CASE REPORT

Management of Class I malocclusion with unilateral first premolar extractions – A Case Report

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Abstract

Over the past 20 years, there has been an increase in the percentage of non-extraction cases in the average orthodontic practice, which now stands as high as 80%. Mid-arch extractions can compromise facial esthetics, especially in patients with concave profiles. The treatment plan must allow for post-treatment facial growth, including the tendency for the noses and chins of young adults to grow more forward than their lips. Decision of extraction of permanent teeth should be based on sound diagnosis, and it should be evidence based. This is a case report of young male patient who had moderate crowding, anterior crossbites, highly placed canine with midlines shift and an unaesthetic smile. The case was treated with unilateral first premolar extractions by using a simple modification of Nance palatal arch and individual T loop along with pre-adjusted Edgewise appliance.


Key words: Unilateral premolar extraction, modify Nance palatal arch, T loop, Unaesthetic smile.

Introduction

The extraction/non-extraction philosophy had received a great deal of consideration in orthodontics. The “no extractions under any circumstances” Angle’s philosophy had been conquered by “extractions when necessary” Case’s philosophy. Nance in 1949 was one of the first to draw consideration to the extraction of second premolars in mild discrepancy cases. A non-extraction approach can be more esthetic in patients with mild or moderate bimaxillary protrusion. Bimaxillary protrusion in adolescent patients has traditionally been treated by extracting the four first premolars and retracting the anterior teeth. Although this approach is less complex than non-extraction treatment and can produce a good occlusal result, it also tends to retrace the lips and reduce the convexity of the face. In cases with severe incisor protrusion, facial convexity, lip incompetence, or crowding, premolar extractions...

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may be unavoidable. In this report, we describe the orthodontic management of a case who had moderate crowding, anterior crossbites, highly placed and labially blocked canine, midlines shift, an unaesthetic smile with the unilateral extractions of first premolars.

**Case Report**

A 14 years-old post-pubertal male patient came to the satellite clinic with the chief complaint of irregularly placed anterior teeth and unaesthetic smile. He was physically healthy and had no history of medical or dental trauma. No signs or symptoms of temporomandibular joint dysfunction or trauma were noted at the initial examination. Extra orally he had a mesoprosopic facial form, mesomorphic body type with a straight facial profile, without any gross asymmetry. Intra orally he had class I molar relation on both sides and class I canine relation on right side, with an overjet of 1 mm, and overbite of 3 mm, the maxillary left canine was blocked out of the arch labially and highly placed, crossbite in relation to 12 and 22, lower arch form-square shaped. Upper midline is shifted to left by 1 mm and lower midline is shifted to right by 3 mm. [Figure 1]. Although lateral cephalogram and orthopantomogram is indicated in most of the orthodontic cases but due to the patient’s good facial profile and lack of facilities at satellite clinic it was decided to go ahead with treatment without these radiographs.

![Pretreatment Photographs](image1)

**Fig 1. Pretreatment Photographs**

![Modified Nance palatal arch](image2)

![Individual T Loop](image3)

**Fig 2. Canine retraction**
**Treatment objectives were to**

- The treatment plan was to obtain space in the both arches by the unilateral extraction of first premolars. In upper arch space is required for highly placed and labially blocked out canine and in lower arch space is required to relieve the crowding.
- The midlines had to be corrected.
- Correction of anterior crossbites in relation to 12 and 22.
- To achieve a stable functional occlusion with normal overjet and overbite, Class I canine relationship on left side.
- Maintaining the Class I molar relation bilaterally, Class I canine relation on right side and the pleasing profile.

**Treatment progress**

Initially, 24 and 34 were extracted and a Begg’s bracket was bonded to the lingual surface of canine. A modified Nance palatal arch was fabricated with a hook in the canine region. The ligature was ligated to the Begg’s bracket and hook [Figure 2]. The ligature was progressively activated to maintain a force of 60–70 g. The pull on the canine was directed disto-palatal toward the extraction space which not only caused the eruption of the canine but also corrected its mesio-distal inclination. This also pulled the canine away from the root of the lateral incisor. Simultaneously, Individual T loop was placed for the lower canine retraction. Total duration of the traction was 7 months. Meantime both arches were bonded and canines were also included in the arches. Treatment was started using 0.014” NiTi in both arches, which was followed by 0.016” NiTi, 0.017” x 0.025” NiTi and 0.019” x 0.025” NiTi. Finally, 0.019” x 0.025” Stainless steel wire was placed in both arches. Cross elastics were given to correct the midline discrepancy. The case was debonded after 12 months of active treatment. Upper and lower lingual bonded retainer from canine to first premolar were given [Figure 3].

![Fig 3. Post treatment Photographs](image-url)
Discussion

This case demonstrates the importance of identifying the specific area of arch asymmetry when initial good profile presents. Because the dental asymmetry for this patient was in the left side, it was appropriate to unilaterally extract in the maxillary arch to achieve canine symmetry and in the mandibular arch to relieve crowding. If the case had been treated with bilateral extractions, it is unlikely that the arches asymmetry would have been corrected thereby resulting in a failure to center the dental midlines facially.

Another advantage of this type of asymmetric extraction was to create canine guidance during lateral movement of the mandible. The establishment of canine guidance is aimed in the orthodontic completion due to several factors: the strategic positioning of the canine in the arch; the favorable root anatomy, presence of a better crown root proportion; the presence of dense and compact bone around the root, which better tolerates the occlusal forces compared with the medullar bone of the posterior teeth; the sensorial pulse that activates less muscles when the canine teeth are in contact than when posterior teeth contact each other.\textsuperscript{8,9}

A study was done by Chen et al.\textsuperscript{10} to clinically investigate the results of unilateral extraction in the treatment of special moderate crowding cases. There is no significant difference in dental arch symmetry between unilateral extraction and bilateral extraction.

Anchorage loss is a potential side effect of orthodontic mechanotherapy.\textsuperscript{11} Since asymmetric extractions were done, maintenance of anchorage was very critical. Otherwise, proclination of anteriors will worsen the profile. In this case report anchorage loss was prevented by using modified Nance palatal arch\textsuperscript{12} in upper arch and tip back bend in T loop\textsuperscript{13} in lower arch.

Also, asymmetric extractions helped in finishing the case with the treatment time of 10 months.

Conclusion

Decision of extraction of permanent teeth should be based on sound diagnosis, and it should be evidence based.

References