

CASE REPORT

An Atypical Orthodontic Extraction Pattern In Bimaxillary Protrusion Case – A Case Report

Prashant Gupta¹, Nandini Venkatesh Kamat²

ABSTRACT

Introduction: In the modern era, treating orthodontic patient with extraction of all first premolars has become challenging in many situations. This holds true in those cases who present with compromised dentition in which teeth other than the first premolars are grossly decayed and indicated for extractions.

Case Report: This case report describes the treatment of a 17 year old male with bimaxillary dentoalveolar protrusion. The patient complained of forwardly placed upper front teeth. The patient had a lingually displaced lower left second premolar and a failed root canal treated lower right second premolar. Generally treatment plan of such cases involves extraction of first premolars but the compromised nature of lower second premolars complicated the treatment planning. This case report provides an alternative treatment approach of extraction of maxillary first premolars and compromised mandibular second premolars without compromising the quality of treatment outcomes. The anchorage requirement was critical in the mandibular arch and the teeth anterior to the extraction space were distalised.

Conclusion: Despite the unusual extraction pattern, superimposition of pretreatment and post treatment cephalometric tracings confirmed desired treatment outcomes. Hence, extraction of a healthy tooth was avoided.

Keywords: Atypical orthodontic extraction, Bimaxillary dentoalveolar protrusion.

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¹Ex- PG Student, ²Professor and Head Department of Orthodontics and Dentofacial Orthopedics, Goa Dental College and Hospital, Bambolim, Goa, India

Corresponding author: Dr. Prashant Gupta, Ex-PG Student, Department of Orthodontics and Dentofacial Orthopedics, Goa Dental College and Hospital, Bambolim, Goa, India

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INTRODUCTION

Bimaxillary dentoalveolar protrusion is a condition characterised by proclined upper and lower incisors with increased lip procumbency.¹ Hence, the goals of orthodontic treatment include retraction of both maxillary and mandibular incisors to decrease soft tissue procumbency and facial convexity.² The common treatment approach would involve extraction of first four premolars with maximum anchorage mechanics like opposing arch, extraoral anchorage, increasing the number of teeth in the anchorage unit or circum-oral musculature.³ The treatment plan becomes complicated when the patient presents with a unfavourably lingually displaced lower left second premolar and failed root canal treated lower right second premolar.

This case report describes the treatment approach for the patient with bimaxillary dentoalveolar protrusion with compromised lower second premolars.

CASE REPORT

A 17- year old male patient presented with a chief complaint of forwardly placed upper front teeth. Clinical examination revealed convex profile, acute nasolabial angle, incompetent lips, non-consonant smile and a recessive chin. Intraorally, he had a Class II canine relationship by 4mm on right side, 5.5mm on the left side and a class III molar relationship bilaterally by 3mm. The patient presented with crowding in the maxillary and mandibular anteriors and an increased overjet. 45 was a failed root canal treated tooth and 35 was lingually displaced. The patient had a Bolton's discrepancy of 0.8mm mandibular anterior tooth material excess and 1.1mm total mandibular tooth material excess (Figs 1A-C). The lateral cephalogram showed a Class II skeletal pattern with hyperdivergent jaw bases as evidenced by the ANB angle 4° and FMA of 37° and SN-GoGn of 42°. The upper incisor to NA was 41° and to SN was 121°, the lower incisor to NB was 31° and IMPA was 101°, confirming the proclination of upper and lower incisors. The nasolabial angle was 93° and the NB to Pog was -2mm, confirming a recessive chin form. There were no signs and symptoms temporomandib-

ular disorders. Treatment objectives included the following:

1. Obtain a pleasing facial profile.
2. Level and align the upper and lower teeth.
3. Achieving ideal overjet and overbite relationships.
4. Achieving Class I canine and molar relationships bilaterally.
5. To achieve a consonant smile.
6. To correct the recessive chin form.

The first alternative was extraction of four first premolars and retraction of the maxillary and mandibular anterior teeth. For this option, the root canal failed 45 would have to be retreated and a prosthetic replacement would be required. This adjunctive procedure, however would be an additional burden to the patient.

The second alternative was extraction of maxillary first premolars and mandibular second premolars. As the lower right second premolar was a failed root canal treated tooth, extracting it was a more preferable option. The lower left second premolar was lingually displaced. Although it could be brought into alignment, it would be a time taking procedure. This treatment alternative would not only prevent the extraction of healthy premolar but would also negate the need for a prosthetic replacement on a re-root canal treated tooth.

Benefits and disadvantages of each were explained to the patient and the patient opted for the second treatment alternative.

The treatment plan involved sliding mechanics in both the arches. After the extractions of 14,24,35 and 45, fixed preadjusted appliance with MBT prescription (0.022x0.028 inch slot) was placed. An initial 0.014 NiTi archwire was placed for aligning and levelling. To relieve crowding, retraction of 13,23 using lacebacks was done. Anchorage in this stage was reinforced using bendbacks in the maxillary arch. In the lower arch, the anchorage was reinforced using a lingual arch and the first premolars on either side were retracted into the extracted second premolar space. Once the space was created mesial to the retracted first premolars, they were included in the anchorage unit along with the first molars. The canines were retracted to relieve the crowding in the lower arch. The patient was progressively shifted to heavier archwires. After the alignment and levelling, coordinated 0.019x0.025 inches stainless steel wires were placed with weldable retraction hooks. En-masse retraction of the anterior teeth was done in both the arches. Interproximal reduction was carried out simultaneously in the mandibular anterior region to

relieve the Bolton's discrepancy.

After the space closure, settling of occlusion was achieved using a sectional maxillary 0.019x0.025 wire from 12-22 and lower 0.014 inches stainless steel wire with short settling elastics. Lingual bonded retainer was placed in the mandibular arch and a circumferential retainer was delivered in the maxillary arch. The total treatment time was 17 months. The patient did not opt for a surgical advancement genioplasty at the end of the treatment.

The patient's profile had significantly improved, although the chin is still recessive as the patient declined for an advancement genioplasty procedure. A consonant smile was obtained at the end of treatment. Class I dental occlusion was achieved bilaterally with optimal overjet and overbite. (Figs 2A,B). Post-treatment cephalometrics tracing revealed significant improvement in the inclination of the maxillary and mandibular incisors (upper incisors to SN angle, pretreatment:121° and posttreatment:104° ; IMPA pretreatment:101° and posttreatment 94°). The nasolabial angle was average at the end of treatment (pretreatment: 93° and posttreatment:102°). Superimposition of pre and post treatment cephalometrics tracings confirmed the retraction of anterior teeth with mild anchor loss in the maxillary arch as desired.

DISCUSSION

Bimaxillary dentoalveolar protrusion cases with poorly prognosed second premolars are a challenge to orthodontists. Conventional treatment plan involves the extraction of all first premolars to achieve facial changes, but a failed root canal second premolar and a lingually displaced second premolar creates a dilemma for the orthodontist, i.e. whether to extract healthy premolars or to extract the compromised teeth and distalise the dentition. This case report provides an alternative treatment approach of extraction of maxillary first premolars and compromised mandibular second premolars without compromising the quality of treatment outcomes.

In the maxillary arch, en-masse retraction was done using sliding mechanics on both sides. In the mandibular arch also sliding mechanics were used after the first premolars were distalized into the second premolar extraction space. For this, the anchorage in the mandibular arch was reinforced by a lingual arch. Once space was created mesial to the retracted first premolars, they were added to the anchorage unit in the lower arch. The alignment and leveling was continued in both the arches subsequently.

**Figure-1A****Figure-1B****Figure-1C****Figure-2A****Figure-2B**

Figure-1A-C : (A) Pretreatment right buccal dental photograph, (B) Pretreatment left buccal dental photograph, (C) Pretreatment mandibular occlusal dental photograph. **Figure-2A,B :** (A) Posttreatment right buccal dental photograph (B) Posttreatment left buccal dental photograph

PARAMETER	AVERAGE	PRE- TREATMENT	POST-TREATMENT
SNA(in degree)	82	81	80
SNB(in degree)	80	77	77
ANB(in degree)	2	4	3
FMA(in degree)	25	37	36
SN-GoGn(in degree)	32	42	41
U1-NA(angle)	22	41	26
U1-NA(linear)	4	13	7
U1-SN(in degree)	102	121	104
L1-NB(angle)	25	31	27
L1-NB(linear)	4	9	5
IMPA(in degree)	90	101	94
Nasolabial angle (in degree)	102	93	102
E line to upper lip	-2mm	+3mm	0mm
NB to Pog	2+/-2	-2mm	-2mm

Table-1: Pre treatment and post treatment cephalometric data

En-masse retraction was initiated on a 0.019x0.025 inches stainless steel wire in the lower arch, without any molar anchor loss. In the upper arch, canines were distalized into a Class I relationship, following which en-masse retraction was carried out to close the extraction spaces. The anchorage requirement in the maxillary arch was not critical as we wanted the molars to mesialise to achieve a Class I molar relationship bilaterally.⁴

Interproximal reduction was carried out in the mandibular anterior region to relieve the mandibular tooth material excess as shown by Bolton's analysis. The negative perception of lip fullness and protruding dentition leads patients to seek orthodontic treatment. Studies have reported that a close relationship exists between upper incisor and lip retraction, suggesting that by extracting premolars, the facial harmony can be achieved.^{4,5,6} Hence, we decided to extract upper first premolar and lower second premolars. At the end of treatment, good facial esthetics with a consonant smile was achieved. The dental procumbency was markedly decreased and a pleasing facial profile was obtained. The patient declined the adjunctive advancement genioplasty procedure. Class I molar and canine relationships were achieved bilaterally.

CONCLUSION

This case report elaborated on the conservation of

healthy teeth by avoiding the extraction of the sound first bicusps. It also provides an alternative treatment approach for a bimaxillary dentoalveolar protrusion case by the extraction of maxillary first premolars and compromised mandibular second premolars without compromising the quality of treatment outcomes.

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