

Controversy in the Management of Asymptomatic Impacted Wisdom Teeth: Review of the Literature

Aseptomatik Gömülü 20 Yaş Dişlerinin Tedavisindeki Belirsizlik: Literatür İncelemesi

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ABSTRACT Removal of impacted third molars is a common surgical procedure performed in dentistry and these teeth are frequently disease-free at the time of removal. The so-called prophylactic removal of asymptomatic third molars is still practiced worldwide, although controversial. The practice of prophylactic removal of the asymptomatic and deeply impacted third molars is not clearly justified and the debates rage for an acceptable evidence. This article critically examines the literature and aims to highlight universally accepted guidelines for management of asymptomatic impacted third molars.

Key Words: Molar, third; tooth, impacted; tooth extraction

ÖZET Gömülü üçüncü molar dişlerin çekimi dişhekimliğinde oldukça sık uygulanan bir cerrahi girişimdir ve genellikle çekim esnasında bu dişler herhangi bir hastalık durumu sergilemezler. Aseptomatik üçüncü molarların profilaktik çekimi olarak tanımlanan bu durum konusunda karşıt görüşler bulunmasına karşın, bu işlem dünya çapında hâlâ uygulanmaktadır. İleri derecede gömülü ve aseptomatik üçüncü molarların profilaktik çekimi işleminin gerekliliği net bir biçimde belirlenememiştir ve bunun için kabul edilebilir bir gerekçe bulunmasına dair tartışmalar yaygınlaşmaktadır. Bu makalede literatür titiz bir biçimde taranmış ve aseptomatik gömülü üçüncü molar dişlerin tedavisine yönelik evrensel olarak kabul görmüş bir rehberlik oluşturulması amaçlanmıştır.

Anahtar Kelimeler: Büyük aza, üçüncü; diş, gömülü; diş çekimi

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Teeth may become impacted when they fail to erupt or develop into the proper functional location. The third molar teeth are last to erupt and have a relatively high chance of becoming impacted.¹ Removal of impacted third molars is one of the most common surgical procedures in dentistry.^{2,3} It is well-established treatment of choice when they are associated with pathological changes and/or severe symptoms. However, prophylactic removal of impacted third molars free of any pathology remains controversial. Even then, reports in literature point to a widespread practice of prophylactic removal of impacted third molars.⁴⁻¹⁰ There are various schools of thought regarding management of asymptomatic impacted third molars. Some authors suggest that any impacted third molar is pathological and should be removed regardless of the absence of symptoms.¹¹⁻¹⁵ Other

authors think that removing an asymptomatic, impacted third molar is questionable due to lack of information about the incidence of development of tooth associated pathologies.¹⁶⁻²⁰ Yet another group of authors consider that prophylactic surgical removal of impacted third molars is not necessary because long-term retention of impacted teeth has little risk of pathological change in the tooth itself or of adverse effects on adjacent structures.^{9,21-25} Understandably, many authors have reported the continuing lack of agreement among dentists and recommend that further studies have to be conducted to resolve the issue.²⁶⁻³⁰ This article reviews the existing literature and aims to highlight universally accepted guidelines for management of asymptomatic impacted third molars.

FACTORS TO BE CONSIDERED IN THE MANAGEMENT OF ASYMPTOMATIC IMPACTED THIRD MOLARS

CHANCES OF INFECTIONS

Recurrent infection is one of the major indications for extraction of an impacted third molar. Most common among them is recurrent pericoronitis.^{23,31,32} Sometimes pericoronitis may progress to complications like cellulitis, abscess formation, space infection and osteomyelitis. Considering these complications and associated morbidity, extraction is advised.

Pericoronitis is mostly associated with impacted mandibular third molars and impinging maxillary teeth have been shown to contribute to the process in more than one third of the cases.³³ Understandably it is more frequent in partially erupted than in completely unerupted teeth, probably because of the exposure of these teeth to the oral environment. A study by Punwutikorn et al.³² regarding symptoms of unerupted lower third molar showed pericoronitis in 8.9% completely impacted teeth, and 26.7% of partially impacted teeth. Studies regarding correlation between pericoronitis and axial inclination of impacted lower third molar suggested that those in distal and vertical inclination showed more incidences.^{32,34,35} In contrast, a study by Knutsson et al.²³ reported that pericoronitis mostly developed in distoangular and

mesioangular third molars. Studies reported that pericoronitis developed most often between 20 to 29 years of age followed by 30-39 years.^{23,34,36}

Hence, in case of retained asymptomatic impacted wisdom teeth, owing to chances of potential infection, it is prudent to check clinically and radiographically every 2 years.

RISK OF DENTAL CARIES, PULPAL PATHOLOGIES AND ROOT RESORPTION

Prevalence of caries in impacted third molars ranges from 5.3% to 13%.^{13,27,31,32,37,38} However, Knutsson et al.⁶ reported a higher prevalence of 26%. Most of the carious lesions occurred in partially erupted teeth; it was almost absent in the completely unerupted teeth. Punwutikorn et al.³² observed caries in 15.5% of partially erupted third molars and none in completely impacted teeth in their samples and estimated the overall prevalence 12.9%. Studies revealed that caries was mainly associated with mesially inclined partially erupted teeth.^{23,32} Like pericoronitis, caries was often found in patients aged 21 to 25 years and 26 to 30 years.³²

Mesio-angular or horizontally impacted mandibular third molars, which impinge on the distal aspect of the second molar, place this tooth at risk of developing caries. Although very few impacted third molars seem to cause caries of the second molar, review of the literature revealed a prevalence between 1% and 7.9%.^{6,20,27,39} A study by Polat et al.³⁷ showed a high prevalence of 12.6%. There is a low incidence (less than 1%) of root resorption of second molars with impacted third molars.⁴⁰ A study by Stanley et al.⁴¹ in retained impacted lower third molars showed that 3.05% were associated with root resorption of second molars.

Removal should be considered when there is unresorable caries in the third molar, which may lead to pulpal pathologies and decay or resorption of second molar, which cannot be managed satisfactorily without extraction of the offending third molar. Retained asymptomatic third molars with caries and resorption risk should be monitored periodically.

PERIODONTAL DISEASE ASSOCIATED WITH IMPACTED THIRD MOLARS

Certain studies suggest that patients with periodontal probing depths equal to or greater than 5 mm in the third molar region had increased level of pathogenic periodontal microorganisms despite a lack of symptoms.^{42,43} In a longitudinal clinical trial, Blakey et al.⁴⁴ found that 25% of the 329 asymptomatic third molars were affected by periodontal pathology with at least one pocket depth ≥ 5 mm. Conversely, in the study by Punwutikorn et al.³² only 3.3% of the impacted lower third molars showed periodontitis. This reduction was attributed to younger age group of the subjects included in the study.

In the study by Polat et al.³⁷ distoangular and vertically impacted teeth were found mostly to cause bone loss of distal aspect of the impacted lower third molars, and mesioangular and horizontal impacted third molars were found mostly to cause periodontal bone loss of distal aspect of adjacent tooth.

ORAL FOCI OF INFECTION

Recently associations have also been found between periodontal pathology and systemic disease.⁴⁵ It is speculated that chronic periodontal inflammation creates a portal for inflammatory mediators and pathogenic bacteria to enter the bloodstream, possibly inducing certain cardiovascular disease at a distant site.^{46,47} Preterm births in obstetric patients have also been related to chronic periodontal inflammation.⁴⁸ Recently Ruvo et al.⁴⁹ reported that although adverse pregnancy outcomes were associated with the presence of periodontal disease, the association was only significant when third molars were present. In contrast, several authors underlined that the lack of evidence in periodontal disease might start in the third molar region.^{50,51} As other foci of infection may also exist in the dentition, prophylactic extraction of asymptomatic impacted third molar alone does not seem to be a prudent practice.

RISK OF DEVELOPMENT OF PERICORONAL CYSTS AND TUMORS

Retention of impacted third molars can also be associated with cyst and tumor development. The

follicular tissue around these teeth has a potential to develop pathologic conditions. Radiographically, dimension of this normal pericoronal radiolucency is in the range of 2-3 mm.⁵² However, several studies have demonstrated considerable pathosis in cases with radiographically normal follicular spaces.⁵³⁻⁶⁰

The incidence of cysts and tumors occurring around impacted third molars differs in various studies. The incidence of cyst ranges from 0.001% to 3.3%.^{31,36,61-65} Among cystic lesions, dentigerous cyst is the most common entity. Most of the cystic changes were found in patients between 20 and 25 years.⁶⁶ The incidence of ameloblastoma associated with impacted third molars is reported to range from 0.14% to 2%.^{61,62,67,68} Guven et al.⁶¹ reported an incidence of 0.79% for odontogenic tumors among 9994 impacted third molars in their study. The majority (92%) of these pathoses developed in the mandible, either in a vertical or a mesioangular position, but this may be due to the high frequency of that type of impactions.³⁷ In contrast, Knutsson et al.²³ suggested that horizontally impacted lower third molar that is completely covered by soft tissue was more susceptible to cystic changes.

Review of the literature revealed that a small minority of the patients did develop pericoronal pathosis associated with asymptomatic impacted third molars. However, the relatively small percentages of pericoronal cysts and tumors associated with retention of those teeth do not justify their prophylactic removal.

RISK OF MANDIBULAR ANGLE FRACTURES IN THE PRESENCE OF IMPACTED LOWER THIRD MOLARS

Many authors consider angle as the weakest region of the mandible because of its natural angulations and the presence of unerupted third molars.⁶⁹⁻⁷² Susceptibility of the mandibular angle to fracture in the presence of impacted lower third molars has long been a strong point for prophylactic removal of lower wisdom teeth, especially in adolescents and young adults who frequently play contact sports.⁶⁹⁻⁷⁴ Reitzik et al.⁷⁵ stated that unerupted third molars weakened mandibular angle and it could fracture due to a less forceful trauma.

According to another school of thought, the absence of unerupted mandibular third molars was significantly associated with higher incidence of condylar fractures in those engaged in contact sports.⁷⁶ When the mandible is traumatically injured in the absence of impacted third molars, more force is transmitted to the condylar region resulting in increased incidence of associated condylar fractures. Condylar fractures are usually more severe, are more difficult to treat, and have greater risk of long-lasting complications than angle fractures.⁷⁷

Considering these two observations, prophylactic extraction of impacted lower third molar as a means for reducing the chances of angle fracture in contact sports persons does not seem to be rational.

CHANCES OF INCREASED MORBIDITY IN ELDERLY PATIENTS

Many studies have showed that impacted third molars in adolescents were most likely to develop pathological conditions, while impacted third molars in adults were unlikely to undergo significant pathological changes.⁷⁸ However, when the alveolar bone is resorbed, the wisdom tooth that was originally impacted intraosseously is exposed through the overlying bone and mucosa, and the risk of infection increases, mechanical irritation by the denture being a cofactor in the infection. In dentulous elderly patients, periodontitis of the second molar may be the cause of the infection around the impacted third molar. There is some evidence that morbidity following surgery is worst in older people but some studies contradict this by stating that morbidity is due to concomitant medical problems and age is relatively an insignificant factor.^{79,80} Unless the validity of the need for surgery has been established, the fact of lesser morbidity in the younger patient should not of itself be used as an indication for preventive surgery.

ORTHODONTIC REASONS

Certain authors in the past have suggested association between mandibular anterior incisor crowding and impacted third molars.⁸¹⁻⁸³ Many studies have investigated this association but have failed to establish any significant correlation.⁸⁴⁻⁸⁷ A thor-

ough prospective randomized study by Harradine et al.⁸⁸ also concluded that, the relation between the presence of third molars and lower anterior crowding was not statistically and clinically significant. Thus, currently there is no conclusive evidence for advising the removal of third molars for preventing lower incisor crowding.

POSTOPERATIVE COMPLICATIONS

Pain, swelling, and trismus are almost universal after third molar surgery. Other postoperative complications include alveolar osteitis (dry socket), secondary hemorrhage and delayed wound healing.⁸⁹ Lopes et al.⁹⁰ reported that 23.2% of their study sample had postoperative complications.

The common iatrogenic injuries caused by third molar surgery are nerve injuries (paraesthesia, dyesthesia, permanent damage) to inferior alveolar and lingual nerve, oro-antral fistula, buccal fat herniations, damage to the adjacent second molar, mandibular fracture, fracture of maxillary tuberosity and retained broken burs in surgical field.

Nerve injuries are the most common among them.¹⁰ The rate of sensory nerve damage after third molar surgery has been shown to range between 0%-20%.^{20,91-93} An incidence of 10.4% for nerve injury was reported by Lopes et al.,⁹⁰ in patients who underwent prophylactic extractions without clinically sound indications for surgery and it was similar to the sensory deficit and morbidity seen in patients with associated symptoms. Some studies have shown that the inferior alveolar nerve may be temporarily damaged in 1.3-7.8% of cases, with permanent damage in less than 1%.^{92,94,95} The lingual nerve may be temporarily injured in 2.1-15% of cases and may be permanently injured in up to 1%.^{92,95-97}

LOSS OF TIME AND WORKDAYS

Inevitably, patients undergoing third molar surgery will suffer from some amount of morbidity. All these have adverse impact on oral health-related quality of life in the immediate postoperative period following third molar surgery, leading to inability to attend workplaces, schools, colleges etc by the patient until he recovers. A study of sick

leave after third molar surgery showed that 81% of patients took time off work. The average number of days off work ranged from 0 to 10 days.⁹⁰

COST-HEALTH BENEFITS

The increasingly significant cost of treatment has raised queries about operating on a patient without good reason. Apart from the treatment cost, other expenditures from the patient side in the form of radiographs, routine investigations and medicines also have to be considered. In some instances treatment expenses of postsurgical complications added up considerably to overall cost. In a study on prophylactic third molar surgery, Edwards et al.⁹⁸ concluded that retaining an impacted mandibular third molar was less costly and thus more ‘cost-effective’ (and more ‘effective’) than surgical removal.

MEDICOLEGAL ISSUES

Apart from the morbidity due to surgery, cost-health benefit and risk-benefit outcomes of third molar surgery also need to be analyzed. Under any circumstances, operating a patient without an appropriate reason will be unnecessary expenditure from his/her side. In present scenario, this may lead to medicolegal problems for practitioners. Claims can also be made against incidental iatrogenic injuries. Therefore, from a legal point of view it would be prudent only to remove teeth with clearly defined indications.

FLAWS IN DECISIONMAKING

Those who are in favor of prophylactic extractions should remove all third molars. However, many dentists make exceptions to this general rule; the reasons for this are unknown and this in itself is a major flaw in the argument for prophylactic removal.⁵⁰

GUIDELINES PROPOSED FOR PROPHYLACTIC EXTRACTON OF THIRD MOLARS

The first attempt in this regard was made by the National Institutes of Health Consensus Conference held in the United States in 1979.⁹⁹ At that conference, the committee members agreed that third molars associated with recurrent infection,

nonrestorable carious lesions, cysts and tumors, as well as those contributing to the resorption of adjacent teeth and periodontal disease, were candidates for removal. There was however, no consensus on removal of impacted teeth when there was no evidence of pathology.

An editorial in the British Medical Journal in 1994 entitled “Surgical removal of third molars – prophylactic surgery should be abandoned” reopened the debate as to whether or not to remove disease-free wisdom teeth.¹⁰⁰ In 1997 the Faculty of Dental Surgery of the Royal College of Surgeons of England published guidelines for the management of patients with impacted wisdom teeth (Table 1).¹⁰¹ These guidelines were endorsed by the National Institute for Clinical Excellence (NICE) of United Kingdom, when their own criteria were published in March 2000.¹⁰² The only substantial addition was that a first episode of pericoronitis, unless particularly severe, should not be considered an indication for removal.

Meanwhile, few other guidelines also have been suggested about the management of patients with asymptomatic impacted third molars, and important ones include the Cardiff criteria established

TABLE 1: Indication for removal of wisdom teeth-Royal College of Surgeons of England, 1997

1. Overt or previous history of infection including pericoronitis
2. Unrestorable caries
3. Non-treatable pulpal or periapical disease or both
4. Cellulitis, abscess and osteomyelitis
5. Periodontal disease
6. Orthodontic abnormalities
7. Prophylactic removal in the presence of specific medical and surgical conditions
8. Facilitation of restorative treatment including provision of prosthesis
9. Internal/external resorption of tooth or adjacent teeth
10. Pain directly related to third molar
11. Tooth in the line of bony fracture or impeding trauma management
12. Fracture of tooth
13. Disease of follicle including cyst/tumour
14. Tooth/teeth impeding orthognathic surgery or reconstructive jaw surgery
15. Tooth involved in/within field of tumour resection
16. Satisfactory tooth for use as donor for transplantation

in 1998¹⁰³ and those published by the Scottish Intercollegiate Guidelines Network (SIGN) in 1999.¹⁰⁴ Both of these are more or less similar to NICE guidelines. SIGN guidelines point to ‘strong’ (Table 2) and ‘less strong’ indications for removal.

In the late 1990s, the American Association of Oral Maxillofacial Surgeons (AAOMS) and the Oral and Maxillofacial Surgery Foundation (OMSF) started a comprehensive multicentre trial of third molar patient management. The AAOMS Third Molar Clinical Trials led by Dr. Raymond White published several scientific articles that link third molars to future health problems in adults. In light of these findings, in 2005, the AAOMS suggested that removing the third molars during young adulthood might be the most prudent option in contrast to the NICE and SIGN guidelines.¹⁰⁵ A recent white paper published by AAOMS also favored prophylactic removal of asymptomatic third molars.¹⁰⁶

However, a recent systematic review by the Cochrane Review Group on the topic of the removal of asymptomatic third molars concluded that there were clear indications for third molar removal in the presence of pathology, but not in the absence of pathology. They recommended that the meticulous monitoring of asymptomatic third molar teeth might be a more appropriate strategy.¹⁰⁷

1. One or more episodes of infection
2. Unrestorable caries in third molar or adjacent second molar induced by third molar
3. Periodontal disease
4. External resorption
5. Dentigerous cyst formation or other related pathology

CONCLUSION

There are well-established indications for removal of impacted lower third molars. Prophylactic removal of third molars can only be justified when clear long-term benefit to the patient is expected. Factors that are in favor and those against prophylactic extractions of asymptomatic impacted third molars are summarized in Figure 1 as a conclusion of our review. It is not possible to predict reliably whether impacted third molars will develop complications if they are not removed. There are no randomized controlled studies to compare the long-term outcome of early removal with retention of pathology-free third molars and resolve the controversy in the decision making. Thus, in this evidence based era, prophylactic extraction of the asymptomatic impacted third molars in the absence of specific medical, pathological and surgical conditions is certainly questionable.

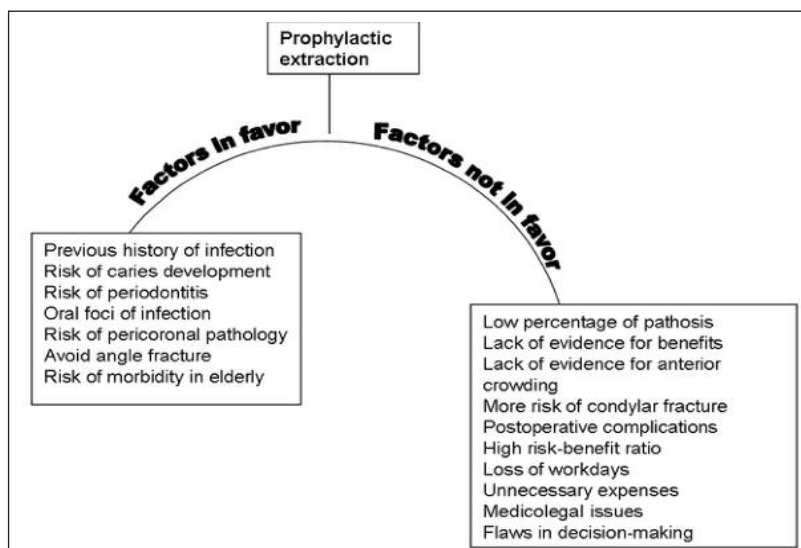


FIGURE 1: Summary of factors in favor and those against prophylactic extraction of asymptomatic impacted third molars.

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