CASE REPORT

Natural Eruption of Impacted Premolar: A Case Report

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ABSTRACT

Aim: To report the inherent potential of impacted mandibular premolar to respond well to treatment for natural eruption.

Summary: An impacted tooth is one that is embedded in the alveolus so that its eruption is prevented or the tooth is locked in position by bone or adjacent teeth. In this case, impaction of second mandibular premolar was due to early loss of its deciduous predecessor causing permanent molar to tip mesially and there was some degree of distal tipping of first premolar of same side leading to reduction of space. This resulted in blockage of successional tooth from erupting into the line of the dental arch. It could have either moved lingually or erupted on the lingual side, or may have remained impacted beneath the pitched roof formed by the two adjacent erupted and tilted teeth. This case was managed by re-siting the drifted teeth back into their former or improved positions by fixed orthodontic appliance using open coil spring, creating back the space, and the impacted tooth was allowed to erupt naturally.

Keywords: Natural Eruption, Mandibular Premolar, Impacted teeth

INTRODUCTION

Impaction of permanent tooth is a common clinical occurrence and may involve any tooth in the dental arch. Mandibular second premolars rank third after permanent third molars and maxillary permanent canines in frequency of impactions.[1] Tooth eruption is of multifactorial nature. Genetic and environmental factors involved in tooth development may be disturbed at any stage of tooth development.[2] Tooth germ of mandibular second premolar is ideally positioned between the roots of second deciduous molar. Normally the path of eruption follows resorption of roots of deciduous molar with no major deviations. The mandibular premolars erupt after the mandibular first molar and mandibular canine; thus if the room for eruption of premolars is inadequate, one of the premolars usually the second premolar remains un-erupted and chances of getting impacted are more.[3] The prevalence of impacted premolars varies according to age.[4] The overall prevalence for impaction in adults has been reported to be 0.5% the range being 0.2% to 0.3% for mandibular premolars.[4,5]

Most common cause of mandibular second premolar impaction is premature loss of deciduous predecessor, the other cause has also been related to the initial angulation of the tooth.[7] The other etiological factors include over-retained or infraocclusal and ankylosed primary molars,[8] ectopic positioning of the developing premolar tooth buds; or pathology such as inflammatory or dentigerous cysts,[9] extrinsic obstructions, such as supernumerary teeth and odontomas.[10] They may also be associated with, thick and fibrous gingival tissue or with syndromes such as cleidocranial dysostosis.[11] If left untreated, the tooth may remain impacted with the risk of damaging neighboring teeth and loss of arch integrity.[12] Impaction of second mandibular premolar may lead to loss of space, 'due to mesial drift of molar and distal movement of mandibular first premolar', shift of lower midline toward the impacted side, spacing in the mandibular arch and deep overbite.

The case described below, illustrates the inherent potential of impacted mandibular premolar to respond well to treatment for natural eruption. Unerupted second premolars have been reported to have tremendous eruptive and migratory potential and are the most common tooth to migrate.

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A 15 year old girl reported in the clinic with chief complaint of spacing in maxillary anterior teeth and missing lower anterior teeth. Her medical history was not significant. She gave history of premature extraction of deciduous second molar at about age of 5 year. On clinical examination it was found that

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all the primary teeth had exfoliated. The teeth were in Angel's class 1 molar relationship. Mandibular anterior teeth were rotated. Routine records like study models (Fig. 1), orthopentomogram (OPG) (Fig. 2) and photographs were taken. OPG confirmed the presence of all the permanent teeth except the mandibular lower right and left central incisors, which resulted in spacing in this region. The various causes for spacing are hereditary, acquired or functional.[13] In this case the reason for spacing in mandibular arch is due to missing central incisors; and in maxillary arch might be due to tooth size- jaw size discrepancy. The mandibular right second premolar with mesial orientation was impacted with root completely formed. The patient was unaware of the impacted premolar existence. Most of the impacted teeth are discovered during routine radiographic examinations. Perhaps in this case premature loss of deciduous second molar has caused mesial migration of permanent first molar and distal tilting of first premolar leading to loss of space and impaction of right second premolar . The space present for eruption of mandibular right bicuspid was merely 2 mm. Based on clinical and radiographic findings treatment plan included space regaining, molar up righting with fixed appliance so as to allow eruption of impacted tooth into normal functional occlusion. Roths fixed appliance (0.022 Slot) was placed in maxillary and mandibular arches. Alignment and leveling was done with sequential 0.016", 0.018", 0.017" x 0.025" and 0.019" x 0.025" NiTi arch wire. Arches were stabilized with 0. 019" x 0.025" stainless steel arch wire. Open coil spring (0.030" lumen) was placed between mandibular first molar and first premolar to create space for eruption of second bicuspid (Fig. 3). Proper brushing technique was taught to the patient. Adequate space was created within 5th month, cusp tip of the impacted second premolar was visible clinically in the oral cavity. After ten months of treatment in lower arch, the right second premolar erupted spontaneously into the occlusion without applying any force onto it. A bracket was bonded to the erupted premolar for final positioning of the tooth. Tooth was regularly checked clinically every 3 month for the eruption pattern and to evaluate oral hygiene status. Complete alignment of bicuspid successfully occurred in next 3 months with good gingival attachment (Fig. 4), and without any external root resorption. All the treatment possibilities like removable and fixed partial denture as well as implant prosthesis for the missing lower central incisors were explained to patient. Patient opted for implant supported prosthesis after two years.

Figure 1: (a) Lower and (b) upper jaw cast showing permanent dentition and missing lower central incisors and right second premolar.

Figure 2: Orthopantograph (OPG) showing impacted mandibular right second premolar.

Figure 3: Open coil spring placed between mandibular first molar and first premolar to create space for eruption of second premolar.

DISCUSSION

An impacted tooth is one that is embedded in the alveolus so that its eruption is prevented or the tooth is locked in position by bone or adjacent teeth.[14] In the mandibular arch, since second premolar is the second last tooth to develop and

Figure 4: (a) Lower and (b) upper jaw casts showing erupted mandibular right second premolar and well aligned teeth.

erupt, it shows a great variation in its developmental pattern. That may be a reason for mandibular second premolar constituting 24% of all the impactions.[1] In this patient, failure to detect and analyze the problem led to unnecessary space loss, impaction of second premolar and collapse of the dental arch. Posen[15] said that eruption of premolar teeth will be delayed in children who lose primary molars at 4 or 5 years of age and before, but if extraction occurs at age of 8, 9 and 10 years, premolar eruption will be accelerated. Various treatment methods have been suggested including observation, intervention, relocation and extraction.[16] On occasion there may be some interactions between these options.[17] In selecting an appropriate treatment option, the underlying etiological factors, space requirement, need for extraction of primary molars, degree of root impaction and root formation will also influence choice of treatment.[18]

Premature loss of mandibular second premolar may cause mesial drifting of mandibular first permanent molar and consequent space loss; retarding the eruption of mandibular second premolar. MacLaughlin *et al*.[19] studied 285 cases of premature loss of deciduous second molar and said it caused impaction of mandibular second premolar in 19% of cases studied. However a study by Wasserstein and Shalish[20] failed to find a significant correlation between premature loss of mandibular second primary molar and malposition of mandibular second premolar. Profitt[21] states that a tooth will erupt into its correct position after obstacles to eruption have been removed by surgical exposure, but after root formation is completed eruption of tooth rarely occur. Even a tooth that is aimed in the right direction usually requires orthodontic force to bring in to position. While, Becker[22] advocated that by whichever method space is made, the tooth will normally erupt with considerable speed, without further assistance, if teeth are with moderately disturbed axial angulations. If sufficient space exists or created in the dental arch, impacted mandibular premolar then has a high potential for self-alignment and eruption without orthodontic intervention.[23]

Preventing mandibular premolar tooth impaction is the ideal form of treatment and provides the best long-term results. With early detection, timely interception, and well-managed orthodontic treatment, impacted tooth can be allowed to erupt naturally and can be guided to an appropriate location in the dental arch. Management of impacted tooth, by regaining space so as to allow its natural eruption, can offer a better and long term prognosis with no adverse pulpal or periodontal risk to the tooth and the supporting structure.

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