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Correction of class II div.2 malocclusion using protraction utility arch

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Abstract
Class II division 2 malocclusion is commonly associated with a mild Class II skeletal pattern, but may also occur in association with a Class I or even a Class III dental base relationship. This case describes management of Class II div 2 with deep overbite with intrusion and protraction of maxillary anteriors using Ricketts's utility arch in adult patient with early permanent dentition and extraction of lower incisor was done to relieve anterior crowding which is lingually locked. Good result was achieved.

Keywords: Class II div 2, skeletal pattern, utility arch, incisor extraction

Introduction

Class II type malocclusion is one of the most commonly observed problems in the practice of orthodontics. It is generally explained as the distally placed relation of the mandibular arch in relation to the maxillary arch along with an amalgamation of distinctive components of the dentition and skeleton [1]. This affects not only aesthetics of the face but also the functional status of the patient. The relationship between aesthetics of the face and occlusal relationship sagittally has been constantly researched since Angle's studies wherein the sagittal deviations in occlusion were observed. These produced various in the disharmonies of facial contours of the patient. In 1899, Angle classified sagittal occlusal relationships into three broad categories/classes based mostly on the anteroposterior relationship of the maxillary and mandibular first permanent molars [2]. A class II occlusion, which he further divided into two: 1 division with the protrusion of upper incisors and 2 division with the retrusion of upper incisors [3]. Angle's Class II div 2 malocclusion has a marked horizontal growth pattern with decreased lower facial thirds, palatally inclined upper anteriors, and remarkably increased transverse maxillary arch dimensions1. Lower incisor extraction in orthodontic treatment was very rare modality of orthodontic treatment because there are few patients who meet the standards for such treatment. A Class II dental relationship may be due to any combination of four major factors: (1) maxillary skeletal excess, (2) maxillary dental excess, (3) mandibular skeletal deficiency, and (4) mandibular dental deficiency. The treatment of cases presenting with a Class II Division 2 malocclusion involves two approaches two phases; one of intervention to treat the retroclined incisors and make them proclined and second approach involves providing a single course of comprehensive therapy during early interceptive treatment is always indicated if the overbite is severe. Thus, if patient shows up with a deep impinging overbite, there is no doubt that it is the best time to treat a Class II Division 2 malocclusion [4].

Diagnosis and etiology

A 19-year-old female patient reported to the department with the chief complaint of irregularly placed upper front teeth. Patient had no medical or dental history. No history of trauma associated.

On extra oral examination patient showed bilaterally symmetrical face with straight profile and competent lips.

On intra oral examination patient revealed Class I molar and canine relation with crowding in lower arch. Patient had Proclined upper lateral incisors and Retroclined upper central incisors.

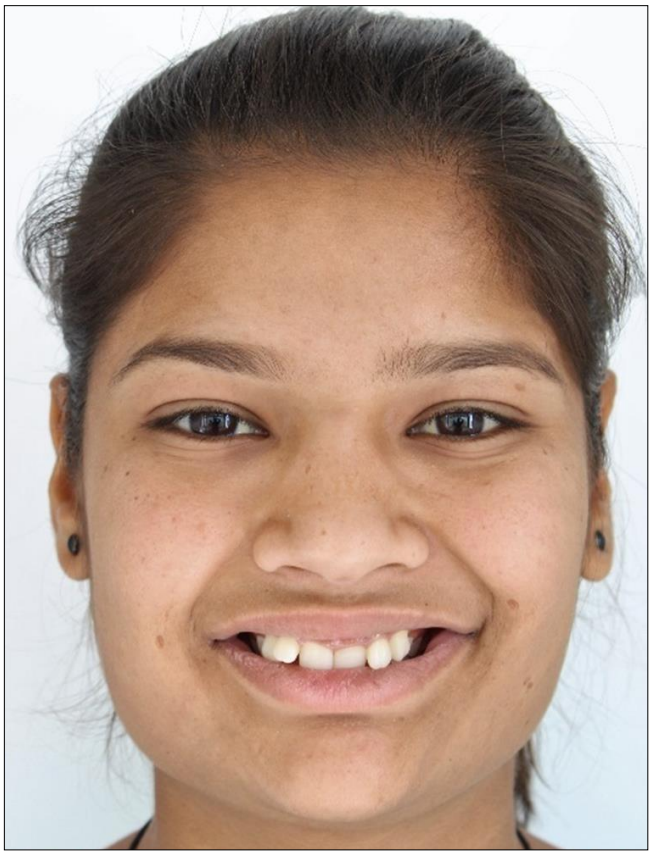

Fig 1: Pre-treatment extra oral

Fig 2: Pre–treatment intra oral

OPG examination revealed missing 18, 28, 38 & 48 with good alveolar support to the teeth.
On lateral cephalometric examination there was skeletal class I relation with normal maxilla & retrognathic and retrusive mandible & hypodivergent jaw bases. On model analysis 2mm of space was required in upper arch and 8mm of space was required in lower arch. (Fig 3)

Fig 3: Pre-treatment radiographs

Treatment objectives
1. To retract upper anteriors
2. To correct crowding in lower anteriors
3. To correct Anterior Deep bite
4. To correct rotation irt 45
5. To achieve balanced soft tissue profile

Treatment plan
1. No extraction treatment plan.
2. Protraction and intrusion utility arch
3. Levelling and alignment of both the arches

Treatment progress
Treatment started with bonding of 0.022”x0.028” pre-adjusted edgewise bracket in the maxillary arch irt 11, 21 with separator placement irt 16, 26. After banding of upper molars was completed a protraction utility arch of 0.016x0.022 arch wire was inserted in the maxillary arch. A trans palatal arch was placed subsequently.

Fig 4: Placement of protraction utility arch

Subsequent activation of protraction utility arch was done every month till the maxillary incisors were upright. After 3 months of placement of protraction utility arch, it was removed and bonding of 0.022”x0.028” pre-adjusted edgewise bracket in the maxillary arch. Initial leveling and alignment started with 0.012” NiTi wire followed by 0.014”, 0.016”, 0.018” NiTi. After 4 months of initial levelling and alignment, anterior bite plate was placed in the upper arch for correction of deep bite. The patient refused to wear the anterior bite plate post which it was removed.
After 9 months of starting the treatment, bonding was done irt lower arch with 0.022”x0.028” pre-adjusted edgewise bracket. Initial leveling and alignment started with 0.012” NiTi wire followed by 0.014”, 0.016”, 0.018” NiTi.

Fig 5: Bonding of lower arch

Space closure was done irt upper arch with 0.018 SS irt upper and lower arch. After the space closure was achieved 1 year and 8 months of starting the treatment, the extraction irt 32 was planned. E-chains were placed irt upper and lower arch and the final space closure was done on 19x25 SS wire. The total treatment duration was of 1 year and 10 months. Debonding was done and fixed lingual retainers from canine to canine were bonded and the patient was given Begg’s wrap around retainer for retention phase.

Fig 6: Post treatment intraoral photos

Discussion

Class II division 2 malocclusion is commonly associated with a mild Class II skeletal pattern, but may also occur in association with a Class I or even a Class III dental base relationship. Where the skeletal pattern is more markedly Class II the upper incisors usually lie outside the control of the lower lip, resulting in a Class II divion 1 relationship, but where the lower lip line is high relative to the upper incisors a Class II division 2 malocclusion can result. The vertical dimension is also important in the aetiology of Class II division 2 malocclusions, and typically is reduced. A reduced lower face height occurring in conjunction with a Class II jaw relationship often results in the absence of an occlusal stop to the lower incisors, which then continue to erupt leading to an increased overbite. Mandibular incisor extraction for orthodontic treatment is considered an unusual treatment option because of the limited number of patients that meet the criteria for such treatment. Traditionally, lower incisor extraction was usually used for an ectopically placed incisor or an incisor having poor prognosis. However, in today's spectrum of treatment options available, single incisor extraction when done on carefully selected cases, will help to obtain optimum results with usage of simple treatment mechanics [5, 6]. Cases generally considered for lower single incisor extraction treatment modality include:

- mild to moderate overjet & overbite,
- pleasant soft tissue profile
- a Bolton's discrepancy with mandibular tooth material excess
- Minimum amount of growth remaining [7, 8].
- Class III cases with anterior cross bite or an edge to-edge incisor relationship.

This treatment option decreases treatment time & also provide stable results as arch expansion is not required and inter-canine width is minimally changed [9, 10].

Conclusion

There may be a short-term aesthetic inconvenience of the extraction space which should be informed & discussed to the patient before treatment. Post treatment, the maxillary midline occludes with the centre of the remaining mandibular central incisor, but this is does not hamper aesthetics or function. A common side effect of this incisor extraction is formation of black triangles or open gingival embrasures.

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