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Impacted Third Molars – Searching for Solutions

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Abstract

A reduction in the number of teeth in the dental arch can be caused by stopping, delaying or delaying their eruption. Teeth that could not be extracted due to certain reasons are called retained. Most likely, it is in the case of third molars that we encounter dystopia, cases of retention or semi-retention or primary dentition. For many years, the removal or retention of retentive dystopic third molars has been a subject of active discussion. That is, due to a number of reasons related to the complicated tooth extraction, the third molar often became a victim of extraction.

Retentive teeth This is a common dental pathology that occurs in 0.8-60% of the population. During treatment planning, it is necessary to take into account a number of factors. It is important to determine the aesthetic and functional value of the retained tooth, the age of the patient, the location of the retained tooth in the alveolar cavity, the correct selection of the treatment plan, the state of the tooth row and dentition, and the patient's consent to long-term treatment. To eliminate the problem related to the presence of retained teeth and to conduct the treatment correctly, first of all, it is necessary to accurately diagnose it. Early diagnosis of a retained tooth is carried out on the basis of clinical and radiological examination.

Based on the above, the aim of our study was to reveal tooth retention and semi-retention by means of panoramic radiography. We identified the correlation between retention with other groups of teeth and determined the regularity of the reduction in the number of teeth in the maxillofacial system. To fulfill this task, 230 orthopantomographic images of patients aged 12 to 35 years, including 132 women and 98 men, were studied.

Not only the number of retentive teeth, but also complications after tooth retention and extraction were included in the research area. It was also suggested that the monitoring of asymptomatic third molars can be considered as an appropriate strategy. The decision-making process regarding prophylactic tooth extraction and retention of asymptomatic third molars should be based on the best evidence in combination with clinical experience.

In the case of prophylactic surgery, a key element of the discussion should be patient safety and the associated risk-benefit analysis to avoid possible iatrogenic factors. In addition, an important role is given to the opinion and attitude of patients. Thus, in the case of timely, correct diagnosis and treatment planning, clinicians can reduce the frequency of ectopic extraction of teeth, their retention and, most importantly, further complications, which in most cases are related to the extraction of wisdom teeth.

Introduction

An impacted tooth can be defined as one that is prevented from erupting into position because of malposition or lack of space. For many years, removing or retaining impacted third molars has been a subject of discussion in the dental literature. Whereas the decision to remove third molars associated with pathologic changes is often a straightforward one, prophylactically removing an asymptomatic third molar may not be an easy decision **[**2,8,11**]**. Although explanations for and against prophylactic removal of impacted third molars have been offered, these often were contradictory and led to confusion in the minds of dental professionals. The prevalence of third molar impaction ranges from 16.7% to 68.6%. Most studies have reported no sexual predilection in third molar impaction **[**8,12,13**]**. However, some studies found a higher frequency in females than in males **[**11**]**. Tooth impaction is a common dental condition ranging from 0.8–3.6% of the general population. A tooth normally erupts when half to three-quarters of its final root length has developed. Impaction is usually diagnosed well after the tooth should have erupted **[**8**]**. The most commonly impacted teeth are, consecutively, third molars, maxillary canines, mandibular premolars and maxillary central incisors **[**4,8**]**. Impaction belongs to the tooth eruption anomaly, named, delayed period of physiological eruption **[**5**]**. The reasons of delayed tooth eruption can be of local and systematic nature. The risk of complications is so high that many dentists recommend removing wisdom teeth as a preventative measure as early as possible **[**1,9**]**.

The complications associated with the removal of impacted third molars should not be underestimated **[**1,2,11**]**. The surgery entails incision, stripping of periosteum, bone and tooth removal, and suturing. Pain, swelling, and trismus are almost universal after this procedure, and the incidence of both inferior and lingual nerve damage is high and may be permanent. Nerve damage with temporary or permanent labial or lingual paresthesia or anesthesia are significant risks of surgery **[**1,11**]**.

There are well-established indications for the removal of impacted wisdom teeth. However, one of the methods is - prophylactic removal of impacted third molars, free of any pathology and is still a common practice and therefore remains controversial **[**1,2,13**]**.

In recent times, prophylactic surgery has been justified on the basis that third molars have no role in the mouth, the need to minimize the risk of disease (cysts and tumors) development, reduction of the risk of mandibular angle fracture and other complications, as well as increased difficulty of surgery with age **[**1,11**]**.

Purpose of "Prophylactic Removal":

Prevent the exacerbation or late development of mandibular incisor crowding arguably attributed due to the eruptive forces of the third molars. Avoid the risks of development of pathological changes or sequelae due to presence of impacted or partially erupted third molars **[**3,9**]**.

The more common, mandibular third molars are scheduled for extraction for the above reasons. This is likely to be accompanied by the simultaneous sacrifice of maxillary third molars for the prophylactic benefit of avoiding sequel resulting from the unopposed supra-eruption of the opposing tooth **[**9,13**]**.

And orthodontic clinicians vary greatly in their practice regarding prophylactic removal of third molars after orthodontic treatment **[**3,9**]**. Orthodontists believed that unerupted or impacted third molars occasionally produce an anterior force that cause separation in the contact points and subsequent crowding of the mandibular incisors, sufficient space was unavailable for the third molars to erupt, they exert forces on the adjacent teeth, causing crowding. the erupting lower third molars exert an anterior force and they ''rarely'' or ''never'' cause crowding of the dentition also third molars are the only or even, the major etiologic factors affecting post treatment changes in incisor alignment. impact of third molar removal on the relapse of mandibular dental arch after orthodontic treatment **[**3,6**]**.

Materials and Methods

According to the above mentioned, the aim of the study was investigation of impaction and semi-impaction (partial erupted) in permanent dentition in the population of Georgia, revealing the correlation and feedback of expressed impaction and its consequences after extraction in different age. Study was also aimed to determine any regularity in reduction of tooth number of the skeleto-dental system. To comply with this goal, 230 panoramic images of patients (12 to 35 of ages) have been examined.

This study included retrospective review of clinical records and panoramic radiographs of 230 consecutive patients undergoing the orthodontic treatment in the Dental clinic and training-research center "UniDent". Between June 2016 and December 2020. Demographic details of patients were obtained from clinical records.

The panoramic radiographs were taken with the equipment Gendex (DP- 700); the exposure settings were 70 kVp, 13 mA (16 sec / DAR: 122: 00), varying according to the age and biotype. Panoramic radiographs were stored in software form. Therefore, no alterations related to storage conditions was occurred. All destroyed or defected and artifact radiographs were not included in this study, also

radiographs in which the second molar is missing for any reason were not included in the study. Data was recorded in a special form and was analyzed.

230 ortho-pantomographic images	Impaction of the teeth n=171				
	Wisdom tooth	Maxillary canine	Maxillary Second molar	Second mandibular premolar	Maxillary second premolar
	109	31	5	18	8
	Impacted third molar n=109				
	n= 109	Fully impacted n= 61		Semi-impacted n= 48	
	Upper Jaw (Maxilla)	n = 41			
	Lower Jaw (mandibule)	n = 68			

Table №1. Impaction and partly eruption in different groups of teeth

The statistical processing of obtained materials was performed in SPSS version. Correlation analysis was made to reveal the correlation between impaction and partly eruption in different groups of teeth (Table #1). The results of the study showed that the most frequent is the impacted third molar (wisdom tooth) - in 47,39% (n=109) of cases. Impaction is also common for the maxillary canine – 13,47% (n=31), the second mandibular premolar – 7,8% (n=18), maxillary second molar – 2,17% (n=5) and maxillary second premolar – 3,47% (n=8), respectively. Fully impacted wisdom teeth were revealed in 26,53% cases (n= 61) and teeth partial erupted in 20,86% (n=48) cases. Impaction of maxillary wisdom teeth appeared in – 17,8% (n=41) and mandibular wisdom teeth in – 29,5% (n= 68) (Table №1).

Gender	Impacted Upper maxillary	Impacted lower Mandibular	Total number of impacted teeth
Male n=98	20 (8,7%)	27 (11,7%)	47 (20,4%)
Female n=132	21 (9,1%)	41 (17,7%)	62 (26,8%)
Total number n=230	41 (17,8%)	68 (29,5%)	109(47,39%)

Table №2 - Association of impacted third molars arch with gender

Table №2 presents the distribution of impacted third molars by arch and gender; From the total number of 230 patients, 47,39% (n=109) had all third molars impacted, the prevalence of impacted mandible

third molars 29,5% (n= 68) was slightly higher than that of impacted maxillary third molars 17,8% (n=41), which was statically significant (p<0,005). The prevalence of impacted third molars in females (26,9% n=62) was slightly higher than that of males (20,4% n= 47), which was statistically insignificant (p 0,23). In the mandible, females (17,7%) had more impacted third molar teeth than males (11,7%). In the maxilla, females (9,1%) had slightly similar rate of impacted third molar teeth of males (8,7%)

The overall view and research area were not only the number of impacted teeth, but the consequences and further complications of tooth impactions and extraction. Also what was the signs and complications associated with wisdom tooth impaction. Investigation was provide revealing the correlation and feedback between interesting area of list:

A) The total number of wisdom teeth removed before orthodontic treatment or during treatment.

B) How many cases of extraction became necessary after orthodontic treatment to avoid tooth alignment problems (Teeth crowding)

C) How many post-extraction complications were detected (swelling, alveolitis, damage to a neighboring tooth, parestesia).

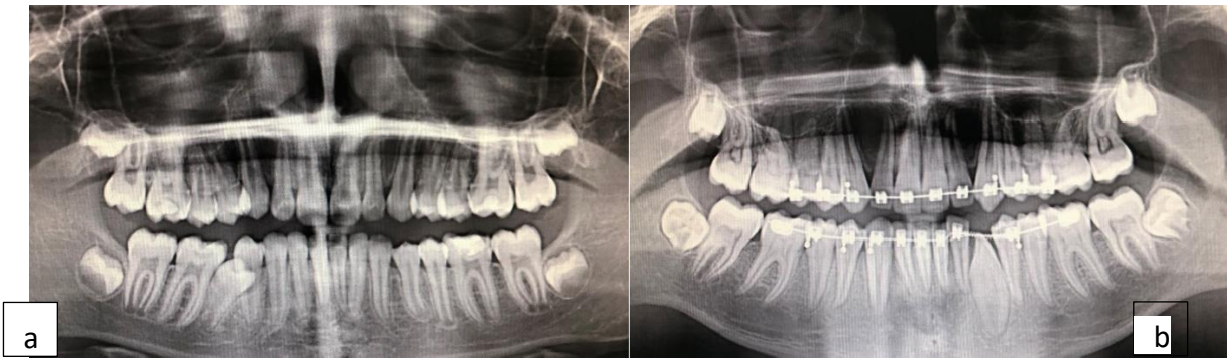

Figure 1: Impaction of the mandibular second premolar (a) and canine(b)

The results of the study were processed, summarized and the following data was revealed depended on options:

- Number and need of extracted third molars before orthodontic treatment;
- Urgent need for tooth (third molars) extraction after orthodontic treatment;
- Post-extraction complications as a result of surgery.

The results of the study showed that total number of wisdom extracted teeth before orthodontic treatment was conducted in 13% - teeth. The needs of extraction after orthodontic treatment of the

impacted or partially erupted third molars were 42%. And From the number of patients who had the post-extraction complication (after surgery) revealed in 74% cases. None of the Prophylactic Removal was revealed in this study.

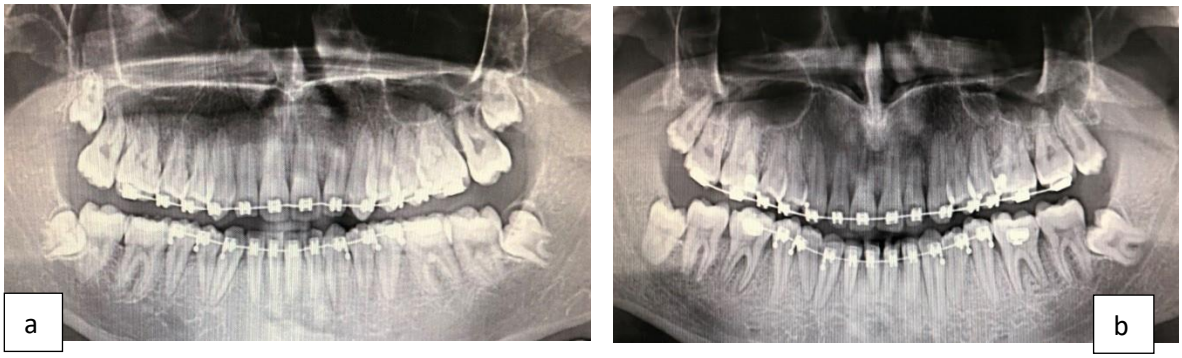

Figure 2 a, b : Impaction and semi-impaction of third molars

Conclusion

Removal of impacted (unerupted and partially erupted) third molars, the majority of which are found in the mandible, is the most common surgical procedure in dentistry. Impacted third molars are known to be associated with the risk of different disorders and complications **[**1,4**]**.

Third molar surgery is a very common procedure, but is associated with many attendant risks and complications. Fortunately, significant complications are rare, but need to be diagnosed and managed early in order to reduce morbidity, and perhaps, mortality. Complications during the impacted teeth surgery are the most common and expected complications. They might be subdivided into several groups: Complications associated with impacted or adjacent tooth, soft tissue complications, nerve injuries (paresthesia), bone complications, maxillary sinus complications, complications associated with swallowing **[**5,9,10**]**.

Impacted wisdom teeth may cause inflammation, pain due to the pressure between both teeth, and infection, if it's partially hidden. In many people, however, the wisdom tooth just stops growing there, so they don't press against or damage the second molar, and nothing happens. Regardless of the pressure applied against the other tooth, if a wisdom tooth gets partially out and then stops emerging, then a condition called pericoronitis inflammation and infection of the soft tissues around a partially erupted tooth is often associated with impacted mandibular third tooth **[**5,10**]**.

Orthodontic treatment with extraction increased the chance of successful treatment. Moreover, the proportion of successful orthodontic treatment level, was significantly higher than in the non-extraction treatment group [2, 8,11].

It should also be emphasized that the outcome and best result of orthodontic treatment significantly correlates with the extraction of third molars before orthodontic treatment. Also, study revealed an increased number of necessary extractions of wisdom teeth after orthodontic treatment (to avoid future orthodontic complications) [1,4,10].

It should be noted that this study considers full interaction between a high number of surgical complications. Accordingly, we can conclude that due to the high probability of surgical complications, timely and targeted extraction is preferred, in the context of which we discuss prophylactic extraction and its necessity.

In conclusion, if tooth extraction is unavoidable, it is advisable to perform the extraction without less hassle, loss, expense, and complication, and most important is to be on time [8,11]. Surgeons must put first the interests of the patient during the evaluation of risks and benefits of third molar removal. Therefore, it is necessary to know the pathologic conditions associated with impacted mandibular third molars [6,10].

Among the reasons why some clinicians do not consider the preventive extraction of the germ of the third mandibular molars there is the possibility of postoperative complications. Furthermore, an additional source of debate is represented by the evidence that third molar germectomy seems to be connected to less morbidity than extraction of third molars with formed roots. So, some authors underline the necessity of carrying out a very careful assessing of cost–benefit ratio for evaluating the indications of third molar early or delayed extraction [12].

Prophylactic Removal: Is it Justified? It is sometimes recommended that non- functional wisdom teeth are best removed in teenagers and young adults. This is sound preventive dentistry. There is variation among general dental surgeons in their management of asymptomatic impacted third molar teeth. The decision-making process, about prophylactic removal verses the retention of asymptomatic impacted third molar teeth, should be based on the best available evidence and must be combined with clinical experience. The key element of judgment in cases of prophylactic surgical removal should first be a patient's safety risk-benefit analysis to avoid possible iatrogenic injuries. In addition, patients' perspectives, values, and attitudes should also play a prominent role [2,3,9].

The importance of an interdisciplinary approach between orthodontists, dental surgeons and sometimes periodontists regarding management of impacted teeth is crucial and should be highlighted **[**8,9**]**.

Thus, providing the accurate and timely diagnosis as well as proper treatment planning will help the clinicians elucidate the prevalence of impaction or ectopic eruption and, most importantly, avoiding further complications, in most cases related with wisdom tooth extraction.

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