

Orthodontic Management of Proclination of Incisors Following all 1st Permanent Molar Extraction of a Young Girl - A Case Report

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Abstract: *Since the early days of orthodontics, the need for tooth extractions in certain orthodontic situations has been discussed and is well established. Premolars, either first or second are the teeth of choice for therapeutic purposes and not the molars or grinders, which are essential for chewing food. However, permanent first molars are extracted, though rare in certain specific situations. Orthodontic biomechanics following first molar extraction is technically more complex due to number of factors. The purpose of this article is to discuss reasons for first molar extraction to describe different stages of orthodontic mechanics involved, by presenting a case treated following extraction of four 1st permanent molars of a young girl.*

Keywords: First molar, anchorage, miniscrews.

1. Introduction

In situations of pronounced labial tipping with a high cephalometric discrepancy and expressive facial convexity, extractions of certain teeth are necessary. Orthodontic treatment with extraction of molars in adult patients are technically more complex. First molars are the permanent teeth that are prone to damage, as they are the first permanent teeth to erupt at as early as 6 years of age. ⁽¹⁾ The chances of carious involvement of 1st molars are therefore considerably very high. Therefore, obviously when extraction proves necessary in managing certain malocclusions, these grossly carious or heavily restored or endodontically treated molars become the teeth of choice, sparing healthy premolars. When 1st molars are extracted, in general the spaces to be closed is greater than that for premolars, rendering critical anchorage and longer treatment time. There is need of greater control over orthodontic mechanics to reduce the side effects of space closure. Therefore, good finishing results can be more difficult to achieve.

2. Case - Report

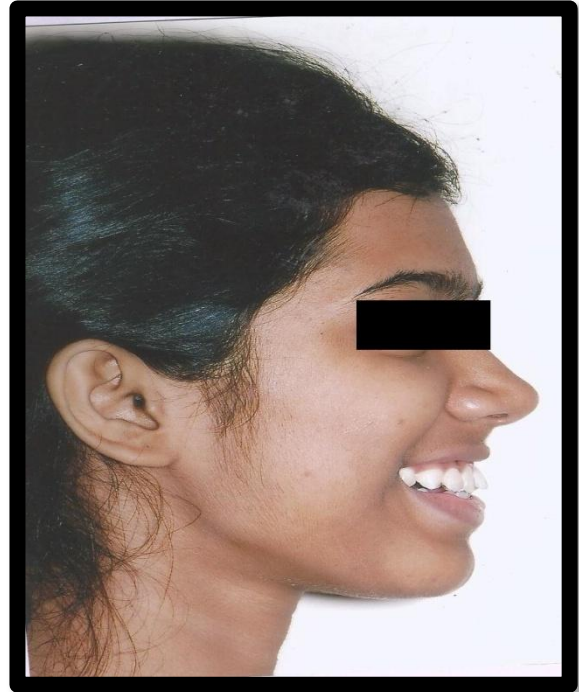
Miss S. Ghosh (S. G) aged 13 years reported at Dept. Of Orthodontia, North Bengal Dental College And Hospital, in the district of Darjeeling seeking treatment for her proclined and crowded upper and lower anterior teeth on a skeletal class I base. On clinical examination it was found, that she had mesoprosopic face with incompetent lips, everted lower

lip and average growth pattern. The most important finding was that, she had grossly carious upper left and upper right as also lower right first permanent molars with completely decayed crowns and retained roots. Cephalometric analysis, study model and photographic analysis revealed about 5 - 6mm space crisis were there in upper and lower arches. The degree of retraction of upper and lower lips necessary ruled out requirement of 1st premolar extraction, but indicated extraction of 2nd premolars. Considering the clinical condition of upper left and right 1st molars as also that of lower right 1st molar, extraction of four 1st molars was decided sparing healthy premolars and to restore dental midline in lower arch.

Pre - Treatment Photographs:

Figure 1: Extraoral and intraoral photographs







The main challenge to manage the case was to utilize wide extraction space situated posteriorly to correct proclination and crowding in incisors. A soldered Nance palatal button from 2nd molars was placed at the onset to preserve anchorage during leveling and alignment phase done with 0.014 NiTi wires.

After completion of initial alignment phase a 0.020 round stainless steel wire was placed in upper arch. Two orthodontic miniscrew implants (TADS) were placed mesial to 2nd molars, and the whole buccal segment containing permanent canine and 1st and 2nd premolars were retracted en masse availing anchorage from the miniscrew implants. In lower arch, 2nd molars were banded and space were closed through sequential retraction of 1st and 2nd premolars on a 0.018 round stainless steel archwire.

After completion of canine retraction in upper arch and premolar retraction in lower arch in stainless steel wire,

rectangular NiTi wire of dimension 19×25 were placed. Due to presence of large extraction space mesial to lower right and left 2nd molars, there was lingual inclination of lower 2nd molars with development of buccal crossbite in molars in both the sides which had to be rectified with placement of wider rectangular NiTi wires and subsequently coordinated 19×25 stainless steel arches in upper and lower. Therefore upper incisors as also lower anterior six teeth (canine to canine) had been retracted on 19×25 S.S posted arch wires.

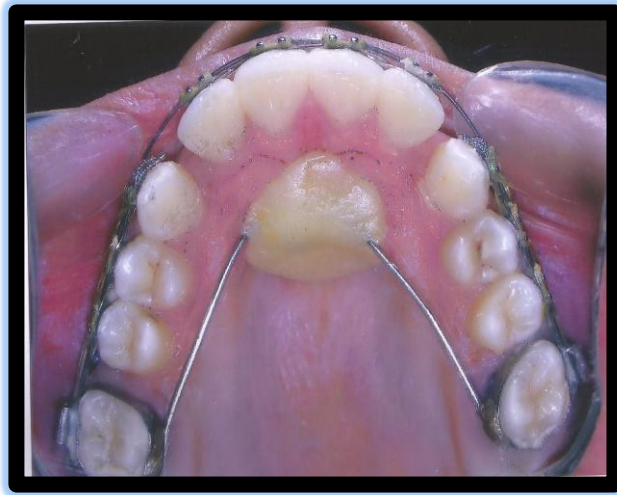
After achievement of class I molar relation, class I canine relation and coincident upper and lower midline relationship, the rectangular stainless steel wires were replaced with 0.014 NiTi wires. The lingual button appliance was removed and the occlusion was settled with setting grey interarch elastics.

In - Treatment Photographs:

Figure 2: Extraoral and intraoral photographs:







Subsequently after debonding the post - treatment occlusion was retained with flexible bonded retainers both in upper and lower incisors as well as Hawleys Retainer in the upper arch. The whole procedure of orthodontic treatment took about 2 ½ years time.

Post - Treatment Photographs:

Figure 3: Extraoral and intraoral photographs:





3. Discussion

Proclination, crowding with mouth breathing, difficulty in closing lips during rest are few definitive factors directing towards orthodontic treatment following extraction. The clinicians have to determine the pattern of extraction, considering the overall health of the teeth mainly and not just in terms of easier biomechanics⁽²⁾.

Excessively extruded molars, endodontically treated, with heavy restorations, periodontically involved molars are the main reasons for consideration of their extraction. High

mandibular plane angle reasons for consideration of their extraction. High mandibular plane angle with convex profile, (extraction of posterior teeth facilitates counterclockwise rotation of mandible and decrease in vertical facial height) and retreatment of class II cases with complete closure of premolar extraction spaces are few clinical situations where first molar extractions are preferred. Whereas first molar extraction is avoided in patients with a lower facial height, noncompliant patients due to a lengthy treatment time, patients who have already undergone orthodontic treatment previously and present with root resorption and (or) short roots. In patients with bruxism,

Volume 12 Issue 3, March 2023

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molar extraction should be avoided due to occlusal interferences that occur during space closure⁽³⁾.

However, when it is decided to extract first molars then the real challenge is to successfully utilize the extraction spaces in retracting anteriors which are situated at a distant place, which demands adequate anchorage preparations. Tungi Sugawara⁽⁴⁾ in his article has shown that it is now possible to predictably move maxillary molars distally in non - growing patients with skeletal anchorage system (SAS) and to improve malocclusions without having to extract premolars and regardless of patient's compliance.

Another concern regarding first molar extraction is management of vertical growth pattern with increased anterior facial height. The more posteriorly extracted the teeth are, the more favourable to manage vertical dimension. According to De Oliveira et al⁽⁵⁾, molar extractions are suitable to solve the problems of vertical growth as well as to attain a class I cusp - fossae relationship at the end.

The 2nd and 3rd molars root anatomy will have to be considered while deciding first molar extraction for orthodontic purpose. First molar extraction has facilitated 3rd molars to be erupted properly in the dental arch in many clinical situations of crowding. Short roots of 2nd molars may hinder their movement. Sandler et al⁽⁶⁾ has emphasized on the clinical effects linked to the 1st molar extraction, that leads to mesial movement of 2nd and 3rd molars however, the effect is pronounced when there is bilateral molar extraction.

4. Conclusion and Summary

Extraction of teeth for orthodontic treatment purpose is already well established. Extraction of 1st permanent molars becomes a viable option where they are in compromised condition due to extensive caries, periapical pathologies and periodontal diseases. Proper selection of cases with appropriate biomechanics makes it possible to achieve perfect post - operative occlusion and pleasing soft tissue pattern and smile characteristics. Orthodontic treatment following first molar extraction however requires skillful biomechanics with skeletal anchorage system.

Source of Support - None

Conflict of Interest - None

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