ABSTRACT:
Lower second premolars, closely followed by upper premolars, are regarded as the third most common teeth prone to impaction, after wisdom teeth and upper canines.

Objective of this article is to show the possibility for spontaneous eruption of impacted premolars upon extraction of deciduous molars and removal of the follicular cyst as described in several clinical cases. The present paper reports four clinical cases supporting the thesis that regardless of the reason behind impacted premolars, undertaking preventive measures significantly improves the position of the germ of those teeth.

Conclusions: The early extraction of the deciduous molar, monitoring the patient and reserving the space for the succeeding impacted premolar can lead to non-invasive or relatively short orthodontic treatment (secondary prevention). If root development is incomplete yet there is a good growth potential which could lead to spontaneous eruption (primary prevention).

Age specifics particular to children such as the great regenerative abilities of the bone, provide a good prognosis for spontaneous eruption or significant improvement in the position of impacted premolars and facilitate the orthodontic treatment.

Keywords: lower premolar, second primary molar, impacted premolars, disturbed eruption, prevention

INTRODUCTION
Lower second premolars, closely followed by upper premolars, are regarded as the third most common teeth prone to impaction, after wisdom teeth and upper canines.

Impaction of lower second premolars account for 0.1 - 0.3% of all impacted teeth [1, 2]. Peck and other authors claim that premolar impaction is due to genetically determined factors [3, 4, 5, 6, 7], while Johnsen, Siero and other authors consider local factors to be central: namely, the lack of space and ectopic position of the tooth germ [8, 9], ankylosed deciduous molars, odontomas and supernumerary teeth [10, 11].

Shear and other authors report that a frequent reason for the retention of the premolar germ appears to be the dentigerous or follicular cyst. Follicular cysts are associated with the crown of the germ of the developing tooth, enclos-

Case 1:
The first case is of a 13- year-old girl with permanent dentition and persistent deciduous lower second molar due to an impacted lower second premolar on the left. The patient is Class I as per Angle’s classification, with hypodontia of tooth 12 and microdontia of tooth 22. (fig. 1a) Family history proved that the mother also has hypodontia, suggesting a congenital predisposition to lack of teeth and impaction of the permanent fifth tooth in the mandible. After extraction of the persistent deciduous second molar there was no need for an orthodontic appliance to facilitate eruption of the second premolar since there was enough space in the dental arch for it. The child was followed through check-ups every 3 months in order to monitor the position of the permanent first molar and the space available in case preventive measures would become necessary. Nine months later a radiographic examination showed a visible change in the position of the fifth tooth germ. (fig. 1b) Following the extraction of the persistent temporary tooth and the growth spurts of the developing
root of the permanent second premolar, a change in the direction of growth and improvement of the tooth position were observed. It was decided to conduct orthodontic treatment of the hypodontia in the maxilla as well as to restore aesthetics while waiting for a spontaneous eruption of the second premolar. If these results are not achieved within 8 months of the beginning of treatment, the premolar will be then exposed and facilitated into the dental arch.

**Fig. 1:**

a) An orthopantomography prior to treatment

b) An orthopantomography after extraction of the deciduous fifth tooth showing a significant improvement in the position of the permanent premolar

**Case 2:**

A 14-year-old girl was checked in the clinic, being a Class I patient as per Angle, with impacted upper second premolar on the right due to hyperdontia of the premolar and a strong mesial inclination of the first molar on the right. (fig. 2a and b). The clinical decision taken was to extract the supernumerary tooth which had an irregular shape. After extraction of the supernumerary tooth segment brackets were placed along tooth from right canine to right permanent first molar region in order to straighten the heavily inclined first molar and provide space for the fifth tooth eruption. Due to the deep position of the impacted second premolar it was decided not to expose the tooth surgically, but instead to wait for a spontaneous eruption or at least some improvement of the premolar position. Follow-up checks were carried out every 3 months, making segmented radiographs. Five months after the extraction of the supernumerary tooth a descent of the second premolar was observed. (fig. 2c) A year and three months since treatment a minor bone cover over the second premolar is observed and the prognosis is for a spontaneous eruption of the second premolar.

**Fig. 2:**

a) An OPG showing a supernumerary second premolar

b) X-ray as per Simpson
c) eruption path and descent of the second premolar

Case 3:
An 11-year-old girl, a Class II patient by Angle, with compression in the upper and lower jaw. The patient exhibited a significant delay in the eruption of permanent teeth. An orthopantomography revealed the presence of a follicular cyst on the lower first premolar on the left and a mesial inclination of the premolar towards the canine. (Fig. 3a) The patient was referred to for extraction of the temporary canine as well as the temporary first molar. A year and a half later the patient returned for a follow-up check; however, the prescribed teeth extraction had not been performed. Clinically, a swelling of the bone and its crackling towards the vestibule in the region of the permanent canine and first premolar were observed. A new orthopantomography revealed the follicular cyst, significantly increased in size, a greater mesial inclination of the first premolar, which had inhibited the eruption of the permanent canine. (Fig. 3b)

As seen, at the absence of prevention steps (extraction of the temporary tooth, providing space for the eruption of the respective permanent premolar and removal of the cyst) the tooth position had worsened and the eruption of the cyst-associated permanent premolar was inhibited. This can lead to negative impact on adjacent teeth, delaying their eruption or even their impaction.

Fig. 3. Deterioration in the position of the first premolar due to the increased size of the follicular cyst.

Case 4:
A 9-year-old girl with compression in the upper and lower jaw and lateral deviation to the right. An orthopantomography revealed a follicular cyst enclosing the germs of permanent canine and first premolar on the left in the upper jaw (Fig. 4a). Clinically, a significant swelling and deformation of the bone was observed as a result of overgrowth of the cyst formation. Following extraction of the temporary canine and temporary first and second molar and removal of the cyst sac by draining the fluid, a plate was placed in the maxilla to ease the compression and reserve the space of the prematurely extracted deciduous teeth, with the attempt to alter the eruption paths of the permanent canine and first premolar. Six months later a new OPG revealed a change in the eruption paths of both teeth: eruption of the first premolar is pending while the canine is in the desired position and descending to its normal position in the dental arch. (Fig. 4b). Organization of the bone structure in the region of the removed cyst is also observed.

Fig. 4: a) Prior to extraction of the temporary teeth: presence of a follicular cyst enclosing the canine and the first premolar
DISCUSSION:

The clinical cases demonstrate that even an unfavourable and deep position of an impacted premolar can be modified by extracting the preceding temporary molar and removing the follicular cyst, if any. In certain cases where there is sufficient space only extraction of the deciduous teeth and monitoring the patient may be appropriate. In the cases of unfavourable inclination of the premolar it is advisable to reserve the space for eruption of the premolar or if there is insufficient space and some orthodontic deformity, treatment should be initiated. Even if spontaneous straightening and eruption of premolars is not achieved, the extraction of temporary molars as early as mixed dentition or permanent dentition (with incomplete root growth) creates favourable conditions for improved position of impacted premolars. This shortens and facilitates an orthodontic treatment at a later stage and avoids surgical intervention on exposing and continuous withdrawal of the premolar. The earlier temporary molars are extracted when the germ root of the permanent premolar is not developed yet, the better the possibility of a spontaneous eruption.

If the cyst is sized and destroys much of the bone, its marsupialization should be initiated in order to reduce the pressure in the cyst formation and its size to ease the bone recovery. Thus complications can be avoided, but still there is a risk of recurrence [16].

K. Thoma, S. Marks and other authors likewise report in their studies that if removal of the cyst and extraction of the temporary tooth is done at an age when the tooth is still actively growing (in early mixed dentition or early stage of late mixed dentition), the change in the eruption path of the impacted tooth is happening fast, which is related to the degree of formation of the tooth root, which in turn is a major factor in the eruption of permanent teeth [17, 18]. Quite often though, apart from an early extraction of temporary molars and removal of the cyst, orthodontic treatment to assist straightening of the premolar germ may be necessary [19, 20].

The following conclusions can be drawn from the discussion above:

CONCLUSIONS:

1. The early extraction of the deciduous molar, monitoring the patient and reserving the space for the succeeding impacted premolar can lead to non-invasive or relatively short orthodontic treatment (secondary prevention).

2. If root development is incomplete yet there is a good growth potential which could lead to spontaneous eruption (primary prevention).

3. Age specifics particular to children such as the great regenerative abilities of the bone, provide a good prognosis for spontaneous eruption or significant improvement in the position of impacted premolars and facilitate the orthodontic treatment.

REFERENCES:


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