Case Report

First molar extraction an option in Orthodontics: A report of two cases

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ABSTRACT

Orthodontic treatment requires extraction of teeth in several cases. Permanent first molar becomes a viable option in cases where they are in compromised condition due to extensive caries, hypoplasia, periapical pathology and periodontal diseases. Proper selection of case with appropriate biomechanics makes it possible to achieve good results not only in occlusion but also in soft tissue changes resulting in short duration of treatment and good clinical outcome. However, for the success of the treatment it is necessary to take into consideration different intramaxillary and intermaxillary factors along with consideration for balancing and or compensating extraction. Here we present two cases where with the extraction of compromised permanent first molars, we were able to establish a stable functional occlusion with an improved profile and a pleasant smile.

Key words: *first permanent molar extraction, orthodontic treatment, stable occlusion*

In the year 1899, Angle described first permanent molar as a key to normal occlusion, being the first permanent tooth of posterior segment they provide guidance for eruption of other teeth and stabilize the dentition [1]. However, the first permanent molars have also a disadvantage as they are prone to caries and show a high incidence of hypo mineralization leading to disintegration of the enamel resulting in caries development [2, 3]. Orthodontic treatment is sought after by a large number of patients today in order to bring about functional occlusion and improvement of esthetics. In most of these cases extraction of permanent teeth is indicated due to space discrepancy, proclination of teeth or intra arch asymmetry. Extraction of premolars is usually the first choice due to their strategic position in the transition zone between anterior and posterior segments. Orthodontists have been reconsidering their treatment plan and extracting compromised first permanent molars in place of healthy premolars despite conflicting perception of difficult mechanics and increased treatment time [4, 5].

Extraction of first permanent molars is indicated in case of extruded molars, extensive carious teeth, hypoplastic first molars, persistence of periapical lesion in endodontic treated teeth, anterior open bite and in patients with severe crowding with high mandibular plane angle [6]. In patients with no crowding and decreased lower facial height, noncompliant patients, patients with bruxism and patients who have undergone previous orthodontic treatment, extraction of first molar is contraindicated [7-10]. Here we present two cases of orthodontic treatment with extraction of highly compromised first permanent molars with poor long term prognosis. The successful treatment resulted in good occlusion and esthetic improvement of the patient, thus favouring the extraction of first permanent molars present in compromised conditions in place of healthy premolars.

CASE REPORT 1

A 12 year old girl came to the Department of Orthodontics and Dentofacial Orthopedics, with a chief complaint of crowding of upper and lower front teeth. On extraoral examination the patient had a dolicocephalic head form, long face, convex profile, competent lips. Intraoral

examination revealed Angles class I molar relationship on both sides. Bilateral maxillary canines and 43 were labially placed, 25 was mesiopalatally rotated and 35 was lingually placed. 2nd molars were erupted in all four quadrants. Upper and lower arches were narrow and constricted. The patient had poor oral hygiene with white spots on few teeth. Upper and lower midlines were not coinciding (Figure 1). Lateral cephalogram showed vertical growth pattern. Panoramic radiographs showed grossly carious 16, endodontically treated 36 and heavily restored 46 and presence of crowns of all four 3rd molars (Figure 2a, 2b).

Figure 1: Pretreatment extraotal and intraoral photographs

The treatment was planned to align and level the teeth with the aim of maintaining class I molar relation, in order to improve facial esthetics. After the extraction of all four 1st molars, fixed orthodontic treatment was started with 0.022 slot MBT prescription with 2nd molars banded. The alignment and levelling phase was started with 0.014 NiTi and continued up to 0.018 X 0.025 SS wires. The space created after extraction of molars was used up in decrowding of teeth. The occlusion was settled and debonding done followed by upper lower Hawley's retainer. Total treatment time was 36 months.

Post treatment the patient had a pleasant face, with a more esthetic smile. Intraorally the patient had well aligned upper lower arches in class I molar relationship with normal overjet, overbite. The midlines showed only a deviation of 2mm to the left. The contact between 2nd molar and 2nd premolar was good (Figure 4). Post treatment cephalogram showed maintenance of skeletal bases in Class I and OPG showed no root resorption post treatment with maintenance of healthy periodontal structures and root formation of all 3rd molars in progress (Figure 3a, 3b).

Figure 2a, 2b: Pre treatment OPG and lateral cephalogram, Figure 3a, 3b: post treatment OPG and lateral cephalogram

Figure 4: Post treatment clinical photographs

CASE REPORT 2

A 14 year old girl reported to the Department of Orthodontics with the problem of forwardly placed upper front teeth, difficulty in biting, along with some alteration in the speech. On extraoral examination the patient had a dolicofacial pattern, convex profile and incompetent lips. On intraoral examination, Angle's class I relationship was noted on both sides, labially placed maxillary and mandibular canines bilaterally, constricted arches, open bite and midlines not coinciding. She had extensively restored 16 with severely damaged crown, restored 26, 36 and 46. 2nd molars were erupted in all four quadrants. Lateral cephalogram analysis showed vertical growth pattern with open bite. Panoramic radiograph which was taken few months before starting the treatment showed mixed dentition with deciduous molar in the stage of exfoliation and permanent premolars about to erupt. All 2nd molars were fully erupted and crowns of only mandibular 3rd molars were present (Figure 5).

Figure 5: Pretreatment photographs showing extraoral intraoral and lateral cephalogram views

Extraction of all compromised 1st molars instead of healthy premolars were considered for the treatment. Upper and lower teeth were bonded with 0.022 slot MBT prescription. Levelling and alignment was started with 0.014 NiTi and continued till heavy rectangular stainless steel wires. Space obtained in the upper arch was used for decrowding and retraction of upper anterior teeth and lower arch space was used for decrowding of anterior teeth along with closure of bite. Once the occlusion was settled, debonding was done followed by upper and lower removable retainers. The total treatment time was 33 months.

Patient had a pleasing smile and improved facial esthetics at the emd of treatment. Intraorally the teeth were well aligned, with uprighted anteriors with good overjet and overbite. Althought tight contact was achieved bwetween the teeth on left side, space of 1-2mm was present between premoilar and molar on the right side. Post treatment lateral cephalogram showed reduction in tooth protrusion and closure of open bite. Post treatment OPG showed good root positioning of 2nd molars with continuing eruption of mandibular 3rd molars, and absence of maxillary 3rd molars may pose supraeruption of antagonist teeth. (Figure 6).

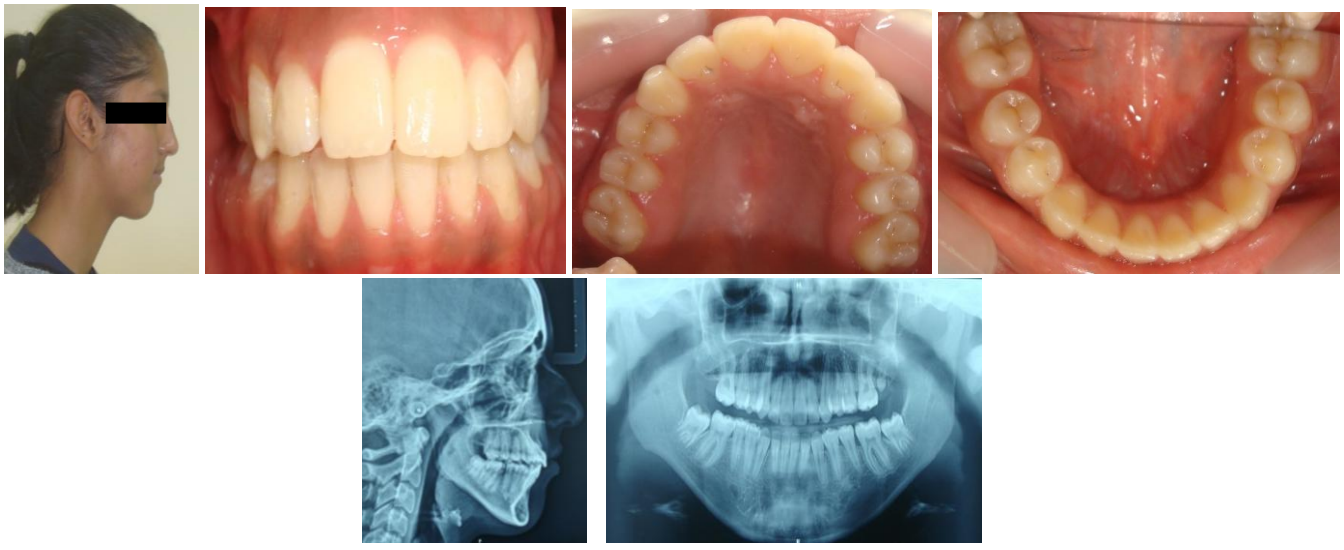

Figure 6: Post treatment photographs showing extraoral, intraoral, laterak cephalogram and OPG views.

DISCUSSION

Literature shows conflicting opinions when extraction of permanent first molars was considered. Wilkinson in 1948 had reported that planned extraction of permanent first molars could lead to self-correction of space discrepancies and prevention of malocclusions to develop [11]. Although premolars are often the first choice of extraction for orthodontic purpose, teeth with extensive caries and restorations periapical pathology, can also be considered [6]. As permanent first molars are more prone to caries and hypoplasia, with the rate of 35% in children in mixed dentition being affected, they become the choice for extraction instead of healthy premolars. The amount of coronal destruction of permanent first molars makes them a good option for extraction as extensive caries, re-restoration, endodontic treatment, periapical pathologies makes them enter a restorative cycle with eventual extraction at a later stage [6]. The choice of permanent first molars extraction over premolar extraction was advocated by Jensen who reported that there is loss of 25% of total dental material after extraction of four first premolars followed by extraction of all four 3rd molars whereas extraction of four permanent first molars is equivalent to 12.5% of dental material, facilitating the space closure easily [12].

However, when extraction of permanent first molars is planned due to poor prognosis, intramaxillary arch deviations, crowding, intermaxillary relationship, skeletal pattern, dental age along with presence and condition of other teeth must be considered [13, 14]. The timing of extraction also holds importance. If permanent first molars are extracted before 8 years, then 2nd premolars may drift or tilt into permanent first molars space due to lack of guidance by permanent first molars [13, 15]. The occlusal consideration says that in Class I individuals with compromised lower permanent first molar, a balancing extraction in the lower arch and a compensating upper permanent first molar extraction should be considered. However if maxillary first permanent molar is compromised, only balancing extraction in upper arch will suffice without whereas compensating lower molar extractions. [16, 17]. Balancing extraction of contralateral side is always preferred to prevent midline shift [12]. In our both cases, most of the permanent first molars were compromised with either caries, extensive caries, restorations, extensively restorations, RC treatment with severely damaged crown, hence making them a choice for extraction over premolars [13].

The significant amount of intra arch crowding justifies permanent first molar extraction as in our cases, since it is much easier to close the space in such cases as compared to minimum intra arch crowding, where space closure gets difficult and also affects the profile of the patient [16]. Presence of 3rd molars in cases with permanent first molar extraction facilitates their eruption and better positioning but their absence also doesn't contraindicate extraction of permanent first molar [18-20]. In one of our case all 3rd molars were present whereas in 2nd case only mandibular 3rd molars were present. In cases where permanent first molar are extracted with 2nd molars located above CEJ of 1st molars, there is a very favourable space closure especially in children and young adults [10]. In cases where upper permanent first molar are extracted after eruption of 2nd molars, it results in their tipping and rotation. Hence the correct time for permanent first molar extraction can be decided according to our need for space utilization.

As compared to all four first premolar extraction, the treatment time with permanent first molar extraction increases by 6-9 months approximately to bring 2nd molars into satisfactory relationship with 2nd premolars especially mandibular [8, 21] and also decreases the prognosis whereas Daugaard- Jensen found no difference in treatment time between permanent first molar and premolar extraction cases [22]. Treatment period in our cases was 36 and 33 months respectively. Another drawback of extraction of permanent first molar is that it may affect the profile of patient as found in studies of Stalpers et al [23]. Whereas Williams and Hosila documented the fact that permanent first molar extraction has less effect on profile of the patient than premolar extraction [4, 19]. Profile may be affected in attempt to close large residual spaces of first permanent molar extraction in absence of significant intra arch crowding. In our cases with extraction of permanent first molars, we were able to achieve functionally stable occlusion of patients with normal overjet, overbite along with improvement of profile of the patient. The need for elaborate restorative, endodontic and prosthetic procedures was eliminated and also saved healthy premolars from being sacrificed.

CONCLUSION

For any successful orthodontic treatment there is a need to perform comprehensive examination of entire dentition. With its compromised state extraction of permanent first

molars are considered a treatment of choice. However, different intramaxillary and intermaxillary factors must be considered before extraction. Proper selection of case along with proper biomechanics makes it possible to achieve good results not only in occlusion but in soft tissue changes as well as with the benefit of finishing treatment in comparable treatment time.

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