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Case Report

"Single Canine and 3 Premolar Extractions for Achieving a Balanced Occlusion and Congruent Dental Midlines" – A Case Report

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Abstract

This case report is of a 29 year old female patient who presented with unfavorably impacted maxillary left canine and severely proclined upper and lower dentition. This case was corrected merely by employing simple mechanics with the help of Fixed Orthodontic Mechanotherapy. The patient presented with bimaxillary dentoalveolar protrusion and hence needed extraction of all 4 premolars. Since the unfavorably impacted maxillary left canine needed extraction as well, it was decided to not extract the premolar in the 2nd quadrant as the canine extraction in that quadrant would compensate for the space needed for correction of anterior proclination. Hence, 3 premolars and a single canine were extracted in this case. 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 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: Single canine extraction, 3 premolar extraction, Hypodivergent case, Horizontal grower, Orthodontic treatment, Fixed Orthodontic Mechanotherapy, Non-consonant smile arc, Impacted canine, Unfavorable canine impaction, non-congruent dental midlines, Balanced occlusion, Case report.

INTRODUCTION

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 impacted teeth 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 numbers 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, such as a prognathic maxilla and mandible, proclined maxillary and mandibular incisors. This case presents the correction of a Class I malocclusion with bimaxillary protrusion and impacted upper left canine in a 29 year old female patient merely simply by

executing extraction of a single impacted canine and 3 premolars. The single canine and 4 premolar 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 for balancing of occlusion.

CASE REPORT

Extra-Oral Examination

A 29 year old adult female patient presented with the chief complaint of forwardly placed upper and lower front teeth with a missing canine tooth. On Extra-oral examination, the patient had an convex facial profile, grossly symmetrical face on both sides with potentially incompetent lips and an acute Nasolabial Angle, a Mesoprosopic facial form, Dolicocephalic head form, Average width of nose and mouth, and a posterior divergence of face. The patient had no relevant prenatal, natal, postnatal history, history of habits or a family history. On Smiling, there was excessive show of maxillary anterior teeth and the patient had a toothy smile with missing upper left canine. The patient had an unaesthetic smile arc and was extremely dissatisfied with her smile.

Fig-1: Pre-Treatment Extra-Oral Photographs

Intra-Oral Examination

Intraoral examination on frontal view showed presence of an average overbite and shift of lower dental midline to the patient's right by 2mm. On lateral view the patient showed the presence of Class I incisor relationship with an average overjet, a class I canine relationship on the right side and a Class I Molar relationship bilaterally. Patient also showed presence of a missing/impacted maxillary left canine and presence of slight crowding in mandibular anterior region. Occlusal view showed presence of rotations in lower anterior teeth and a "U" shaped upper and lower arch form.

Fig-2: Pre-Treatment Intra-Oral Photographs

Table-1: Pre Treatment Cephalometric Summary

PARAMETERS	PRE- TREATMENT
SNA	83°
SNB	81°
ANB	2°
WITS	1mm(AO ahead of BO)
MAX. LENGTH	89mm
MAN. LENGTH	107mm
IMPA	102°
NASOLABIAL ANGLE	88°
U1 TO NA DEGREES	35°
U1 TO NA mm	7mm
L1 TO NB DEGREES	31°
L1 TO NB mm	5mm
U1/L1 ANGLE	112°
SADDLE ANGLE	134°
ARTICULAR ANGLE	146°
GONIAL ANGLE	125°
FMA	23°
Y AXIS	64°

Diagnosis

This 29 year old adult female patient is diagnosed with a Class I malocclusion and Class I skeletal pattern with an horizontal growth pattern and a convex facial profile with posteriorly divergent face, proclined upper and lower anterior teeth with an impacted maxillary left canine, slight crowding in mandibular anterior region, deviated lower dental midline, acute nasolabial angle, increased lip strain with protruded upper and lower lip.

List of Problem

1. Proclined maxillary and mandibular anterior teeth.
2. Unfavorably impacted maxillary left canine.
3. Mandibular midline shift to the right.
4. Mild mandibular anterior crowding.
5. Decreased Nasolabial angle.
6. Increased lip strain and potentially incompetent lips.
7. Protruded upper and lower lip.
8. Convex facial profile and posteriorly divergent face.

Treatment Goals

1. To correct the proclined maxillary and mandibular anterior teeth.
2. To manage the unfavorably impacted maxillary left canine.
3. To correct the shifted mandibular midline.
4. To improve the nasolabial angle.
5. To reduce the lip strain and improve the lip competency.
6. To correct the protruded upper and lower lip.
7. To maintain a Class I Incisor, Canine and Molar relationship.
8. To achieve a pleasing smile and a pleasing profile.

Treatment Plan

- Extraction of 14, impacted 23, 34 and 44.
- Fixed appliance therapy with Pre-adjused Edgewise bracket system.
- 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.
- Retention by means of Begg's Wrap-around retainers along with lingual bonded retainers in the upper and lower arch.

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 followed by 0.016" x 0.022" NiTi and 0.017" x 0.025" NiTi wires. A decision was made to extract the unfavorably impacted upper left canine as there was no means by which this canine could be bought into alignment in the arch even with surgical intervention. Along with the impacted canine, three 1st premolars were extracted from the 1st, 3rd and 4th quadrant respectively for correction of bimaxillary dento-alveolar protrusion. After 6 months of alignment and leveling, 0.017" x 0.025" NiTi rectangular wires were discontinued. 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 and lower 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 and space closure was done with the help of Elastomeric chains. 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. Begg's wraparound removable retainers were given to the patient followed by fixed lingual bonded retainers in the upper and lower arch. The treatment changed the patients overall smile and helped her feel more confident. She was very happy and satisfied with the treatment. A pleasing smile and a pleasing profile were achieved.

Treatment Results

All of the original treatment objectives were achieved. The maxillary and mandibular arches were well aligned and coordinated. Class I incisor, canine and molar relationship was maintained bilaterally. The chief complaint of forwardly placed upper and lower front teeth with a missing canine tooth was addressed. The upper and lower dental midlines were congruent and angulation of upper and lower anterior teeth decreased significantly. The decreased nasolabial angle at pre-treatment was improved, lips changed from being potentially incompetent to competent and lip strain decreased significantly at the end of treatment with a good lip support. The facial profile of the patient changed from being convex to orthognathic. Wire fixed retainers were attached to the lingual aspect of each tooth from the right to the left canines in both arches. The patient wore a Begg's wrap around retainer for 15 hours per day for the first 2 months, followed by another 10 months of nighttime wear.

DISCUSSION

The patient's chief complaint was forwardly placed upper and lower front teeth with a missing canine tooth. 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 with extraction of single canine and 3 premolars appropriately resulted in an improvement in the patient's smile in this case. A decision was made to extract the unfavorably impacted upper left canine as there was no means by which this canine could be bought into alignment in the arch even with surgical intervention. The patient presented with bimaxillary dentoalveolar protrusion and hence needed extraction of all 4 premolars. Since the unfavorably impacted maxillary left canine needed extraction as well, it was decided to not extract the premolar in the 2nd quadrant as the canine extraction in that quadrant would compensate for the space needed for correction of anterior proclination. Hence, 3 premolars and a single canine was extracted in this case. 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 smile of this 29 year old adult female patient improved significantly as seen in the post treatment Extra-oral photographs. Removable Begg's wraparound retainers followed by fixed lingual bonded retainers were then delivered to the patient. The crowding in the lower arch was corrected and the smile arc of the patient improved drastically to being more consonant and pleasant. All pre-treatment goals were achieved as mentioned in the treatment results. The patient was very happy and satisfied with the outcome of the treatment.

Table-1: Post Treatment Cephalometric Summary

PARAMETERS	POST- TREATMENT
SNA	82°
SNB	81°
ANB	1°
WITS	0mm
MAX. LENGTH	88mm
MAN. LENGTH	106mm
IMPA	93°
NASOLABIAL ANGLE	104°
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	66°

Fig-3: Post-Treatment Extra-Oral Photographs

Fig-4: Post-Treatment Intra-Oral Photographs

Table-2: Comparison of Pre and Post Treatment Cephalometric Readings

PARAMETERS	PRE- TREATMENT	POST- TREATMENT
SNA	83°	82°
SNB	81°	81°
ANB	2°	1°
WITS	1mm(AO ahead of BO)	0mm
MAX. LENGTH	89mm	88mm
MAN. LENGTH	107mm	106mm
IMPA	102°	93°
NASOLABIAL ANGLE	88°	104°
U1 TO NA DEGREES	35°	25°
U1 TO NA mm	7mm	2mm
L1 TO NB DEGREES	31°	23°
L1 TO NB mm	5mm	2mm
U1/L1 ANGLE	112°	131°
SADDLE ANGLE	134°	132°
ARTICULAR ANGLE	146°	143°
GONIAL ANGLE	125°	124°
FMA	23°	24°
Y AXIS	64°	66°

CONCLUSION

This case report shows how a case with severe dental proclination and unfavorably impacted canine can be managed alongside fixed orthodontic treatment with extraction of a single canine and 3 premolars, thus modifying the usual orthodontic treatment protocol, lowering the treatment time and enhancing the facial 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. The correction of malocclusion was achieved and lower anterior 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.

REFERENCES

1. Boyd RL, Leggott PJ, Quinn RS, Eakle WS, Chambers D. (1989). Periodontal implications of orthodontic treatment in adults with reduced or normal periodontal tissues versus those of adolescents. Am J Orthod Dentofacial Orthop, 96;191-198.
2. Gottleib EL, Nelson AH, Vogels DS. (1991). 1990 JCO study of orthodontic diagnosis and treatment procedures. Part 1: Results and trends. J Clin Orthod, 25:145-156.
3. Bailey LJ, White R Jr. 1999 Assessment of patient for orthognathic surgery. Semin Orthod, 5:209-222.
4. Tulloch Jf, Lenz BE, Phillips C. (1977). Surgical Versus orthodontic correction for class II patients: age and severity in treatment planning and treatment outcome. Semin Orthod, 72:1-22.
5. Graber TM, Vanarsdall RL, Vig KWL. (2000). Orthodontics. Current principles and techniques ed 3. St Louis: Mosby.
6. Proffit WR, White RP Jr. (1990). Who needs surgical-orthodontic treatment? Int J Adult Orthodon Orthognath Surg, 5:81-89
7. Turvey Ta (1998). Orthognathic surgery: A significant contribution to facial and dental esthetics. J Am Dent Assoc, 117:49e-55e.
8. Trivedi B, Mahadevia S, Shah R, Thakker D. (2014). Combined Orthodontic and Surgical Approach in an Adult Patient with Skeletal Class III Malocclusion. Journal of Advanced Oral Research, 5(3):24-7.
9. Lishoy R, Priyal R, Jamenis SC, Jawale B, Mahajan N. (2020). 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, 6(4):1-8.
10. Jawale B, Rodrigues L, Keluskar KM, Patil S, Belludi A, Patil A. (2020). Forsus fixed functional appliance therapy for dentoalveolar and profile correction- A case report. IP Indian J Orthod Dentofacial Res, 6(4):1-7.
11. Rodrigues L, Jamenis SC, Jawale B, Patil S, Garcha V. (2020). A questionnaire study to assess and evaluate the common gingival problems faced by patients undergoing fixed orthodontic treatment, IP Int J Maxillofac Imaging, 6(4):101-107.
12. Jawale, D. B., Rodrigues, D. L., Patil, D. S., Patil, D. A., & Jethe, D. S. (2021). Burstone'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, International Journal Of Scientific Research, 10(05).
13. Jawale B, Rodrigues L, Patil S, Kangane S, Belludi A. (2021). Aesthetic rehabilitation and correction of crowding with collaboration of orthodontics and endodontics – A case report, Global J Dent Specialty, 1(1).
14. Bhushan Jawale et al. (2021). "Fixed Orthodontic Mechanotherapy for Correction of Generalized Spacing and Severe Proclination of Anterior Teeth" – A Case Report. Glob Acad J Dent Oral Health, Vol-3, Iss- 3, pp-29-35.
15. Bhushan Jawale et al. (2021). "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, 3(3), 37-44.
16. Bhushan Jawale et al. (2021). "Effect of Asymmetric Premolar Extractions on Smile Aesthetics in A Patient With Severe Crowding" – A Case Report, SAR J Dent Oral Surg Med, 2(3), 36-43.
17. Rachana Mhetre et al (2021). "Temporary Anchorage Devices (TADs) for Management of Class I Malocclusion" – A Case Report, SAR J Dent Oral Surg Med, 2(3), 44-53.
18. Bhushan Jawale et al. (2021). "Correction of Spaced Dentition with Fixed Orthodontic Pre-adjusted Edgewise Bracket System" – A Case Report. South Asian Res J Oral Dent Sci, 3(3), 45-52.
19. Bhushan Jawale et al. (2021). "Adjunctive Orthodontic Treatment in an Adult Patient with Mutilated Dentition" – A Case Report On Multidisciplinary Orthodontics. Glob Acad J Dent Oral Health; Vol-3, Iss- 3, pp-36-41.
20. Bhushan Jawale et al. (2021). "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, 6(5): 203- 208.
21. Bhushan Jawale et al. (2021). "Conventional MBT Mechanotherapy for Management of Bimaxillary Dentoalveolar Protrusion" – A Case Report. EAS J Dent Oral Med, 3(3), 65-72.
22. Bhushan Jawale et al. (2021). ―Wonders of Rapid Maxillary Expansion and Lower Premolar Extractions in Correction of a Skeletal Class III Case with Maxllary Deficiency and Mandibular Excess‖ – A Case Report on Non- Surgical Orthodontic Camouflage. Saudi J Oral Dent Res, 6(5): 192-202.
23. Bhushan Jawale et al. (2021). "Maxillary 1st Premolar Extractions For Correction of Proclined Upper Dentition" – A Case Report. Int J Recent Sci Res. 12(05), pp. 41740-41745.
24. Bhushan Jawale et al. (2021). "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, 3(3), 73-77.