Case Report

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ORTHODONTIC CORRECTION OF AN AESTHETICALLY COMPROMISED ANGLE'S CLASS I MALOCCLUSION

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ABSTRACT:

Treatment of Angle's Class I malocclusion with its varied manifestations presents us with different situations for which we have to formulate a treatment plan tailor-made to the particular patient. This particular patient presents us with severe proclination and spacing of upper anteriors which had affected her profile and lip competence considerably. Treatment goal was attained by restoring normal overjet and overbite thus improving not only the function but also enhancing her profile which was her major concern at the start of treatment.

Key words: Angle's Class I malocclusion, Proclination, Lip trap swallow, Incisor Classification.

INTRODUCTION:

The demand for facial aesthetics during treatment is an increasing concern for patients. There is a paradigm shift from occlusion to esthetics in orthodontics. A specific treatment plan is required for each patient and since a Class I malocclusion can have different manifestations, a definitive protocol is difficult to establish. This case report illustrates a thirteen year old with severe upper anterior proclination who gains good facial esthetics and muscle balance because of timely treatment.

CASE DETAIL:

A 13-year-old female patient with no relevant medical history was referred for orthodontic treatment. The patient's chief concern was the severe proclination of her upper anteriors with a retrusive lower lip as well as increased overjet. (Figures 1&2)

Extraoral examination revealed a Class I skeletal relation with severe maxillary

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incisor proclination, convex profile, average mandibular plane angle, protruded upper lips, incompetent lips, increased overjet and overbite. An important feature of this malocclusion was the presence of abnormal muscle activity. The upper lip was hypotonic and failed to form a lip seal. The lower lip cushions the palatal aspect of the upper teeth, a feature referred to as 'lip trap'.

Intraorally, the patient had Angle's Class I molar relation on both sides, end-on canine relation on the right side and Class I canine relation on the left side. There was severe proclination of upper incisors with a resultant increase in overjet of 11mm. A deep incisor overbite was present in the anterior region (Figures 3, 4). The patient's dental health was good. According to the British Standards Institute Classification (1983), this patient comes under the category of Class II Division1 incisor classification thus reinforcing the paradigm shift which focuses more on aesthetics than occlusion.

Panoramic radiograph examination confirmed the presence of all the permanent teeth with the third molars unerupted (Figure 5). The Class I skeletal pattern and severe proclination of the upper incisors were reconfirmed by cephalometric analysis (Figure 6). The soft-tissue outline confirmed the impaired facial aesthetics and a lower lip trap swallow.

Treatment objectives:

1. Reduce the severe proclination.
2. To reduce the deep overbite and improve the interincisal angle
3. Reduce the overjet
4. Achieve Class I canine relation with good anterior guidance
5. Maintain Class I molar relation
6. Improve the facial esthetics with a more balanced lower lip.

Diagnostic records included a detailed history, clinical examination, study models, radiographs (Orthopantomogram and a Lateral Cephalogram) as well as standard extraoral and intraoral photographs.

Treatment Plan:

As there is no antero-posterior arch discrepancy in Class I malocclusion, the treatment usually involves correction of local irregularities.[1] Because of the patient's age and labial segment proclination and spacing, it was agreed that non-extraction therapy with 0.022'' slot preadjusted edgewise appliance was more appropriate in this case. Orthodontic appliance prescription and bracket positioning techniques are of paramount importance in ensuring a successful orthodontic treatment.[2] The orthodontic appliance used in the present case was 'Synergy® R'RMO®'s SWLF (Straight Wire Low Friction) bracket.

Treatment Progress:

'Synergy® R' RMO®'s SWLF (Straight Wire Low Friction) brackets were bonded to all teeth in the upper and lower dental

arches. The brackets were positioned vertically according to the MBT recommendations. [2,3,4] For the axial positioning the incisal edges of anterior teeth were used as reference and the inter-marginal ridge lines of premolars and molars for the posterior teeth.[2]

Since the patient had no upper or lower crowding, the initial alignment was performed with 0.014" Copper NiTi (Ormco, Glendora, CA, USA) archwires and subsequently 0.016" x 0.022" Copper NiTi (Ormco, Glendora, CA, USA) archwires were placed in the bracket slots . Leveling was achieved with 0.017" x 0.025" Copper NiTi wires. Spaces were closed using sliding mechanics with E-chain on rectangular 0.017" x 0.025" stainless steel (SS)wires (Figures 7,8).[4] After anterior space closure, the space was brought to the distal of the upper canines and en-masse anterior retraction was done.

Following space closure, passive lace backs were placed using steel ligatures extending from first molar to first molar for a period of two months to maintain the space closure.

During the detailing and finishing phase, rectangular 0.019" x 0.025" SS wires were used. The space closure was maintained during this phase of treatment with passive lace backs placed under the arch wire from first molar to first molar.

Fourteen months after commencement of treatment, the appliance was debonded after ensuring a perfect intercuspation of the teeth and good functional movements (Figures 9,10). At this stage, a canine to canine lingual retainer was bonded to the upper arch and a Hawley's retainer was placed in the lower dental arch. The Hawley's retainer was prescribed for a period of six months full time and a further six months night time wear. The upper canine to canine lingual retainer will be kept in place for a period of two years.

Treatment Results:

The final result showed that the treatment attained all functional and aesthetic goals (Figures 11,12). Patient was extremely satisfied with the treatment outcome. The radiographic evaluation confirmed the reduction of the upper incisor proclination improving the facial profile substantially (Figures 13,14).Treatment goal was attained by restoring normal overjet and overbite thus improving not only the function but also enhancing her profile which was her major concern at the start of treatment

DISCUSSION:

Malocclusion is a condition reflecting an expression of normal biologic variability. The greater the deviation from the accepted ideal or normal occlusion as classified by Angle, the more severe the expression of the malocclusion.[1] Heredity and familial characteristics of facial pattern contribute significantly to skeletodental development. However, other influences may affect the proportionality of the facial skeleton and position of the teeth. A specific cause can

usually only be identified in less than 5% of malocclusions regardless of its severity because the development of the dentition and craniofacial skeleton are the result of an interaction of genetic and environmental factors.[5]

Important features of Angle's Class I malocclusion include normal molar relation with deviations from the line of occlusion in antero - posterior, vertical and transverse planes.[1] Dewey's modification to Angle's Class I malocclusion was introduced in 1915 segregating Class I to five types and Class III to three types. Angle's Class I Type 2 Dewey's modification represents Angle's Class I malocclusion with proclined maxillary incisors as is seen in this patient.

The primary concern of patients today is facial aesthetics. In the present case, there was severe proclination and spacing of the upper anteriors which had affected the facial aesthetics as well as muscle balance causing a lip trap swallow. Since the focus of orthodontic treatment has shifted to aesthetics, a more apt classification may be the incisor classification according to the British Standards Institute Classification (1983). This case then becomes a Class II Div 1 incisor classification which then gives us a definite problem list for the specific corrections needed to be done.

'Synergy® R' RMO®'s SWLF (Straight Wire Low Friction) brackets were bonded to the teeth. The advantages of the preadjusted edgewise appliance are its ability to move teeth effectively in all three planes of space, to move teeth bodily, and to torque teeth in the buccolingual plane.[4] For these reasons, the preadjusted edgewise appliance, if properly placed and adjusted, can produce the finest and most stable finished occlusion.In the present case,adequate retroclination of the upper incisors was achieved as is evidenced by the post treatment cephalogram as well as photographs. The patient had an improved smile. Class I molar & canine relation was achieved bilaterally and the lower lip exhibited normal position in relation to E-plane.

The relationship between lip retraction and anterior incisor movement relies on complex multifactorial relationships that depend on lip strain and thickness, dentofacial morphology, and ethnicity and sex.[6,7] Previous studies of lip movement after retraction of anterior teeth showed that upper lip retraction correlated strongest with horizontal retraction of the maxillary incisor, followed by vertical movement of the mandibular incisor.[6,7] Our measurements of this patient yielded similar results, indicating a strong correlation of upper lip retraction with maxillary incisor retraction.

Clinical Significance: The demand for facial aesthetics during treatment is an increasing concern for patients. A specific treatment plan is required for each patient and since a Class I malocclusion can have different manifestations between the patients, a definitive protocol is difficult to be established. To successfully treat patients with these malocclusions, the clinician must have a thorough understanding of the diagnostic

and treatment planning criteria. In addition, the clinician must have acquired the skills needed to successfully design and manipulate the appliances used in treatment and retention.

CONCLUSION:

Severe proclination is a common clinical occurrence requiring careful treatment planning and equally careful execution of treatment. The treatment results show the drastic improvement in appearance because of the correction of malocclusion during the growing period which enabled remodelling of facial appearance.

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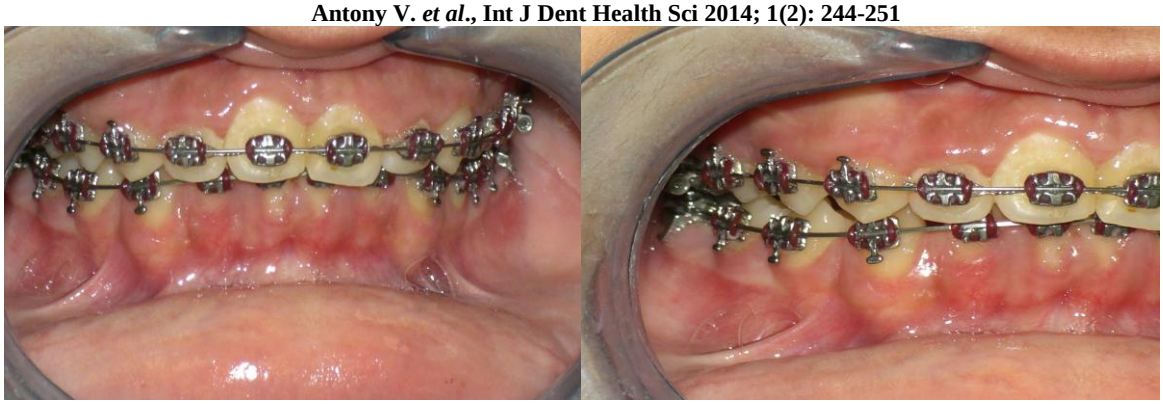
FIGURES:

Figure 1 ,2 : Pre-treatment extraoral photographs

Figures 3, 4: Pre-treatment intraoral photograph

Figure 5: Pre-treatment panoramic radiograph

Figure 6: Pre-treatment cephalometric radiograph



Figures 7,8: Intra-oral views showing rectangular 0.017" x 0.025" stainless steel archwires in place during space closure

Figures 9,10: Post-treatment intraoral photographs

Figures 11,12: Post-treatment extraoral photographs

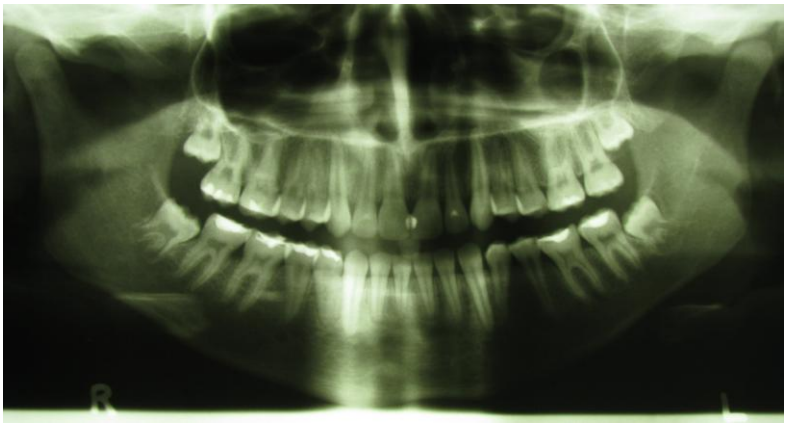


Figure 13: Post-treatment panoramic radiograph

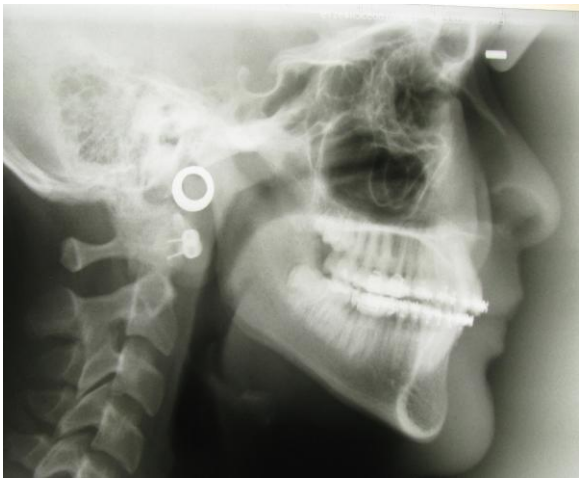


Figure 14: Post-treatment cephalometric radiograph