CASE REPORT

Impacted maxillary second premolars: a report of four cases

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SUMMARY

Impacted teeth are commonly encountered in clinical practice. Apart from their symptomatic nature and the probable functional disruption they can cause, impacted teeth have the potential to cause more severe and serious problems such as development of dentigerous cysts and other complications due to their proximity to the nasal and oral cavity. In this report, we highlight a series of four cases involving maxillary second premolars, teeth that are not often impacted.

BACKGROUND

Impaction is a frequently observed phenomenon in clinical practice, although the prevalence varies from location to location and from one tooth type to another. An impacted tooth is one which is prevented from erupting in its normal functional position by bone, other teeth, or fibrous tissue.¹ Molars and canines are found to be impacted to a far greater extent than other teeth.²

The rate of incidence of impaction in premolars is estimated to be about 0.5%. Among premolars, mandibular premolars are reported to have a higher rate of prevalence than their maxillary counterparts, and mandibular second premolars are estimated to comprise almost 24% of all impactions, excluding molars.^{3–4}

Like any impacted tooth, impacted premolars are responsible for a host of problems such as aesthetic disharmony, reduced masticatory efficiency and improper maintenance of oral hygiene. Apart from these, an impacted maxillary premolar might be in extreme proximity with the floors of the nasal and antral cavities, leading to the potential for further complications that might require extensive surgical intervention. Furthermore, dentigerous cysts are commonly seen in association with impacted teeth, as also with the development of odontomas and infection along with cysts.^{5–6} The literature contains a limited number of cases on impacted premolars.^{7–8} This report presents a series of four cases of impacted maxillary second premolars involving adolescents and young adults and seeks to highlight the fact that proper and timely diagnosis and treatment planning is absolutely essential to treat the condition and to avoid undesirable consequences of the phenomenon of impaction.

CASE PRESENTATION

All the four cases involved adolescents or young adults who had presented with the symptom of missing or unerupted maxillary second premolars

to several general dentists. Later these patients were referred to a senior Consultant Oral and Maxillofacial Surgeon. The specialist undertook clinical and appropriate radiographic investigations as per the requirements and diagnosed the missing/ unerupted teeth as impacted; surgical removal was the treatment of choice as there was no sufficient space for eruption of these teeth. All the clinical and radiographic details are enumerated in [table 1](#).

INVESTIGATIONS

Different types of radiological investigations ([figures 1A, B, 2A, B, 3A, B and 4A](#)) are conducted and listed according to their respective cases, see [table 1](#).

TREATMENT

All the four cases were treated by surgical exposure and removal of the tooth under local anaesthesia using an intraoral approach ([figure 4B](#)). There was no association of any pathologies or cystic lining with the impacted teeth.

DISCUSSION

An impacted tooth is invariably either embedded in the alveolus so that its eruption is prevented or locked in position by bone or adjacent teeth.¹ The most frequently impacted teeth are the third molars followed by maxillary canines; premolars rank third commonest.⁹ The literature pertaining to impacted premolars is limited and not extensive. The prevalence of impacted premolars has been found to vary according to age. The overall prevalence in adults has been reported to be 0.5% (the range is 0.1–0.3% for maxillary premolars and 0.2–0.3% for mandibular premolars).^{7–8}

The rate of prevalence of impacted premolars is about 1%, involving impacted teeth among ethnic Chinese in Hong Kong, and a recent study in a North Greek population showed 2.2% impacted premolars; the most commonly affected teeth were second mandibular premolars, followed by second maxillary premolars.^{8–9} Such differences in prevalence rates may be due to differences in the genetic and ethnic backgrounds of the patients involved. A recent study in an Indian population indicated that the prevalence of tooth impaction was 16.8%, within the range 5.6–18.8%, as reported in earlier studies.^{10–11}

Causes for impacted premolars can be either systemic or local factors, including lack of space in the jaw, mesial drift of teeth resulting from premature loss of primary molars, abnormal/ectopic

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Table 1 Clinical and radiographic details of the four cases

Serial number	Age/gender	Site of impaction	Type of impactions	Radiograph
1	13/F	Left	Horizontal	3D CT scan, OPG
2	22/F	Left	Mesioangular	OPG
3	13/M	Right	Vertical	OPG, CBCT
4	14/M	Right	Horizontal	OPG

3D, three-dimensional; CB, cone-beam; F, female; M, male; OPG, orthopantomogram.

positioning of developing premolar tooth buds, inflammatory or pathological lesions, such as dentigerous cysts, etc. Genetic or environmental factors may also play a role in these cases.¹²

Impacted premolars may lead to aesthetic concerns, masticatory inefficiency and oral hygiene difficulties as well as follicle pathology and destruction of adjacent structures, including neighbouring teeth.^{13 14} Odontogenic cysts, most commonly dentigerous cysts, have been reported to arise from impacted teeth.¹⁴ These dentigerous cysts may further be subjected to inflammatory changes and secondary infection, resulting in symptoms such as pain and swelling. Adenomatoid odontogenic tumours have also been reported to arise in such cases. In addition, maxillary premolars tend to be palatally positioned, in contrast to mandibular premolars, which are buccally positioned, making it difficult for patients to discover them. Often they are discovered only after pain and swelling occur, thus leading to their late reporting.¹⁵ This can prove to be a risk, as such impacted teeth tend to be in proximity to the nasal cavity or the maxillary antrum.¹⁶

All our case patients had come for orthodontic treatment of irregular or mal-aligned teeth. Extraorally there was no swelling or other abnormality noticed. Intraorally there were missing

Figure 1 (A) Orthopantomogram revealing horizontal-impacted tooth in maxillary left quadrant, (B) three-dimensional CT scan showing the crown of horizontal-impacted tooth in palatal area (case 1).

Figure 2 (A) Orthopantomogram showing the ectopic-impacted maxillary left second premolar tooth and (B) surgical exposure of the ectopic tooth (case 2).

upper left second premolars in cases 1 and 2. In cases 3 and 4, the missing teeth were in the right maxillary arch. There was a definite bulge or swelling noticed on the palatal side of the same region in three cases. In contrast, the swelling was on the buccal side in the fourth case. All other findings were close to normal.

Precise and accurate diagnosis is an absolute necessity for proper treatment. Apart from clinical examination, in which a suspicion of impacted tooth should arise in cases of absent teeth beyond the expected date of eruption, various available radiographic aids should be made use of.¹⁶

Radiographic techniques play a major role in planning the surgical procedure. According to a study, the morphological changes associated with impacted teeth and their relationship to adjacent structures can be visualised by the use of proper radiographic examinations in the diagnosis and surgical planning of impacted teeth. The most frequently advised radiographic techniques are periapical, occlusal and panoramic radiographs. Nonetheless, the radiographs obtained may not allow complete visualisation of all the structures in the region in three-dimensions (3D) mainly due to overlapping of the anatomical structures.^{3 17}

The location and proximity of an impacted tooth often requires special radiographic procedures. Cone-beam CT (CBCT) is a very useful tool in the assessment of impacted teeth and is being widely used instead of, or in addition to, conventional techniques.¹⁸ Recent literature suggests the use of CBCT due to its advantages including detailed visualisation of the area and lower patient exposure compared with helical tomography. Thus, CBCT makes it possible to obtain the precise location of the tooth and to establish the relations between it and adjacent structures through multiplanar views.^{18 19}

In the present case series, apart from conventional panoramic radiographs (orthopantomogram) for all cases, we employed recent radiographic techniques such as CBCT for case 3, 3D CT and Denta scan for case 1.

Figure 3 (A) Completely formed right second premolar-impacted maxillary tooth along with multiple incompletely formed as well as forming teeth in the orthopantomogram; (B) axial, cross sectional, sagittal and cone-beam CT scan showing the impacted maxillary right second premolar tooth (case 3).

Different treatment methods have been suggested including observation, interceptive orthodontics, surgical exposure with orthodontic intervention, autotransplantation and extraction depending on position of impacted tooth, relationship with adjacent teeth and need for orthodontic treatment.

All four cases were planned for surgical removal under local anaesthesia. In case 2, the right second premolar was extracted for orthodontic purposes. All cases were treated orthodontically for aesthetic reasons, either for mal-alignment or smile correction. All cases were treated by straight wire technique of orthodontic correction by a consultant orthodontist. As per the consultant, these treatment procedures are lengthy and should ideally be performed under the supervision of an experienced orthodontist.

Observation involves regular monitoring of the patient (a child or an adolescent) clinically and radiologically without treatment for a specific time. Simple extraction of a tooth or teeth is the intervention. Usually a primary and rarely a

Figure 4 (A) Orthopantomogram showing horizontal-impacted maxillary right second premolar tooth and (B) surgical exposure of the impacted tooth in the buccal side (case 4).

permanent tooth may be extracted depending on the causes and the tooth impacted.⁴ Although a little extensive, the surgical procedure yields excellent results and leaves no residual, cosmetic or functional impairments.²⁰

Learning points

- ▶ Correct knowledge of regional anatomy and application of mechanical principles on the removal of teeth with careful handling of tissue will help in successful surgical management of impacted teeth.
- ▶ Awareness of the potential risks associated with such teeth is essential.
- ▶ We believe that the present report on peculiar and rare cases regarding impacted maxillary second premolar teeth will contribute towards the scant literature available.

Competing interests None.

Patient consent None.

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