



ARTICLE

“Changes in Nasolabial Angle, Lip Competency And Facial Profile By Correcting Angulation Of Maxillary Central Incisors” – A Case Report

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Abstract

This case report evaluates the management of bimaxillary dentoalveolar protrusion in a female patient with a Class I malocclusion with conventional fixed appliance mechanotherapy. The case required extraction of 1st premolars for correction of the proclined and forwardly placed upper and lower anterior teeth. However we managed it without extractions by correcting just the angulation of the upper central incisors which drastically brought about an improvement in the patients smile, profile and aesthetics. Clinical and cephalometric evaluation revealed skeletal Class I malocclusion with a convex facial profile, an average to horizontal growth pattern, an Orthognathic divergent face, increased overjet and average overbite, severe jetting proclination in the maxillary anterior region and mild crowding in the mandibular anterior region, potentially incompetent lips, increased lip fullness and lip strain and a decreased nasolabial angle. Following fixed orthodontic treatment by changing the angulation of upper central incisors and with retraction of anterior segment, a marked improvement in patient's smile, facial profile and occlusion 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.

Keywords: Fixed Orthodontic Mechanotherapy, Bimaxillary dentoalveolar protrusion, Fixed Appliance Therapy, Class I malocclusion, Proclined maxillary central incisors, Crowding, Spacing Mesoprosopic facial form, Aesthetic Improvement, Non Extraction protocol, Unaesthetic smile

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1 | INTRODUCTION

Fixed Appliance treatment can significantly alter and improve facial appearance in addition to correcting irregularity of the teeth. 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 patients 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 I malocclusion is the most prevalent followed by Class II and Class III 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 adolescents, especially girls 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 I malocclusions, according to the characteristics associated with the problem, such as antero-posterior 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 I 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 bi-maxillary dento-alveolar protrusion with a Class I malocclusion in an adolescent female patient with proclined maxillary anterior teeth, merely simply by executing a non-extraction protocol merely by torqueing the maxillary central incisors and decreasing its angula-

tion by fixed appliance therapy using conventional MBT fixed appliance mechano-therapy. The Non-extraction protocol shown in this case is indicative of how an unaesthetic non consonant smile can be converted into a more aesthetic and pleasing one by routine fixed Orthodontic treatment without the need for extracting premolars.

2 | CASE REPORT

2.1 | EXTRA-ORAL EXAMINATION

A 14 year old female patient presented with the chief complaint of forwardly placed upper front teeth and jetting out of upper front teeth. On Extra-oral examination, the patient had an orthognathic facial profile, grossly symmetrical face on both sides, a Mesoprosopic facial form, Dolicocephalic head form and average width of nose and mouth, potentially incompetent lips with increased lip strain, an acute Nasolabial Angle with increased upper and lower labial fullness. The patient had no relevant prenatal, natal, postnatal history, history of habits, medical or a family history. On Smiling, there was presence of spacing in the maxillary anterior region and a non-consonant reverse smile arc. The patient had a toothy smile with minimal buccal corridor space on smiling. The patient was very dissatisfied with her smile.

2.2 | INTRA-ORAL EXAMINATION

Intraoral examination on frontal view shows presence of congruent upper and lower dental midlines and presence of spacing in the maxillary anterior region. On lateral view the patient shows the presence of a Class II Division 1 incisor relationship and a Class I canine and molar relationship bilaterally.

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FIGURE 1: PRE TREATMENT EXTRA-ORAL PHOTOGRAPHS



FIGURE 2: PRE TREATMENT INTRA-ORAL PHOTOGRAPHS

There is mild crowding in the lower anterior region with proclined and forwardly placed upper anterior teeth. On occlusal view the patient shows presence of retained deciduous right 2nd molar. The upper arch shows the presence of a “V” shaped arch form and lower arch shows the presence of a “U” shaped arch form.

2.3 | RADIOGRAPHIC EVALUATION

Lateral cephalogram showed presence of severely proclined maxillary anterior dentition with an average to slightly horizontal growth pattern. OPG shows presence of tooth buds of mandibular 3rd molars bilaterally and absence of both tooth buds in the maxilla, adequate height of interdental alveolar bone and well positioned condyles without presence of any anomaly. OPG also shows presence of a spaced maxillary dentition and absence of root parallelism. There is presence of over-retained deciduous maxillary right 2nd molar and impacted 15 due to obstruction created by the deciduous over-retained molar. Ramal width is broad and the mandibular plane is flat without presence of an antegonial notch.

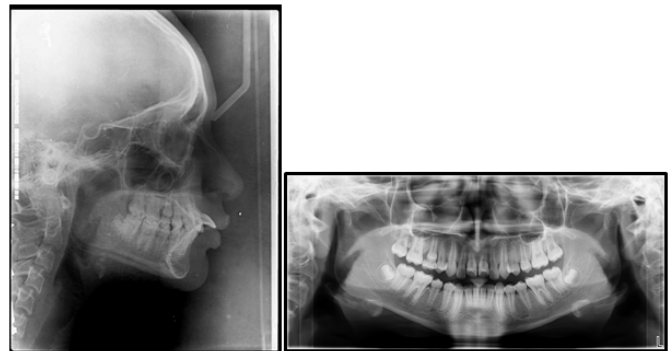


FIGURE 3: PRE TREATMENT RADIOGRAPHS

3 | DIAGNOSIS

This 14 year old female patient was diagnosed with a II malocclusion on a Class I Skeletal base with an average to horizontal growth pattern, proclined upper incisors with increased overjet, spacing in the upper anterior region and mild crowding in lower anterior region with over-retained deciduous maxillary right 2nd molar, potentially incompetent lips with increased lip fullness and a reduced nasolabial angle with increased lip strain.

“CHANGES IN NASOLABIAL ANGLE, LIP COMPETENCY AND FACIAL PROFILE BY CORRECTING ANGULATION OF MAXILLARY CENTRAL INCISORS” – A CASE REPORT

TABLE 1: PRE TREATMENT CEPHALOMETRIC READINGS

PARAMETERS	PRE- TREATMENT
SNA	84°
SNB	82°
ANB	2°
WITS	0mm
MAX. LENGTH	98mm
MAN. LENGTH	108mm
IMPA	94°
NASOLABIAL ANGLE	86°
U1 TO NA DEGREES	46°
U1 TO NA mm	9mm
L1 TO NB DEGREES	28°
L1 TO NB mm	4mm
U1/L1 ANGLE	114°
FMA	24°
Y AXIS	65°
L1 TO A-POG	3mm
CONVEXITY AT PT. A	2mm
LOWER LIP- E PLANE	2mm
N-PERP TO PT A	2mm
N-PERP TO POG	0mm
CHIN THICKNESS	12mm

3.1 | LIST OF PROBLEMS

1. Proclined maxillary anterior dentition
2. Increased overjet
3. Spacing in maxillary anterior region
4. Mild crowding in mandibular anterior region
5. Decreased Nasolabial angle
6. Potentially Incompetant lips
7. Increased lip strain
8. Reverse smile arc

3.2 | TREATMENT OBJECTIVES

1. To correct proclined maxillary anterior dentition
2. To correct the increased overjet

3. To correct spacing in maxillary and crowding in mandibular anterior teeth
4. To correct the decreased Nasolabial angle
5. To correct the potentially incompetent lips
6. To decrease the lip strain
7. To correct the reverse smile arc
8. To achieve a Class I molar relationship
9. To maintain Class I canine and molar relationship
10. To achieve a pleasing smile and a pleasing profile

3.3 | TREATMENT PLAN

- Non-extraction protocol with banding, bonding and fabrication of trans-palatal arch in the maxilla
- Extraction of over-retained maxillary right deciduous 2nd molar
- 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
- Torquing of maxillary incisors and correction of its angulation
- Piggy back NiTi for getting impacted 15 into occlusion
- 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.
- Conservation of anchorage in the upper and lower arch to maintain a Class I canine and molar relationship
- Final finishing and detailing with 0.014” round stainless steel wires

- Retention by means of Hawley's retainers along with lingual bonded retainers in the upper and lower arch.

4 | TREATMENT PROGRESS

Complete bonding & banding in both maxillary and mandibular arch was done, using MBT-0.022X0.028" slot and over-retained maxillary right deciduous 2nd molar was extracted. 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. Torquing of maxillary central incisors was done with the help of Beggs's torquing auxiliary. Retraction and closure of existing 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. A segmental Piggy back NiTi was run in the upper arch for getting impacted 15 into occlusion. Reverse curve of spee in the lower arch and exaggerated curve of spee in the upper arch was incorporated in the heavy archwires to prevent the excessive bite deepening during retraction process. Anchorage was conserved in the upper and lower arch by using light retraction forces, thus constantly monitoring molar and canine relationship. Anchorage was needed in the upper and lower arch to maintain a Class I canine and molar relationship. Retraction and closure of existing spaces was done with the help of Elastomeric chains delivering light continuous forces and replaced after every 4 weeks due to force decay and reduction in its activity. 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 upper proclination was corrected with an ideal occlusion at the end of the fixed appliance therapy. The Nasolabial angle improved significantly at the end of treatment and the reverse smile arc was corrected, thus improving the profile even further. There was improvement in occlusion, lip competency and profile at the end of the treatment.

TABLE 2: MID TREATMENT CEPHALOMETRIC READINGS

PARAMETERS	MID- TREATMENT
SNA	83°
SNB	82°
ANB	1°
WITS	0mm
MAX. LENGTH	97mm
MAN. LENGTH	108mm
IMPA	93°
NASOLABIAL ANGLE	99°
U1 TO NA DEGREES	30°
U1 TO NA mm	4mm
L1 TO NB DEGREES	27°
L1 TO NB mm	3mm
U1/L1 ANGLE	128°
FMA	25°
Y AXIS	67°
L1 TO A-POG	2mm
CONVEXITY AT PT. A	1mm
LOWER LIP- E PLANE	2mm
N-PERP TO PT A	1mm
N-PERP TO POG	0mm
CHIN THICKNESS	12mm



FIGURE 4: MID TREATMENT EXTRA-ORAL PHOTOGRAPHS

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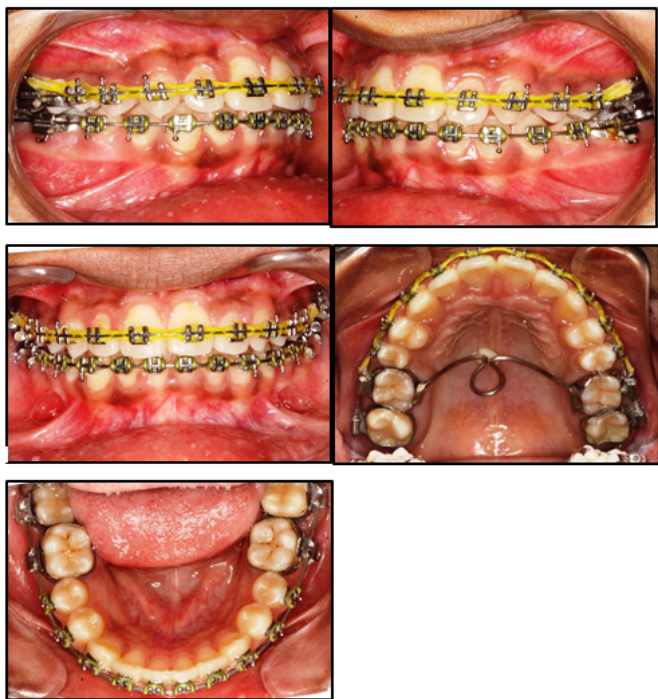


FIGURE 5: MID TREATMENT INTRA-ORAL PHOTOGRAPHS

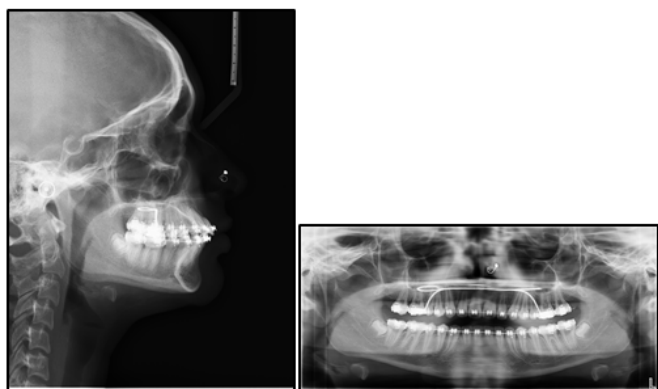


FIGURE 6: MID TREATMENT RADIOGRAPHS

5 | DISCUSSION

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. In adolescents, tooth movement is affected by growth while in adults we deal strictly with tooth movement alone. In addition, orthodontic treatment in the adults is often based on symptoms detected by the patient while in children; it is based more often on signs detected by practitioners or parents. Of equal significance is the

fact that the adults seek treatment more often for esthetic reasons and hence is likely to have unreasonable expectations about the outcome of the treatment, is less adaptable to the appliance and is uncompromising in his appraisal of the treatment results. Treatment of bi-maxillary dento-alveolar protrusion without extraction of premolars in an adolescent patient 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 I malocclusion might have any number of a combination of the skeletal and dental components. Hence, identifying and understanding the etiology and expression of Class I malocclusion and identifying differential diagnosis is helpful for its correction. The patient's chief complaint was forwardly placed upper front teeth and jetting out of upper front teeth and sought treatment for the same. 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 most important point to be highlighted here is the decision to not extract the premolars. After analyzing the case thoroughly and reading all pretreatment cephalometric parameters along with evaluating the patients profile clinically, a decision was made of proceeding with the treatment without extracting premolars as the patient presented with severe maxillary anterior proclination but with proper buccal root torquing of maxillary central incisors and by appropriate application of begg's biomechanics, the case could be managed without extractions. Begg's torqueing auxiliary was used for the purpose of root uprighiting of maxillary central incisors. This drastically reduced the angulation of the incisors and thus created more space for enabling retraction of the maxillary anterior dentition. The treatment after closure of anterior spaces improved the patients profile changing the Nasolabial angle from acute to average at the end of the treatment. There was a significant decrease in the lip strain and lip fullness with increased competency of lips. Successful results were obtained after the fixed appliance therapy within a stipulated period of time. The overall treatment time

was 16 months. After this active treatment phase, the profile of this 14 year old female patient improved significantly as seen in the post treatment Extra oral photographs. Hawley's retainers were then delivered to the patient along with fixed lingual bonded retainers in upper and lower arch. Patient was very happy and satisfied with the results of the treatment

TABLE 3: POST-TREATMENT CEPHALOMETRIC READINGS

PARAMETERS	POST - TREATMENT
SNA	83°
SNB	82°
ANB	1°
WITS	0mm
MAX. LENGTH	98mm
MAN. LENGTH	107mm
IMPA	93°
NASOLABIAL ANGLE	107°
U1 TO NA DEGREES	26°
U1 TO NA mm	3mm
L1 TO NB DEGREES	26°
L1 TO NB mm	2mm
U1/L1 ANGLE	133°
FMA	25°
Y AXIS	66°
L1 TO A-POG	2mm
CONVEXITY AT PT. A	0mm
LOWER LIP- E PLANE	1mm
N-PERP TO PT A	1mm
N-PERP TO POG	0mm
CHIN THICKNESS	12mm

6 | CONCLUSION

This case report shows how a borderline extraction case can be managed with a Non Extraction Protocol by means of properly conserving Anchorage. The planned goals set in the pretreatment plan were successfully attained. Good intercuspation of the teeth was maintained with class I incisor and Class I canine and molar relationship bilaterally. Treatment of bimaxillary protrusion and localized spacing included the retraction and retroclination of maxillary and mandibular incisors with a resultant decrease



FIGURE 7: POST TREATMENT EXTRA-ORAL PHOTOGRAPHS



FIGURE 8: POST TREATMENT INTRA-ORAL PHOTOGRAPHS

“CHANGES IN NASOLABIAL ANGLE, LIP COMPETENCY AND FACIAL PROFILE BY CORRECTING ANGULATION OF MAXILLARY CENTRAL INCISORS” – A CASE REPORT

TABLE 4: COMPARISON OF PRE, MID AND POST TREATMENT CEPHALOMETRIC READINGS

PARAMETERS	PRE-TREATMENT	MID-TREATMENT	POST-TREATMENT
SNA	84°	83°	83°
SNB	82°	82°	82°
ANB	2°	1°	1°
WITS	0mm	0mm	0mm
MAX. LENGTH	98mm	97mm	98mm
MAN. LENGTH	108mm	108mm	107mm
IMPA	94°	93°	93°
NA-SOLABIAL ANGLE	86°	99°	107°
U1 TO NA DEGREES	46°	30°	26°
U1 TO NA mm	9mm	4mm	3mm
L1 TO NB DEGREES	28°	27°	26°
L1 TO NB mm	4mm	3mm	2mm
U1/L1 ANGLE	114°	128°	133°
FMA	24°	25°	25°
Y AXIS	65°	67°	66°
L1 TO A-POG	3mm	2mm	2mm
CONVEXITY AT PT. A	2mm	1mm	0mm
LOWER LIP-E PLANE	2mm	2mm	1mm
N-PERP TO PT A	2mm	1mm	1mm
N-PERP TO POG	0mm	0mm	0mm
CHIN THICKNESS	12mm	12mm	12mm

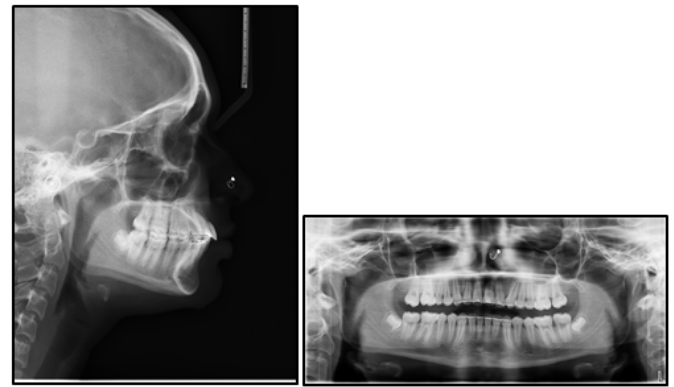


FIGURE 9: POST TREATMENT RADIOGRAPHS



FIGURE 10: COMPARISON OF PRE AND POST TREATMENT PROFILES

in soft tissue lip procumbency and lip fullness. The maxillary and mandibular teeth were found to be esthetically satisfactory in the line of occlusion. An ideal overjet was achieved and a normal overbite was maintained. Patient had improved smile and Profile without the need for extractions. The 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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