

## REASONS FOR THIRD MOLAR EXTRACTION – ORTHODONTIC INDICATIONS

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### ABSTRACT

**Objectives:** Eruption of third molars and their influence on dental arches is the topic of interest of doctors and dental specialties. Since they emerge as last teeth in the permanent dentition, these teeth often remain impacted. Therapy of impacted teeth can be directed towards their preservation and promotion of their emergence or towards their removal. The aim of this systematic review was to determine the most common indications for third molar extraction.

**Material and methods:** Computer research was used to examine, and then analyse scientific articles published within two databases – namely, PubMed and Google Scholar, until April 2018, related to third molar extraction. During the research, various combinations of keywords have been used: third molar extraction, orthodontics, indications, prophylactic extraction.

**Conclusion:** Recommendations by most authors regarding impacted and emerged third molars that cause significant problems are clear and they refer to the removal of these teeth as an only possible solution. However, when the fate of asymptomatic third molars is concerned, the attitudes are not so clear and synchronised. Many studies have proven that third molars do not affect the occurrence of incisors crowding, so this reason for prophylactic and orthodontic extraction should be abandoned.

**Keywords:** Third molar extraction. Orthodontics. Indications. Prophylactic extraction.

## Introduction

There is a big-time difference in the calcification development and third molar emergence. This development can start as early as the age of five, but also much later, not until sixteen; and the most common formation time is at the age of eight or nine. The average emergence time is from the ages of eighteen to twenty, while in some patients the process of third molar eruption can last until the age of twenty-five. As these teeth emerge the last out of all teeth of permanent dentition, they often remain impacted. The therapy of impacted teeth can be directed towards their preservation and promotion of their emergence or towards their removal, and in certain cases, the treatment is delayed or it is cancelled, primarily in situations when it is assessed that the extraction would create greater problems than the presence of the impacted tooth could create.

During the planning and setting of the indications for tooth extraction, one should be very cautious since it is an irreversible intervention. To create a detailed therapy plan, it is necessary to have detailed anamnesis, radiographic processing, clinical examination of the patient and the model analysis. Every operative procedure exposes the patient to risks (pain, swelling, bleeding, nerve injury, inflammation), which should be considered to decide whether the extraction is justified. Despite this, dentists recommend early prophylactic extraction of the asymptomatic third molar to prevent the onset of future disease symptoms thus minimizing the operative and postoperative risks. Prophylactic extraction of asymptomatic third molar is defined as (surgical) removal of a third molar that has no local indications of a disease [1].

Some authors find that the delay or abandonment of treatment is not the best solution since complications may arise in persons over the age of forty. At that time, many patients often have another chronic disease (cardiovascular, diabetes, haemorrhagic syndrome, and others), which further complicates the operative procedure. Bone tissue of the lower jaw becomes more compact and loses its elasticity with diminished vascularisation, prolonged healing time, and the possibility of infection and other complications are much greater. The most optimal time for surgical removal of impacted third molar is at a

completed one-third of tooth root growth, and before the end of the formation of the second third of the root, usually between the ages of seventeen and twenty [2].

Beside general indications for third molar extraction, such as recurrent pericoronitis, cellulitis, abscesses, osteomyelitis, follicular cysts and tumours, incurable caries, internal and external resorption of second molar, tooth fracture and tooth position in the area of resection of tumorous lesion, orthodontic indications for the extraction of these teeth constitute a special category. In most cases, third molars are not directly included in the orthodontic treatment, however, they may affect the orthodontic treatment or the orthodontic treatment may affect them.

According to some authors, the presence of a third molar can be held accountable for certain orthodontic problems [3, 4]. The most common indications for third molars extraction in orthodontics are: prevention of late crowding of the incisors, third molars as an obstacle for orthodontic treatment, or orthognathic surgery. The aim of this systematic review was to determine the most common indications for third molars extraction.

## Material and methods

Computer research was used to examine, and then to analyse scientific articles published within two databases PubMed and Google Scholar, until April 2018, related to third molar extraction. During the research, various combinations of keywords have been used: third molar extraction, orthodontics, indications, prophylactic extraction. Inclusive criteria were the accessibility of paper in its entirety, papers published in English language, papers published until April 2018, and the fact that papers contain one of the keywords in their title.

## Results

Examination of reference literature related to third molar extraction resulted in greater number of papers published on this topic. Twenty papers that were further analysed matched the inclusion criteria for this research.

## Discussion

One of the most controversial topics that have been discussed for many years is the justification of prophylactic surgical extraction of impacted third molars. The advocates for routine prophylactic extraction believe that early extraction is more desirable since it limits the possibility of pathology related to the third molar later in life. Other authors that do not advise routine prophylactic extraction believe that the possibility of occurrence of pathological states later in life does not justify physical and psychological trauma that the patient is subjected to during the procedure. Prophylactic removal of asymptomatic impacted third molar is surgical removal of third molar without symptoms and without the presence of any local signs of disease.

Scientific literature estimates that around 18 to 40 % of asymptomatic third molars are extracted [5]. Gemini et al considered the effects of extraction in comparison to preservation of asymptomatic impacted third molar in adolescents and adults. The overview of the literature included two studies. In the primary outcome, none of the studies have shown the effects of extraction, in comparison to preservation of asymptomatic healthy impacted third molar, to the quality of life. No evidence has been found indicating the fact that in the long-term period the presence of asymptomatic third molar can be related to the increased risk of periodontitis of the second molar. Even though the third molar can be related to the increased risk of periodontitis of the second molar, there is not enough evidence for it.

The conclusion of this research states that if a decision is made to retain the asymptomatic impacted molar, a clinical assessment should be conducted at regular time intervals to prevent unwanted outcomes [6].

Cuncha-Cruz et al researched reasons that general dentists have to recommendation the extraction or preservation of third molars. In a two-year study, they followed 801 patients aged 16 to 22, from 50 general dentistry practices. Dentists recommended the extraction of a total of 1683 third molar to their patients (469 patients). As the main reason to recommend the extraction, 79% of dentists listed the prevention from future problems as well as no

emergency present regarding third molars, in their opinion. They recommended monitoring for other patients whose third molars had favourable path of eruption, for those with enough space for the eruption, or it was early for them to decide. So, in mentioned study, the primary reason to recommend the extraction of third molars was not pathology related to the third molar, but prevention of future complications or a conclusion that the tooth would never emerge. Observation of asymptomatic third molars, according to the authors' opinion, would be more cost-effective strategy for the management of third molars [7].

Krishnan et al, also researched indications for the extraction of impacted lower third molars. They retroactively gathered data on patients who had lower third molars extracted in the last three years at the Faculty of Dentistry in Libya. Indications for the extraction of third molars were divided into ten groups and observed on a sample of 439 patients. The most frequent reason for the extraction of a third molar was recurrent pericoronitis (54%). Only 14 extractions (2%) for orthodontic reasons were recorded which by itself can be characterized as prophylactic extraction. In these authors' opinion, molar distalization seems to be the only scientifically justified indication for the extraction of third molars for orthodontic reasons [8].

In retrospective overview of 1198 cases, Patel et al analysed the incidence of impaction of the third molar and its connection with the type and side of impaction, gender, age of the patient as well as indications for extraction. Orthodontic and prophylactic indications shared almost the same percentage of frequency – at around 5 %. Out of 1198 cases, 64 indications were for orthodontic reasons, while 12 patients were referred to extraction and to prepare for orthognathic surgery [9].

Torres et al evaluated indications given by general dentists and oral surgeons and compared justifications for extraction with the main reason the patient came for consultation. Within their results, they stated that the extractions performed for prophylactic reasons made up 51% of indications given by oral surgeons, and 46% of indications given by general dentists. Oral surgeons recommended extractions for orthodontic reasons in 35% of cases, whereas general dentists recommended them in

19% of the cases. The authors concluded that the greatest number of extractions was performed for prophylactic reasons, followed by orthodontic indications [10].

The greatest number of prophylactic indications for the extraction of third molars is also the result of a retrospective study conducted at the Faculty of Dentistry at the University of Salle Bajio. A total of 9148 wisdom teeth were extracted in 3206 patients. The most common reason for extraction was prevention (8251 cases, 90.19%), followed by chronic, acute pericoronitis and orthodontic indications in 29 cases (0.32%) [11].

Unlike the above-mentioned authors, in their study Chaparro-Avendano et al noted the greatest number of orthodontic indications for extraction of third molars. The study included younger patients aged from 12 to 18, a total number of 173. Out of 390 surgical extractions of upper and lower third molars, 40.5% were indicated for orthodontic reasons. The main reason was the fact that patients worn or wear a fixed orthodontic appliances, so the extraction of third molars was mostly recommended for the purpose to prevention late crowding of the lower incisors. Most of the orthodontic indications for the extraction were related to the lower third molar [12].

Practical experiences refer to the common occurrence of extraction of third molar after orthodontic treatment to prevent possible relapse. This is one of the most controversial problem concerning mandibular third molars and their effect on mandibular incisors. In controlled randomized study conducted by Harradine et al, they analysed the effect of third molars on the late appearance of the lower incisors crowding. This study concluded that the presence of a third molar has a slight effect on the occurrence of late crowding of the lower incisors [13].

However, although third molars contribute to the mesial shift of back teeth to some extent, taking into consideration costs and morbidity, surgical removal of impacted third molars, for this reason, is not justified [14]. Many studies have been published supporting both sides – namely, the one where authors advocated the theory that lower incisors crowding occurs as a consequence of the presence of third molars, and the other where authors consider that the relapse and occurrence of tertiary crowding in patients are not in relation with the presence of lower third molars. In recent literature including

greater number of orthodontic patients, it was concluded that third molars did not have a significant effect on the lower incisors crowding. Actually, the lower incisors crowding was more connected to the lack of length of the dental arch than the presence of an impacted tooth [15]. When it comes to the role of third molars in the occurrence of the incisors crowding there is a certain difference in opinions and results of authors before and after the 1990s. In chronologically older studies, third molars were significantly more associated with the occurrence of the lower incisors crowding by the authors [16, 17, 18].

In more recent researches, among which is one by Nunn et al, authors did not find evidence proving that extraction had any effect on the dimensional changes in the dental arch by analysing changes in the dental arch of teenagers five years after the extraction of third molar due to crowding [19]. Several other authors did not find a relation between third molars and the occurrence of incisors crowding finding that prophylactic removal of third molars for those purposes is unjustified [20, 21, 22]. Molar distalization within orthodontic therapy, with the aim of securing additional necessary space without the extraction of premolars, become clinically more significant since the use of orthodontic mini-implants are increasing rapidly. Application of this type of absolute anchoring can secure predictable movement of molar even with minimal cooperation from the patient. This type of treatment requires the removal of third molar if present, even before the very beginning of the tooth movement. However, orthodontic teeth movement into the retro-molar space not only requires adequate anchorage but also enough space for distalization of the second molar. For this reason, it can be said that impacted third molars are somewhat unjustifiably and routinely removed before molar distalization in adults. Not even the extraction of third molars in the lower jaw can indicate there would be enough space for molar distalization since the available space for distalization of the second molar is determined by the lingual cortex of the mandibular body thus not being affected by third molar extraction. For this reason, before making decision for this type of therapy, it is recommended to examine the available space using computerized tomography regardless to the existence of the third molar [3, 4].

## Conclusion

Recommendations by most authors regarding impacted and emerged third molars that cause significant pain, are infected, carious, or affect the state of a second molar or surrounding bone, are clear and indicate the removal of these teeth as the only possible solution. However, when it comes to the asymptomatic third molars the opinions are not so clear and synchronized. Although some researches indicate that retention of asymptomatic impacted third molar might increase the long term risk of periodontitis of a second molar, the evidences for that are not such strong to produce recommendations for the extraction of these teeth. Many studies have proven that third molars do not affect the occurrence of incisors crowding, so the reason for prophylactic and orthodontic extraction should be abandoned.

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