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Case Report

"Management of Malaligned Dentition with Single Tooth Crossbite by Routine Fixed Orthodontic Treatment" – A Case Report

Dr. Bhushan Jawale[1], Dr. Lishoy Rodrigues[2*], Dr. Anup Belludi[3], Dr. Shrinivas Ashtekar[4], Dr. Anand Patil[5] ,Dr. RK Suryawanshi[6]

[1]Professor, Dept of Orthodontics and Dentofacial Orthopedics, Sinhgad Dental College and Hospital, Vadgaon Bk, Pune, Maharashtra, India
[2]Post Graduate Resident, Dept of Orthodontics and Dentofacial Orthopedics, Sinhgad Dental College and Hospital, Vadgaon Bk, Pune, Maharashtra, India
[3]Professor and HOD, Dept of Orthodontics and Dentofacial Orthopedics, KLE Dental College and Hospital, Bangalore, Karnataka, India
[4]Professor, Dept of Orthodontics and Dentofacial Orthopedics, VPDC Dental College and Hospital, Sangli, Maharashtra, India
[5]Professor, Dept of Orthodontics and Dentofacial Orthopedics, SDM Dental College and Hospital, Dharwad, Karnataka India
[6]Professor and HOD, Dept of Oral and Maxillofacial Surgery, Sinhgad Dental College and Hospital, Vadgaon Bk, Pune, Maharashtra, India

***Corresponding Author**
Dr. Lishoy Rodrigues

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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 her smile 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 pecularities 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 acute 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 an 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.

Fig-1: 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 and lower dental midline shift to the patient's right. On lateral view the patient showed the presence of Class I incisor relationship with an average overjet and overbite and a Class I Canine and Molar relationship bilaterally. Patient also showed presence of an in-standing maxillary left lateral incisor with slightly overlapping central incisors.

Pre-2: Treatment Intra-Oral Photographs

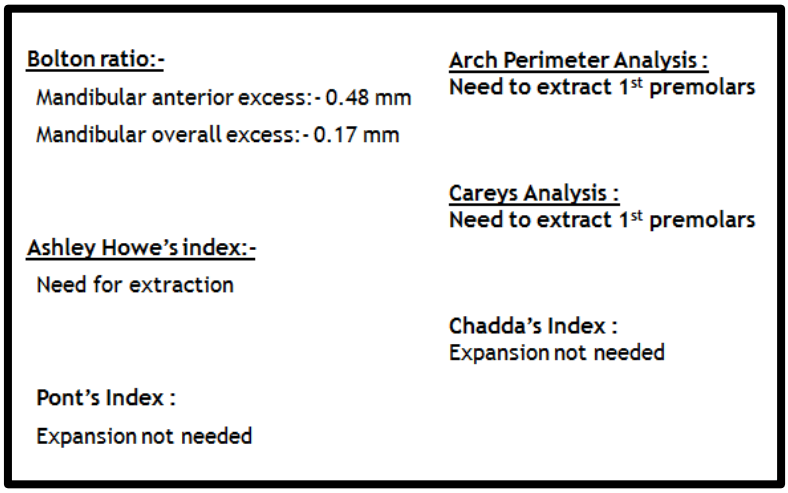
Table-1: Pre Treatment Cephalometric Summary

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 maxillary left lateral incisors with deviated upper and lower dental midlines, crowding in upper and lower anterior region and a Non-consonant smile arc with an acute naslabial angle.

Model Analysis



List of Problem

1. Crowding in upper and lower anterior region.
2. Non-coincident dental midlines.
3. In-standing maxillary left lateral incisor.
4. Non-consonant smile arc.
5. Acute Nasolabial angle.

Treatment Goals

1. To correct crowding in upper and lower anterior region.
2. To achieve congruent dental midlines.
3. To correct the crossbite in maxillary left lateral incisor region.
4. To maintain a Class I Incisor, Canine and Molar relationship.
5. 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 maxillary 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.

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 11 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.

Table-2: 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°

Fig-3:Post-Treatment Extra-Oral Photographs

Fig-4: Post-Treatment Intra-Oral Photographs

Table-3: Comparison of Pre and Post Treatment Cephalometric Readings

PARAMETERS	PRE- TREATMENT	POST- TREATMENT
SNA	83°	82°
SNB	81°	81°
ANB	2°	1°
WITS	2mm(AO ahead of BO)	1mm(AO ahead of BO)
MAX. LENGTH	78mm	78mm
MAN. LENGTH	107mm	108mm
IMPA	99°	93°
NASOLABIAL ANGLE	93°	101°
U1 TO NA DEGREES	27°	25°
U1 TO NA mm	4mm	2mm
L1 TO NB DEGREES	26°	23°
L1 TO NB mm	3mm	2mm
U1/L1 ANGLE	128°	131°
SADDLE ANGLE	134°	132°
ARTICULAR ANGLE	146°	143°
GONIAL ANGLE	125°	124°
FMA	24°	24°
Y AXIS	64°	64°

CONCLUSION

This case report shows how the correction of 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.

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