



ARTICLE

“PREMOLAR EXTRACTIONS FOR CORRECTION OF SEVERE CROWDING, GUMMY SMILE AND AN UNAESTHETIC NON-CONSONANT SMILE ARC IN A PATIENT WITH CLASS III SKELETAL PATTERN” – A CASE REPORT

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Abstract

This case report is of a 27 year old male patient who presented with irregularly placed and severely crowded teeth in both maxillary and mandibular arch with non-coincident dental midlines. This case was corrected non surgically merely by employing simple mechanics with the help of Fixed Orthodontic Mechanotherapy by extracting 1st premolars in both arches followed by retraction and closure of spaces with the help of Elastomeric chains. The case ended in a Class I Molar and canine relationship bilaterally. The case report emphasizes on the need for extracting 1st premolars for the purpose of correcting various problems the patient presented with such as severe crowding, peg shaped laterals, deviated midlines, incompetent lips and a gummy 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. Minor spaces weren't closed at the end of the treatment for the purpose of composite build up restorations of the peg shaped lateral incisors. The patient was extremely satisfied with the results at the end of treatment

Keywords: Class III malocclusion, Peg shaped lateral incisors, Occlusal Rehabilitation, Deviated midlines, Incompetant lips, Premolar Extractions, Gummy smile, Non consonant smile arc, Space closure, Orthodontic treatment, Severe Crowding, Buccally placed canines, Midline shift, Fixed Orthodontic mechanotherapy, Orthodontic Camouflage, Therapeutic Extractions, composite build up

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1 | INTRODUCTION

Careful diagnosis and treatment planning on a multidisciplinary basis is required to treat adult patients. In truth, the adult, unlike the child, is a relentless patient who will not cover up deficiencies in the skill of diagnosis or errors in the use of mechanical procedures by helpful settling in post treatment. He presents with no growth, little rebound and meager accommodation to mechanics. In addition, the adult may exhibit a potential for such pathological changes as knife-edge ridges increased cortical thickness, buried roots, impactions, periodontal breakdown, atrophic changes TMJ problems osteoporosis, osteomalacia, diabetes mellitus. These conditions, which obtain as a result of hormonal, vitamin or systemic disorders common to the adult, necessitate more careful and extensive diagnosis evaluations. Orthodontic diagnosis involves development of a comprehensive database of pertinent information. The standard diagnostic aids such as case history, clinical examination and study casts, radiographs and photographs are mandatory. Nowadays, patients with the slightest misalignment of teeth demand Orthodontic treatment to get it corrected and improve their smile and facial profile. Facial Esthetics has been in increasing demand in today's century. 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 Bimaxillary dentoalveolar protrusion with a Class III malocclusion in an adult male patient having severe crowding, gummy smile, incompetent lips and deviated dental midlines by extracting 1st premolars in the maxillary and mandibular arch. The 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 simply by executing an extraction protocol.

2 | CASE REPORT

2.1 | EXTRA-ORAL EXAMINATION

A 27 year old adult male patient presented with the chief complaint of forwardly and irregularly placed upper and lower front teeth with excessive show of front teeth. On Extraoral examination, the patient had an prognathic facial profile, grossly symmetrical face on both sides with incompetent lips, shallow mentolabial sulcus, increased lip strain, procumbent upper and lower lips, increased labial fullness and an acute Nasolabial Angle, a Leptoprosopic facial

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form, Dolicocephalic head form, average width of nose and increased width of mouth, increased buccal corridor space and a non- consonant reverse smile arc. The patient had no relevant prenatal, natal, post-natal history, history of habits or a family history. On Smiling, there was excessive show of maxillary and mandibular anterior teeth. The patient had a gummy smile. On smiling he also showed the presence of severely crowded anterior dentition and an unaesthetic facial profile and smile. The patient was very dissatisfied with his smile.



FIGURE 1: PRE TREATMENT EXTRA ORAL PHOTOGRAPHS

2.2 | INTRA-ORAL EXAMINATION

Intraoral examination on frontal view shows presence of a reverse overjet and overbite with the lower dental midline shifted to the patients right by 2mm

and severe crowding in upper and lower anterior region. Patient had a reverse overjet of 1 mm and a reverse overbite of 2 mm. On lateral view the patient shows the presence of Class III incisor relationship, a Class III Canine relationship bilaterally and a Class III molar relationship bilaterally. Occlusal view showed presence of labially placed canines and lingually placed lateral incisors in maxillary and mandibular arch. The upper and lower arch showed the presence of a U shaped arch form.



FIGURE 2: PRE TREATMENT INTRA ORAL PHOTOGRAPHS

PRE TREATMENT CEPHALOMETRIC READINGS

3 | DIAGNOSIS

This 27 year old male patient was diagnosed with a Class III malocclusion on a Class III skeletal base with an average maxilla and a prognathic mandible and a vertical growth pattern, reverse overjet and overbite, Severe maxillary and mandibular anterior crowding, proclined and forwardly placed upper and

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PARAMETERS	PRE- TREATMENT
SNA	82°
SNB	83°
ANB	-1°
WITS	-3mm
MAX. LENGTH	75mm
MAN. LENGTH	98mm
IMPA	98°
NASOLABIAL ANGLE	87°
U1 TO NA DEGREES	35°
U1 TO NA mm	4mm
L1 TO NB DEGREES	32°
L1 TO NB mm	5mm
U1/L1 ANGLE	107°
FMA	39°
Y AXIS	77°

lower incisors, deviated dental midlines with the lower midline shifted to the right by 2mm, incompetent lips, procumbent upper and lower lips a reduced nasolabial angle, an increased lip strain, prominent chin, shallow mentolabial sulcus , increased buccal corridor space, increased lip fullness, a non- consonant reverse smile arc and excessive show of maxillary and mandibular anterior teeth with a gummy smile.

3.1 | LIST OF PROBLEMS

1. Severe maxillary and mandibular anterior crowding
2. Prognathic mandible
3. Class III malocclusion
4. Non coincident midlines
5. Reverse Overjet and overbite
6. Proclined upper and lower incisors
7. Gummy smile
8. Incompetant lips
9. Increased buccal corridor space
10. Procumbent upper and lower lips

11. Decreased nasolabial angle
12. Increased lip strain
13. Shallow mento-labial sulcus

3.2 | TREATMENT OBJECTIVES

1. To correct maxillary and mandibular anterior crowding
2. To correct mandibular prognathism
3. To correct the non-congruent midlines
4. To correct the reverse overjet and overbite
5. To correct proclined upper and lower incisors
6. To correct the gummy smile
7. To correct the incompetent lips
8. To correct the increased buccal corridor space
9. To correct the procumbent upper and lower lips
10. To correct the decreased nasolabial angle
11. To correct the increased lip strain
12. To correct the shallow mento-labial sulcus
13. To achieve a Class I Incisor, Canine and molar relationship
14. To achieve a pleasing smile and a pleasing profile

3.3 | TREATMENT PLAN

- Extraction of 14,24,34,44
- Fixed applianceTherapy 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
- Retraction and closure of spaces by use of 0.019” x 0.025” rectangular NiTi followed by 0.019” x 0.025” rectangular stainless steel wires

- Final finishing and detailing with 0.014" round stainless steel wires
- Composite build-up restorations with the peg shaped maxillary lateral incisors
- Retention by means of Beggs Wrap-around retainers along with lingual bonded retainers in the upper and lower arch.

4 | 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. Retraction and closure of spaces was then started by use of 0.019" x 0.025" rectangular NiTi followed by 0.019" x 0.025" rectangular stainless steel wires. Anchorage was conserved by light retraction forces constantly monitoring the molar relation. Group B anchorage in the upper arch and Group A anchorage in the lower arch was used. This is the most important step in an extraction case wherein anchorage conservation is of utmost importance. Class III Elastics were given to correct the reverse overjet. During this period, Bite Turbos were given on mandibular 1st molars bilaterally for opening of bite until the anterior crossbite 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. The reverse Overjet and overbite was corrected with an ideal occlusion at the end of the fixed appliance therapy. Also the smile of the patient improved significantly from being non consonant and reverse to more consonant and pleasing.

5 | DISCUSSION

Treatment of a Class III with extractions of premolars is challenging. A well-chosen individualized



FIGURE 3: MID TREATMENT EXTRA ORAL PHOTOGRAPHS

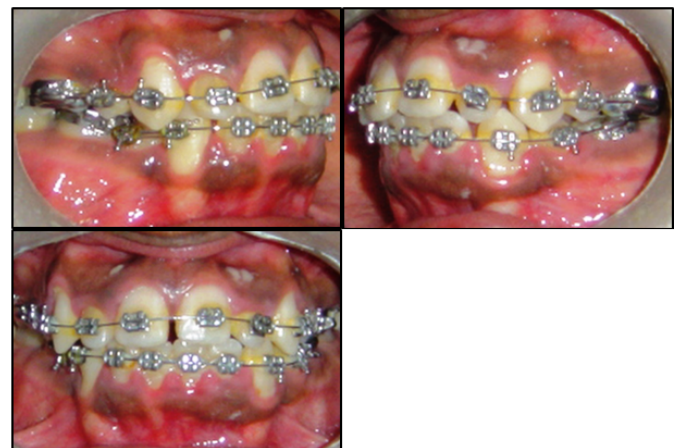


FIGURE 4: MID TREATMENT INTRA ORAL PHOTOGRAPHS

TABLE 1: POST TREATMENT CEPHALOMETRIC READINGS

PARAMETERS	POST-TREATMENT
SNA	82°
SNB	82°
ANB	0°
WITS	-1mm
MAX. LENGTH	74mm
MAN. LENGTH	97mm
IMPA	92°
NASOLABIAL ANGLE	95°
U1 TO NA DEGREES	26°
U1 TO NA mm	2mm
L1 TO NB DEGREES	22°
L1 TO NB mm	2mm
U1/L1 ANGLE	134°
FMA	36°
Y AXIS	75°

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FIGURE 5: POST TREATMENT EXTRA ORAL PHOTOGRAPHS



FIGURE 6: POST TREATMENT INTRA ORAL PHOTOGRAPHS

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 component. 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 forwardly and irregularly placed upper and lower front teeth with excessive show of 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 very pivotal role in this case for drastically bringing improvement not only in the correction of the reverse overjet, 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, lower 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 18 months. After this active treatment phase, the profile of this 27 year old male patient improved significantly as seen in the post treatment Extra oral photographs. Minor spaces weren't closed at the end of the treatment for the purpose of composite build-up restorations of the peg shaped lateral incisors. The patient was extremely satisfied with the results at the end of treatment. Removable Begg's retainers were then delivered to the patient along with fixed lingual bonded retainers in upper and lower arch.

TABLE 2: COMPARISON OF PRE AND POST TREATMENT CEPHALOMETRIC READINGS

PARAMETERS	PRE-TREATMENT	POST-TREATMENT
SNA	82°	82°
SNB	83°	82°
ANB	-1°	0°
WITS	-3mm	-1mm
MAX. LENGTH	75mm	74mm
MAN. LENGTH	98mm	97mm
IMPA	98°	92°
NASOLABIAL ANGLE	87°	95°
U1 TO NA DEGREES	35°	26°
U1 TO NA mm	4mm	2mm
L1 TO NB DEGREES	32°	22°
L1 TO NB mm	5mm	2mm
U1/L1 ANGLE	107°	134°
FMA	39°	36°
Y AXIS	77°	75°

6 | CONCLUSION

This case report shows how Class III case can be managed with 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 Prognathic appearing lower jaw included the retraction and retroclination of mandibular incisors with a resultant decrease in soft tissue procumbency and facial concavity. The reverse overjet and overbite were eliminated and the profile changed to orthognathic. The overjet become near ideal and normal 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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