

Case Report

“Management of Reverse Overjet and Overbite in an Adult Patient with Angle’s Class III Malocclusion and a Horizontal Growth Pattern” – A Case Report On Non-Surgical Orthodontic Camouflage

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Abstract: This case report is of a 26 year old male patient who presented with unaesthetic appearing irregularly placed teeth in both maxillary and mandibular arch with a reverse overjet and overbite, non-coincident dental midlines, a non-consonant smile arc and Class III pattern both skeletally and dentally. This case was corrected non surgically merely by employing simple mechanics with the help of Fixed Orthodontic Mechanotherapy without extraction of premolars by expansion and proximal stripping of teeth. The case ended in a Class I Molar and canine relationship bilaterally. The case report emphasizes on the non-extraction protocol despite various problems the patient presented with such as reverse overjet and overbite and an unaesthetic smile. Following fixed orthodontic treatment, marked improvement in patient's smile was achieved and there was a remarkable increase in the patient's confidence and quality of life the profile changes and treatment results were demonstrated with proper case selection and good patient cooperation with fixed appliance therapy. The patient was extremely satisfied with the results at the end of treatment.

Keywords: Reverse Overjet and Overbite, Angles Class III Malocclusion, Horizontal growth pattern, unaesthetic smile, Proximal stripping, Class III malocclusion, Occlusal Rehabilitation, Non consonant smile arc, Orthodontic treatment, Fixed Orthodontic mechanotherapy, Non-surgical Orthodontic camouflage.

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INTRODUCTION

Facial Esthetics has been in increasing demand in today's century. Nowadays, patients with the slightest misalignment of teeth demand Orthodontic treatment to get it corrected and improve their smile and facial profile. Fixed Appliance treatment can significantly alter and improve facial appearance in addition to correcting irregularity of the teeth[1]. The number of adults seeking orthodontic treatment has increased significantly [1,19, 26]. In Today's times,

Fixed Appliance treatment can significantly alter and improve facial appearance in addition to correcting irregularity of the teeth. Class III malocclusion is the 3rd most prevalent after Class I and Class II malocclusion [2-3, 14-15]. Over the last few decades, there has been an increase in the awareness about orthodontic treatment which has led to more and more adults demanding high quality treatment in the shortest possible time with increased efficiency and reduced costs [4, 16-18]. There are many ways to treat Class III

malocclusions, according to the characteristics associated with the problem, such as anteroposterior discrepancy, age, and patient compliance [5, 6, 20]. The indications for extractions in orthodontic practice have historically been controversial [7-9, 21]. On the other hand, correction of Class III malocclusions in growing patients, with subsequent dental camouflage to mask the skeletal discrepancy, can involve either retraction by non-extraction means simply by utilizing the available spaces or by extractions of premolars [10-11]. Lack of crowding or cephalometric discrepancy in the mandibular arch is an indication of 2 premolar extraction [12- 13, 22-25]. Fortunately, in some instances satisfactory results with an exceptional degree of correction can be achieved without extraction of permanent premolars. This case presents the correction of a Class III malocclusion in an adult male patient with reverse overjet and overbite, by non-extraction of premolars, simply by executing the procedure of arch expansion and proximal stripping. The Non-extraction protocol shown in this case is indicative of how an unesthetic non consonant smile can be converted into a more aesthetic and pleasing one by routine fixed Orthodontic treatment without the need for extracting premolars.

CASE REPORT

Extra-oral examination

A 26 year old adult male patient presented with the chief complaint of irregularly placed upper and lower front teeth with reduced show of upper front teeth. On Extraoral examination, the patient had an orthognathic facial profile, grossly symmetrical face on both sides with competent lips ,shallow mentolabial sulcus, decreased lip strain, retruded upper lip, decreased labial fullness and an obtuse Nasolabial Angle, a Leptoprosopic facial form, Dolicocephalic head form, average width of nose and mouth, increased buccal corridor space and a non- consonant flat smile arc. The patient had no relevant prenatal, natal, postnatal history, history of habits or a family history. On Smiling, there was reduced show of maxillary anterior teeth and presence of an unaesthetic appearance and smile. The patient was very dissatisfied with his smile.



Pretreatment extra oral photographs

Intra-oral examination

Intraoral examination on frontal view showed presence of reverse overjet and overbite with crossbite

present in the anterior region. There was presence of lower dental midline shift to the patients left by 1.5mm. On lateral view the patient showed presence of a Class III incisor relationship, a Class I Canine relationship bilaterally, a Class I molar relationship on the right side and a Class III molar relationship on the left side. Occlusal view showed presence of mild crowding in the maxillary and mandibular anterior region. The upper and lower arch showed the presence of a “U” shaped arch form.



Pretreatment intra oral photographs

Pretreatment cephalometric readings

| PARAMETERS | PRE- TREATMENT |
|------------------|----------------|
| SNA | 79° |
| SNB | 80° |
| ANB | -1° |
| WITS | -1mm |
| MAX. LENGTH | 74mm |
| MAN. LENGTH | 99mm |
| IMPA | 96° |
| NASOLABIAL ANGLE | 101° |
| U1 TO NA DEGREES | 21° |
| U1 TO NA mm | -1mm |
| L1 TO NB DEGREES | 23° |
| L1 TO NB mm | 1mm |
| U1/L1 ANGLE | 136° |
| FMA | 24° |
| Y AXIS | 63° |

Diagnosis

This 26 year old male patient was diagnosed with a Class III malocclusion on a Class III skeletal base with a retrognathic maxilla with an average mandible and a horizontal growth pattern, reverse overjet and overbite, mild maxillary and mandibular anterior crowding, crossbite in the anterior region, retruded upper lip, increased buccal corridor space and a non- consonant flat smile arc

List of problems

1. Retrognathic maxilla
2. Reverse overjet and overbite

3. Class III malocclusion
4. Crossbite in anterior region
5. Mild maxillary and mandibular anterior crowding
6. Increased buccal corridor space
7. Non-consonant smile arc

Treatment objectives

1. To correct maxillary retrognathism
2. To achieve ideal positive overjet and overbite
3. To correct crossbite in anterior region
4. To correct maxillary and mandibular anterior crowding
5. To reduce the unaesthetic buccal corridor spaces
6. To achieve a Class I Incisor and molar relationship
7. To achieve a pleasing smile and a pleasing profile

Treatment plan

- Fixed appliance therapy with MBT 0.022 inch bracket slot
- Initial leveling and alignment with 0.012”, 0.014”, 0.016”, 0.018”, 0.020” Niti archwires following sequence A of MBT
- Arch expansion in maxillary and mandibular arch with heavy 0.019” x 0.025” rectangular stainless steel expanded archwires
- Bite turbos on mandibular molars until correction of anterior crossbite and reverse overjet and overbite
- Proximal stripping in upper and lower anterior region
- Final finishing and detailing with 0.014” round stainless steel wires
- Retention by means of Hawleys’s retainers along with lingual bonded retainers in the upper and lower arch.

Treatment progress

Complete bonding & banding in both maxillary and mandibular arch done, using MBT-0.022X0.028”slot. Initially a 0.012” NiTi wire was used which was followed by 0.014 , 0.016”, 0.018”, 0.020” Niti archwires following sequence A of MBT. After 6 months of alignment and leveling NiTi round wires were discontinued. Use of 0.019” x 0.025” rectangular NiTi followed by 0.019” x 0.025” rectangular stainless steel wires was done followed by which the rectangular stainless steel wires were expanded manually both in upper and lower arch and replaced in the bracket slot for the purpose of arch expansion and broadening of both the dental arches. Hence the space required was gained by this method and the residual space was obtained by proximal stripping in the upper and lower anterior region. Class III Elastics were given to correct the incisor relationship and molar relationship bilaterally. Crossbite in the anterior region was corrected by using cross elastics. Bite Turbos were given on mandibular 1st molars bilaterally for opening of bite until the crossbite, reverse overjet and overbite was corrected. Finally light settling elastics were given

with rectangular steel wires in lower arch and 0.012” light NiTi wire in upper arch for settling , finishing, detailing and proper intercuspation. Class I incisor, canine and molar relationship was achieved and an ideal occlusion was obtained at the end of the fixed appliance therapy. The smile of the patient improved significantly from being non consonant and flat to more consonant and pleasing.

Post treatment cephalometric readings

| PARAMETERS | POST-TREATMENT |
|------------------|----------------|
| SNA | 81° |
| SNB | 80° |
| ANB | 1° |
| WITS | 0mm |
| MAX. LENGTH | 76mm |
| MAN. LENGTH | 97mm |
| IMPA | 98° |
| NASOLABIAL ANGLE | 98° |
| U1 TO NA DEGREES | 26° |
| U1 TO NA mm | 2mm |
| L1 TO NB DEGREES | 25° |
| L1 TO NB mm | 2mm |
| U1/L1 ANGLE | 133° |
| FMA | 24° |
| Y AXIS | 64° |



Post treatment extra oral photographs



Post treatment intra oral photographs

DISCUSSION

Treatment of a Class III malocclusion with reverse overjet and overbite is challenging. A well-chosen individualized treatment plan, undertaken with sound biomechanical principles and appropriate control of orthodontic mechanics to execute the plan is the surest way to achieve predictable results with minimal side effects. Class III malocclusion might have any number of a combination of the skeletal and dental components. Hence, identifying and understanding the etiology and expression of Class III malocclusion and identifying differential diagnosis is helpful for its correction. The patient's chief complaint was irregularly placed upper and lower front teeth with reduced show of upper front teeth. The selection of orthodontic fixed appliances is dependent upon several factors which can be categorized into patient factors, such as age and compliance, and clinical factors, such as preference/familiarity and laboratory facilities. The execution of only fixed appliance therapy appropriately resulted in an improvement in the patient's profile in this case. The most important point to be highlighted here is the use of Class III Elastics. Class III Elastics played a pivotal role in this case for drastically bringing improvement not only in the correction of the incisor and molar relationship, but also very efficiently improving the patients profile changing it to more orthognathic at the end of the treatment. There was improvement in occlusion, smile arc, profile, upper incisor inclination and position of chin. Successful results were obtained after the fixed MBT appliance therapy within a stipulated period of time. The overall treatment time was 17 months. After this active treatment phase, the profile of this 26 year old male patient improved significantly as seen in the post treatment Extra-oral photographs. The patient was extremely satisfied with the results at the end of treatment. Removable Hawley's retainers were then delivered to the patient along with fixed lingual bonded retainers in upper and lower arch.

Comparison of pre and post treatment cephalometric readings

| PARAMETERS | PRE-TREATMENT | POST-TREATMENT |
|------------------|---------------|----------------|
| SNA | 79° | 81° |
| SNB | 80° | 80° |
| ANB | -1° | 1° |
| WITS | -1mm | 0mm |
| MAX. LENGTH | 74mm | 76mm |
| MAN. LENGTH | 99mm | 97mm |
| IMPA | 96° | 98° |
| NASOLABIAL ANGLE | 101° | 98° |
| U1 TO NA DEGREES | 21° | 26° |
| U1 TO NA mm | -1mm | 2mm |

| PARAMETERS | PRE-TREATMENT | POST-TREATMENT |
|------------------|---------------|----------------|
| L1 TO NB DEGREES | 23° | 25° |
| L1 TO NB mm | 1mm | 2mm |
| U1/L1 ANGLE | 136° | 133° |
| FMA | 24° | 24° |
| Y AXIS | 63° | 64° |

CONCLUSION

This case report shows how Class III case can be managed without Extraction Protocol by means of appropriate use of simplified fixed orthodontic treatment and efficient use of Class III Elastics. The planned goals set in the pretreatment plan were successfully attained. Good intercuspation of the teeth was achieved with a class I Incisor, Canine and Molar relationship bilaterally. Treatment of the retrognathic appearing upper jaw included the retraction and retroclination of mandibular incisors and proclination of maxillary incisors with a resultant improvement in the soft tissue profile. Near ideal overjet and overbite was achieved. The maxillary and mandibular teeth were found to be esthetically satisfactory in the line of occlusion. Patient had improved smile and Profile and correction of the malocclusion was achieved, with a significant improvement in the patient aesthetics and self-esteem. The patient was very satisfied with the result of the treatment.

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