

Importance of Diagnosis in Selection of Orthodontic Treatment Mechanics: A Case Report

Dr. Santosh Shukla¹, Dr. Harshkumar Mandan²

¹ Senior Lecturer, Awadh Dental College And Hospital, Jamshedpur, Jharkhand.

² Senior Lecturer, Faculty Of Dental Sciences, Dharamsinh Desai University, Nadiad, Gujarat.

Abstract: *The Importance of diagnosis in orthodontics cannot be over-emphasized. Based on the correct diagnosis, a proper treatment and the prognosis of the case have to be formulated. This case report presents a case in which the skeletal and dentoalveolar relation is Class III and based on this diagnosis, the treatment plan consisted firstly to achieve the harmony between the skeletal and dentoalveolar relation and then later on correcting the tooth size arch length discrepancy with extractions in both the arches to achieve a good harmonious end result. Thus the decision of balanced extractions was made after achieving balanced skeletal jaw base relation.*

Keywords: *Corrective Orthodontics. Diagnosis. Tooth extraction. Orthodontic treatment planning.*

I. Introduction

From the early days of orthodontics, there is an ongoing debate regarding tooth extractions for orthodontic treatment. Angle favored non extraction mode of orthodontic treatment and emphasized on positioning all 32 teeth in their correct position in the dental arches. However, Calvin Case opposed Angle's non extraction protocol for orthodontic treatment and advocated tooth extractions in some cases. Also, Tweed, who was one of the brightest students of Angle, started practicing orthodontic treatments without extractions, but with more and more clinical experience he soon realized his folly and started extracting teeth for the purpose of orthodontic treatment. This dichotomy about whether to extract or not, still remains to this day. The diagnosis of some malocclusion can be ambiguous in terms of need of extractions. The diagnosis of cases which definitely require extraction or definitely do not require extractions are easy but to assess the need of extractions in borderline cases still remains a challenge.

This states the importance of a proper diagnosis and formulating a treatment plan with objectives of treatment based on correct and objective diagnosis. Furthermore, the concept of extractions based on the skeletal jaw base relation is also very important to understand. This helps to achieve a good harmonious and stable result. In this case report, we will discuss some points, which must be carefully considered in deciding whether or not to perform extractions in orthodontic treatment planning. Deciding on extraction involves more than just the need to obtain space in the arches, be it designed to align teeth or retract anterior teeth and thereby obtaining an esthetically pleasing profile.

II. Case Findings

A male patient aged 14 years reported with the chief complaint of lower jaw being forwardly placed. On examination it was found that the face was leptoprosopic with a concave facial profile. The upper lip was retrusive and lower lip was protrusive. Intraorally, a full complement of permanent dentition except all the third molars was present. The molar relation on right side was Class III (Angle) and on left side was Class I (Angle). Upper incisors were in crossbite relation. The upper left canine was high labially placed. Tongue size was normal and palatal contour was also normal. (Fig. 1 to Fig. 8)



Fig.1



Fig.2



Fig.3



Fig.4



Fig.5



Fig.6



Fig.7



Fig.8

Cephalometric Findings showed that the patient had mild Skeletal Class III jaw bases. The upper and the lower incisors were proclined. The growth pattern was average. (Fig. 9 & Fig. 10)



Fig.9



Fig.10

Model Analysis showed a space discrepancy in both the maxillary and mandibular arches. Bolton's analysis suggested that both the overall and anterior ratios were in normal range.

Treatment Progress:

Initially a Rapid maxillary expansion appliance was fabricated from HYRAX expander along with acrylic cap splints. The rapid maxillary expansion was done for period of 14 days and transverse expansion of 11 mm was achieved(Fig. 11 to Fig. 15).



Fig.11



Fig.12

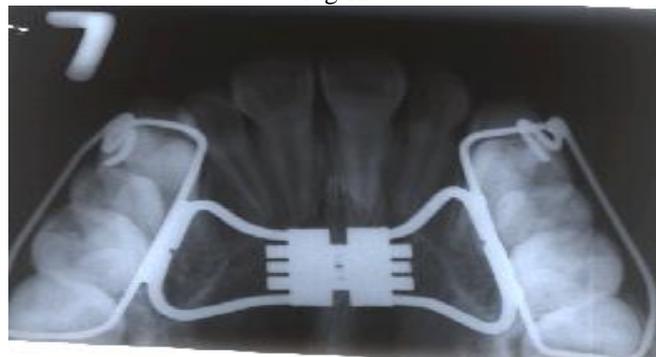


Fig.13



Fig.14

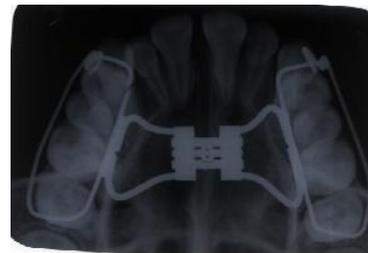


Fig.15

The HYRAX was then sealed and face mask therapy was started using PETIT type of face mask with 3/16" elastics which generated 500 gms of force. (Fig. 16 & Fig. 17)

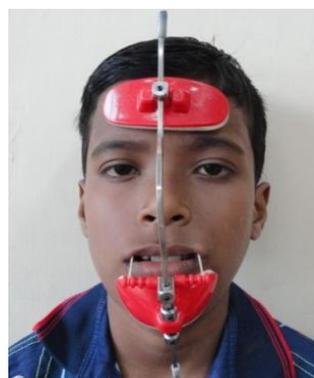


Fig.16

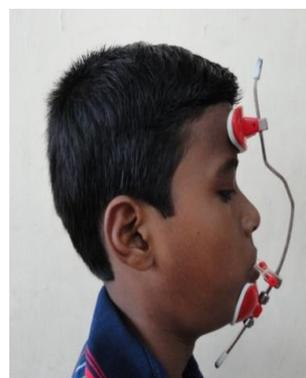


Fig.17

After the facemask therapy, all the first premolars were extracted to gain space in the arch. Also fixed mechanotherapy with the straight wire appliance of 0.022" slot MBT prescription was started.

Gradually the wire sequencing was done to achieve levelling and alignment. The residual extraction space was closed with sliding mechanics using NiTi closed coil springs. The total time duration for fixed mechanotherapy was 18 months.(Fig. 18 to Fig.25)



Fig.18



Fig.19



Fig.20



Fig.21

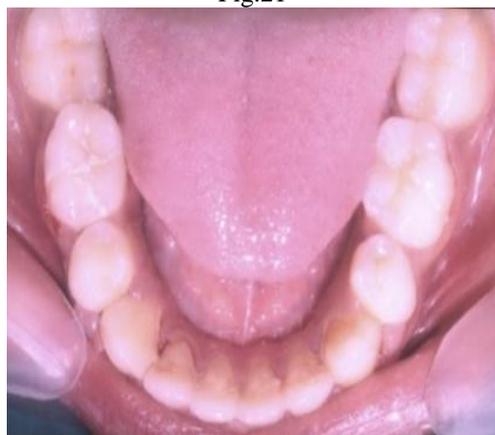


Fig.22



Fig.23



Fig.24



Fig.25

Results: (Fig. 26 & Fig. 27)



Fig.26



Fig.27

TABLE 1

PARAMETER	PRE TREATMENT	POST TREATMENT
SNA	83°	86°
SNB	83°	84°
ANB	0°	2°
Wits Appraisal	- 2.5 mm	+ 1 mm
FACIAL ANGLE	91°	89°
ANGLE OF CONVEXITY	0°	3°
Y-AXIS	58°	60°
SN-GoGn	31°	32°
Jarabak's Ratio	62.83%	64.22%
Upper incisor – NA	32° / 7 mm	25°/5 mm
Lower incisor – NB	34° / 8.5 mm	20°/ 7 mm
Upper incisor – Lower incisor	110°	130°

III. Discussion

As seen in the pretreatment cephalometric findings, the maxilla and mandible were in Class III jaw relation (ANB = 0°, Angle of convexity = 0°, Wits Appraisal = -2.5 mm). The Growth pattern was average (Y-Axis = 58°, SN-GoGn = 31°, Jarabak's ratio = 62.83%). The upper incisors were proclined (Upper incisor to NA = 32°/7mm) and the lower incisors were proclined(lower incisor to NB = 34°/8.5mm). Also the upper incisor to lower incisor angle was reduced (110°).

Also from the study model analysis, it was seen that there is a space discrepancy of 8 mm in both the maxillary and mandibular arches. Bolton's analysis suggested that overall and anterior ratio show mandibular tooth material excess by 1 mm and 0.4 mm respectively. So the diagnosis of mild skeletal and dentoalveolar Class III malocclusion was made.

The space discrepancy in both the arches dictated extraction of first premolars in both the arches. However the maxillary dentition was already in retroposition in relation with the mandibular dentition. Hence extraction of the upper premolars would have led to further arch collapse in the maxilla and it would have been difficult to achieve a normal Class I dentoalveolar relation.

Henceforth it was decided that before proceeding with extractions, first the upper dentition must be brought in normal anterior position in relation to the lower dentition. To achieve this treatment objective, Rapid maxillary expansion with facemask therapy was done. Thus the anterior Crossbite was corrected. Now the malocclusion is converted into skeletal and dentoalveolar Class I malocclusion.

Now, both the upper and lower first premolars were extracted to gain space. The space obtained was utilized with fixed mechanotherapy with straight wire technique with 0.022” of MBT prescription.

The main advantage of this treatment protocol was that the previous skeletal and dentoalveolar class III malocclusion is converted into class I malocclusion so that balancing extractions could be carried out thus helping to achieve good stable occlusion with balanced musculature and a pleasing profile.

IV. Conclusion

In this case, the treatment protocol followed illustrates the importance of correct diagnosis and treatment planning. In this case, first the skeletal and dentoalveolar relation of the upper and lower jaw is corrected to facilitate further treatment by balanced extractions. This way a Class I occlusion with harmonious soft tissue profile is achieved.

References

- [1]. Williams MD, Sarver DM, Sadowsky PL, Bradley E. Semin Orthod. 1997 Dec;3(4):265-74 Combined rapid maxillary expansion and protraction facemask in the treatment of Class III malocclusions in growing children: a prospective long-term study.
- [2]. Daniella Torres Tagawa; Carolina Loyo Sérvulo da Cunha Bertoni; Maria Angélica Estrada Mari; Milton Redivo Junior; Luís Antônio de Arruda Aida Dental Press J. Orthod. vol.17 no.3 Maringá May/June 2012
- [3]. Orthopedic treatment of Class III malocclusion with rapid maxillary expansion combined with a face mask: a cephalometric assessment of craniofacial growth patterns.
- [4]. Baccetti T, McGill JS, Franchi L, McNamara JA Jr, Tollaro I. Skeletal effects of early treatment of Class III malocclusion with maxillary expansion and facemask therapy. Am J Orthod Dentofacial Orthop. 1998 Mar;113(3):333-43.
- [5]. Gallagher RW, Miranda F, Buschang PH. Maxillary protraction: treatment and posttreatment effects. Am J Orthod Dentofacial Orthop. 1998 Jun;113(6):612-9.
- [6]. Haas AJ. Rapid expansion of the maxillary dental arch and nasal cavity by opening the midpalatal suture. Angle Orthod. 1961;31:73-90.
- [7]. Kim JH, Viana MA, Graber TM, Omerza FF, BeGole EA. The effectiveness of protraction face mask therapy: a meta-analysis. Am J Orthod Dentofacial Orthop. 1999 Jun;115(6):675-85
- [8]. McNamara JA Jr. An orthopedic approach to the treatment of Class III malocclusion in young patients. J Clin Orthod. 1987 Sep;21(9):598-608.
- [9]. Westwood PV, McNamara JA Jr, Baccetti T, Franchi L, Sarver DM. Long-term effects of Class III treatment with rapid maxillary expansion and facemask therapy followed by fixed appliances. Am J Orthod Dentofacial Orthop. 2003 Mar;123(3):306-20