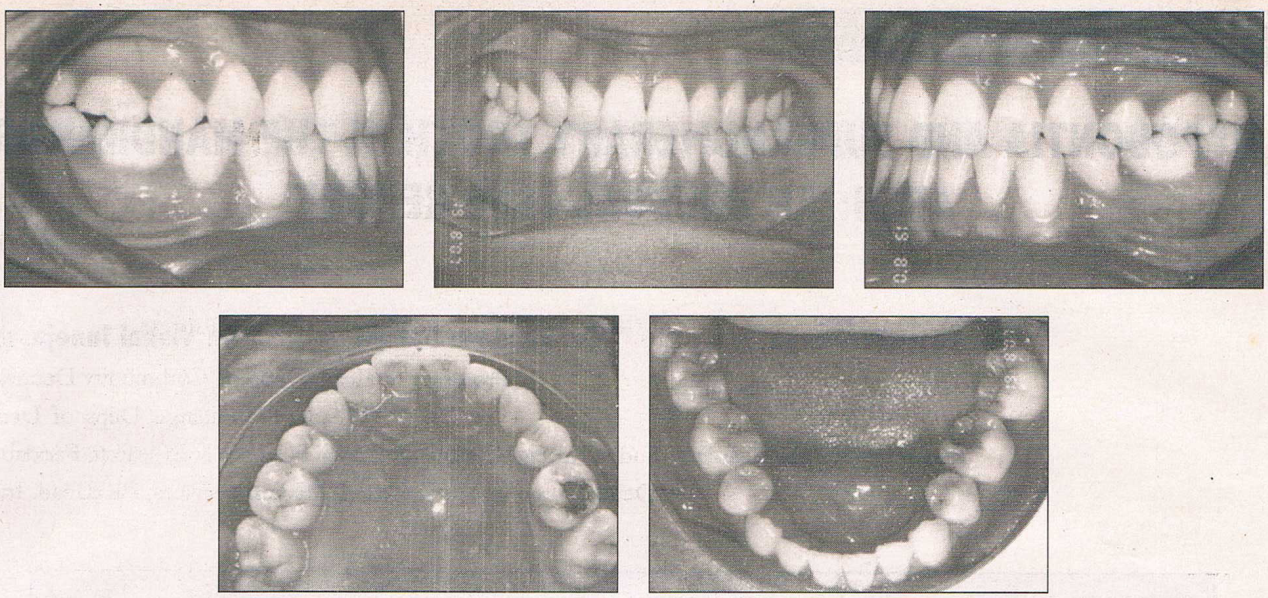

Fig 4.1 – 4.5 Photograph at 25 months post-operative

CONCLUSION

While taking the class III cases and treating with dentoalveolar compensation, the clinician must check carefully the benefit and costs of the choice. As the patient denied surgery, if the benefits weigh more than the cost of the choice, this approach may be chosen. Otherwise, it would be better not to indulge in heroic orthodontic treatment in which satisfactory result cannot be predicted. RPHG, class III elastics, banding the 7's and proclination bent (U stops) manipulation served to provide a stable dentoalveolar response in this patient. This non-surgical orthodontic treatment is very viable in a country like ours where patient are reluctant for surgical interventions and cannot bear the cost of surgical and orthodontic treatment. Despite the limitations of this treatment, the patient's chief concerns were addressed and treated to her satisfaction. Off course, it could not have been successful without the patient's cooperation and compliance. There is no indication of a relapse and shows a stable result.

ACKNOWLEDGEMENT:

I would like to thank Dr. Shambhu Man Singh and Dr. Prashanta Shrestha for the guidance in preparing this case report. I would also like to thank Dr. Suhit Adhikari and Dr. Malcom Deall for the continuous support in the upliftment of my knowledge.

REFERENCES:

1. McNamara JA Jr. A method of cephalometric evaluation. *Am J Orthod* 1984;86:449-69
2. Fukui T, Tsuruta M. Invisible treatment of a Class III female adult patient with severe crowding and cross bite. *J Orthod* 2002;29:267-75
3. Hong R, Ahn J, Soh B. Correction of anterior crossbite with a combination technique. *J Clin Orthod* 1998;32:557-61
4. Dwyer P. Orthodontic and Orthognathic surgical correction of a severe class III malocclusion *Am J Orthod* 1998;113:125-32
5. Frank C. The non surgical orthodontic correction of a Class III malocclusion. *Am J Orthod* 1993;103:107-14
6. KKK.Lew. Soft tissue profile changes following orthodontic treatment of Chinese adult with Class III malocclusion. *International Journal of Orthodontics and Orhtognathic Surgery* 1990;volume 5 number 1
7. Lin Jiuxiang, A cephalometric evaluation of hard and soft tissue changes during class III traction. *European Journal of Orthodontics* 1985;7:201-204
8. James R.Miller. A dental ClassIII malocclusion treated to a full-cusp Class II molar relationship.*Am J Orthod* 1190;97:10-9
9. Lew K. Soft tissue profile changes following orthodontic treatment of Chinese adults with calss III malocclusion. *Int J Adult Orthod Orthognath Surg* 1990;5:59-65
10. Wehrbein H, Bauer W,Diedrich P. Mandibular incisors, alveolar bone and symphysis after orthodontic treatment: a retrospective study. *Am J Orthod* 1996;110:239-46
11. Wainwright W. Faciolingual tooth movement: its influence on the root and cortical plate. *Am J Orthod* 1973;64:278-302
12. Bauru, S.Paulo. Extreme dentoalveolar compensation in the treatment of Class III malocclusion. *Am J Orhtod* 2005;128:787-94