Non-extraction protocol for correction of crowded dentition in a patient with horizontal growth pattern” – A case report

Bhushan Jawale¹, Lishoy Rodrigues^{2*}, Amit Chaudhari³, Manoj Patel⁴, Neetal Patel⁵

¹Professor, ²Post Graduation Student, ³Associate Professor, ^{4,5}Private Practice, ^{1,2}Dept. of Orthodontics and Dentofacial Orthopedics, ³Dept of Periodontics and Oral Implantology, ^{1,2}Sinhgad dental college and hospital, Pune Maharashtra, ³BVP Dental College and Hospital, Pune, Maharashtra, India. ^{4,5}Shahada, District Nandurbar, Maharashtra, India

Corresponding Author: Lishoy Rodrigues

Email: lishoy95@gmail.com

Abstract

This case report is of a 16-year-old female patient who presented with crowded upper and lower front teeth with an unaesthetic and non-consonant smile arc. This case was corrected merely by employing simple mechanics with the help of Fixed Orthodontic Mechanotherapy. Following fixed orthodontic treatment, marked improvement in patient's smile and facial profile were 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 and there was significant improvement in the unaesthetic narrow appearing buccal corridor space at the end of the treatment.

Keywords: Non- Extraction, Crowded Dentition, Horizontal Growth pattern, Orthodontic treatment, Fixed Orthodontic Mechanotherapy, Non-consonant smile arc, Case report, Arch expansion, Proximal Stripping.

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. The number of patients seeking orthodontic treatment has increased significantly^[1,2,9-14] Treatment alternatives of correction of crowded anterior teeth with proclination are either Orthodontic camouflage by extraction of premolars or a combined orthodontic-orthognathic surgical therapy. It eventually depends mainly upon the severity of the malocclusion^[3,4] and the amount of needed tooth movements.^[3,5,15-17] If the skeletal discrepancy^[6] cannot be corrected by camouflage, any dental compensation may produce a reasonably good occlusion^[7] but at the expense of compromised esthetics.^[8,18] Over the last few decades, there are increased number of patients who have become aware of orthodontic treatment and are demanding high quality treatment in the shortest possible time with increased efficiency and reduced costs.^[1-22] Class I malocclusion patients frequently show a combination of skeletal and dento-alveolar components.^[23,24] Many cephalometric peculiarities have been reported in class I malocclusion patients with crowding, such as a prognathic maxilla and mandible, proclined maxillary and mandibular incisors. This case presents the correction of a Class I malocclusion with

crowded dentition in a 16 year old female patient merely simply by executing non extraction protocol. The non-extraction protocol shown in this case is indicative of how an unaesthetic smile can be converted into a pleasant smile by routine Fixed Orthodontic treatment.

Case Report

Extra-oral examination

A 16 year old female patient presented with the chief complaint of irregularly placed upper front teeth. On Extra-oral examination, the patient had an orthognathic facial profile, grossly symmetrical face on both sides with competent lips, moderately deep mentolabial sulcus and an obtuse Nasolabial Angle, a Mesoprosopic facial form, Dolicocephalic head form, Average width of nose and increased width of mouth, decreased buccal corridor space, a non-consonant smile arc and orthognathic divergence of face. The patient had no relevant prenatal, natal, postnatal history, history of habits or a family history. On Smiling, there was crowding, excessive show of maxillary anterior teeth and the patient had a toothy smile. The patient had an unaesthetic smile arc and was very dissatisfied with her smile.

Pre-treatment extra-oral photographs

Intra-oral examination

Intraoral examination on frontal view showed presence of crowded upper and lower anterior teeth with non-coincident dental midlines. On lateral view the patient showed the presence of Class I incisor relationship with an average overjet and overbite, a Class I Canine and Molar relationship bilaterally. The patient also showed the presence of mandibular in-standing lateral incisors.

Pre-treatment intra-oral photographs

Pre treatment cephalometric summary

Parameters	Pre- treatment
SNA	83°
SNB	81°
ANB	2°
WITS	2mm(AO ahead of BO)
Max. Length	78mm
Man. Length	107mm
IMPA	99°
Nasolabial angle	93°
U1 to na degrees	27°
U1 TO NA mm	4mm
L1 TO NB degrees	26°
L1 TO NB mm	3mm
U1/L1 angle	128°
Saddle Angle	134°
Articular Angle	146°
Gonial Angle	125°
FMA	24°
Y AXIS	64°

Diagnosis

This 16 year old female patient is diagnosed with a Class I malocclusion and Class I skeletal pattern with a horizontal growth pattern, in-standing mandibular lateral incisors with

deviated upper and lower dental midlines, crowding in upper and lower anterior region and a Non-consonant smile arc.

Model Analysis

Bolton ratio:- Mandibular anterior excess:- 0.48 mm Mandibular overall excess:- 0.17 mm	Arch Perimeter Analysis: Need to extract 1 st premolars
Ashley Howe's index:- Need for extraction	Careys Analysis: Need to extract 1 st premolars
Pont's Index: Expansion not needed	Chadda's Index: Expansion not needed

Problem List

1. Crowding in upper and lower anterior region
2. Non-coincident dental midlines
3. Non-consonant smile arc

Treatment goals

1. To correct crowding in upper and lower anterior region
2. To achieve congruent dental midlines
3. To maintain a Class I Incisor, Canine and Molar relationship
4. To achieve a pleasing smile and a pleasing profile

Treatment progress

Complete banding, followed by bonding in both maxillary and mandibular arch was 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. 0.016" x 0.022" NiTi wire was then used with an underlying Piggy back NiTi wire for correction of the in-standing mandibular lateral incisors. After 6 months of alignment and leveling NiTi round wires were discontinued. Proximal stripping was done in maxillary and mandibular anterior region. Use of 0.019" x 0.025" rectangular NiTi with accentuated Anchor sweeps in the upper and lower stiff arch wires were given to prevent the bite deepening during retraction in the upper arch followed by 0.019" x 0.025" rectangular stainless steel wires for retraction and closure of spaces. Midline Elastics were given for correction of the deviated and non-coincident dental midlines. Expanded stainless steel archwires were placed in upper and lower arch to increase the arch length slightly to accommodate the crowded anterior teeth. Finally light settling elastics were given with rectangular steel wire in lower arch and 0.012" light NiTi wire in upper arch for settling, finishing, detailing and proper intercuspation. The upper and lower incisor crowding was unraveled and dental midlines were matching. Hawley's removable retainers were given to the patient followed by fixed lingual bonded retainers in the upper and lower arch. After completion of

orthodontic treatment, the smile of the patient changed from being unaesthetic and non-consonant to a more pleasing and consonant smile arc. The treatment changed the patients overall profile and helped her feel more confident. She was very happy and satisfied with the treatment. A pleasing smile and a pleasing profile were achieved.

Mid-treatment cephalometric summary

Parameters	Mid-treatment
SNA	82°
SNB	81°
ANB	1°
WITS	1mm(AO ahead of BO)
Max. Length	79mm
Man. Length	108mm
IMPA	94°
Nasolabial angle	99°
U1 to na degrees	26°
U1 TO NA mm	3mm
L1 TO NB DEGREES	24°
L1 TO NB mm	2mm
U1/L1 ANGLE	131°
Saddle angle	132°
Articular angle	143°
Gonial angle	124°
FMA	24°
Y AXIS	63°

Mid-treatment extra-oral photographs

Mid-treatment intra-oral photographs

Discussion

The patient's chief complaint was irregularly placed upper and lower front teeth and also excessive 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 fixed appliance therapy without extraction of premolars appropriately resulted in an improvement in the patient's profile in this case. Alongside fixed orthodontic treatment, proximal stripping was done in upper and lower anterior region to correct the already existing malocclusion. The patient presented with crowding in the upper and lower anterior region with a pleasant facial profile due to which it was decided to not extract premolars and rectify the malocclusion only with proximal stripping. Successful results were obtained after the fixed MBT appliance therapy within a stipulated period of time. The overall treatment time was 13 months. After this active treatment phase, the profile of this 16 year old female patient improved significantly as seen in the post treatment Extra-oral photographs. Removable Hawley's retainers followed by fixed lingual bonded retainers were then delivered to the patient. The crowding in the upper and lower arch was corrected and the smile arc of the patient improved drastically to being more consonant and pleasant. The patient was very happy and satisfied with the results.

Post-treatment cephalometric summary

PARAMETERS	POST-TREATMENT
SNA	82°
SNB	81°
ANB	1°
WITS	1mm(AO ahead of BO)
Max. Length	78mm
Man. Length	108mm
IMPA	93°
Nasolabial angle	101°
U1 to na degrees	25°
U1 TO NA mm	2mm
L1 TO NB DEGREES	23°
L1 TO NB mm	2mm
U1/L1 ANGLE	131°
Saddle angle	132°
Articular angle	143°
Gonial angle	124°
FMA	24°
Y AXIS	64°

Post-treatment extra-oral photographs

	BO)	BO)	BO)
Max. Length	78mm	79mm	78mm
Man. Length	107mm	108mm	108mm
Impa	99°	94°	93°
Nasolabial angle	93°	99°	101°
U1 TO NA Degrees	27°	26°	25°
U1 TO NA mm	4mm	3mm	2mm
L1 TO NB Degrees	26°	24°	23°
L1 TO NB mm	3mm	2mm	2mm
U1/L1 ANGLE	128°	131°	131°
Saddle angle	134°	132°	132°
Articular angle	146°	143°	143°
Gonial angle	125°	124°	124°
FMA	24°	24°	24°
Y AXIS	64°	63°	64°

Conclusion

This case report shows how the correction of severely crowded dentition can be managed alongside fixed orthodontic treatment without extraction of any teeth, thus lowering the treatment time and enhancing the profile of the patient. The planned goals set in the pretreatment plan were successfully attained. Good intercuspation of the teeth was obtained and the maxillary and mandibular teeth were found to be aesthetically satisfactory in the line of occlusion with a pleasing consonant smile arc at the end of treatment. Crowding was unraveled and dental midlines were coincident. The correction of malocclusion was achieved and crowding was unraveled with a significant improvement in the patient aesthetics and self-esteem. The patient was very satisfied with the results of the treatment.

Funding

None.

Conflict of Interest

None.

References

1. Boyd RL, Leggott PJ, Quinn RS, Eakle WS, Chambers D. periodontal implications of orthodontic treatment in adults with reduced or normal periodontal tissues versus those of adolescents. *Am J Orthod Dentofacial Orthop* 1989;96:191-198.

Post-treatment intra-oral photographs

Comparison of pre and post treatment cephalometric readings

Parameters	Pre-treatment	Mid-treatment	Post-treatment
SNA	83°	82°	82°
SNB	81°	81°	81°
ANB	2°	1°	1°
WITS	2mm(AO ahead of	1mm(AO ahead of	1mm(AO ahead of

2. Gottlieb EL, Nelson AH, Vogels DS. 1990 JCO study of orthodontic diagnosis and treatment procedures. Part 1: Results and trends. *J Clin Orthod.* 1991;25:145-56.
3. Bailey LJ, White R Jr. Assessment of patient for orthognathic surgery. *Semin Orthod.* 1999;5:209-222.
4. Tulloch Jf, Lenz BE, Phillips C. Surgical Versus orthodontic correction for class II patients: age and severity in treatment planning and treatment outcome. *Semin Orthod.* 1977;72:1-22.
5. Graber TM, Vanarsdall RL, Vig KWL. Orthodontics. Current principles and techniques ed 3. *St Louis: Mosby, 2000.*
6. Proffit WR, White RP Jr. Who needs surgical-orthodontic treatment ?. *Int J Adult Orthodon Orthognath Surg.* 1990;5:81-89
7. Turvey Ta Orthognathic surgery: A significant contribution to facial and dental esthetics. *J Am Dent Assoc.* 1998;117:49e-55e.
8. Trivedi B, Mahadevia S, Shah R, Thakker D. Combined Orthodontic and Surgical Approach in an Adult Patient with Skeletal Class III Malocclusion. *J Adv Oral Res.* 2014;5(3):24-7.
9. Lishoy R, Priyal R, Jamenis SC, Jawale B, Mahajan N. A survey to assess the knowledge and attitude of adults from the age group of 18 to 35 Years towards comprehensive orthodontic treatment - A questionnaire based study on adult orthodontics. *IP Indian J Orthod Dentofacial Res.* 2020;6(4):1-8.
10. Jawale B, Rodrigues L, Keluskar KM, Patil S, Belludi A, Patil A. Forsus fixed functional appliance therapy for dentoalveolar and profile correction- A case report. *IP Indian J Orthod Dentofacial Res.* 2020;6(4):1-7.
11. Rodrigues L, Jamenis SC, Jawale B, Patil S, Garcha V. A questionnaire study to assess and evaluate the common gingival problems faced by patients undergoing fixed orthodontic treatment. *IP Int J Maxillofac Imaging* 2020;6(4):101-7.
12. Jawale B, Rodrigues R, Patil S, Patil A, Jethe S. Burrstone's 3 piece intrusion utility arch in combination with absolute anchorage using mini-implants for correction of bimaxillary dentoalveolar protrusion" - a case report on segmental arch mechanics, *Int J Scientific Res.* 2021;10(05).
13. Jawale B, Rodrigues L, Patil S, Kangane S, Belludi A. Aesthetic rehabilitation and correction of crowding with collaboration of orthodontics and endodontics – A case report. *Global J Dent Specialty.* 2021;1(1)
14. Jawale B. "Fixed Orthodontic Mechanotherapy for Correction of Generalized Spacing and Severe Proclination of Anterior Teeth" – A Case Report. *Glob Acad J Dent Oral Health,* 2021;3(3):29-5.
15. Jawale B.. "Correction of Lateral Tongue Thrust, Midline Diastema, Flared Maxillary Anterior Dentition, Incompetent Lips and An Unaesthetic Smile Arc By Fixed Orthodontic Mechanotherapy" – A Case Report. *South Asian Res J Oral Dent Sci.* 2021;3(3), 37-44.
16. Jawale B. "Effect of Asymmetric Premolar Extractions on Smile Aesthetics in A Patient with Severe Crowding" – A Case Report, *SAR J Dent Oral Surg Med,* 2021;2(3):36-43.
17. Mhetre R. "Temporary Anchorage Devices (TADs) for Management of Class I Malocclusion" – A Case Report, *SAR J Dent Oral Surg Med.* 2021;2(3):44-53.
18. Jawale S. "Correction of Spaced Dentition with Fixed Orthodontic Pre-adjusted Edgewise Bracket System" – A Case Report. *South Asian Res J Oral Dent Sci.* 2021;3(3):45-52.
19. Jawale B. "Adjunctive Orthodontic Treatment in an Adult Patient with Mutilated Dentition" – A Case Report On Multidisciplinary Orthodontics. *Glob Acad J Dent Oral Health;* 2021;3(3):36-41.
20. Jawale B.. "Treatment of Severe Crowding and Bimaxillary Dental Protrusion in a Patient with Angle's Class I Malocclusion and a Vertical Growth Pattern" – A Case Report On Orthodontic Camouflage. *Saudi J Oral Dent Res.* 2021;6(5):203-8.
21. Jawale B. "Conventional MBT Mechanotherapy for Management of Bimaxillary Dentoalveolar Protrusion" – A Case Report. *EAS J Dent Oral Med.* 2021;3(3):65-72.
22. Jawale B. Wonders of Rapid Maxillary Expansion and Lower Premolar Extractions in Correction of a Skeletal Class III Case with Maxillary Deficiency and Mandibular Excess – A Case Report on Non- Surgical Orthodontic Camouflage. *Saudi J Oral Dent Res,* 2021;6(5):192-202.
23. Jawale B. "Maxillary 1st Premolar Extractions For Correction of Proclined Upper Dentition" – A Case Report. *Int J Recent Sci Res.* 2021;12(05):41740-5.
24. Jawale B. "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. *EAS J Dent Oral Med.* 2021;3(3):73-7.

How to cite: Jawale B, Rodrigues L, Chaudhari A, Patel M, Patel N, Non-Extraction Protocol for Correction of Crowded Dentition in A Patient with Horizontal Growth Pattern" – A Case Report. *Global J Dent Specialty.* 2021;1(3):94-8.