

Evaluation of the indication for surgical extraction of third molars according to the oral surgeon and the primary care dentist. Experience in the Master of Oral Surgery and Implantology at Barcelona University Dental School

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Received: 27/10/2007

Accepted: 06/05/2008

Indexed in:

-Index Medicus / MEDLINE / PubMed
-EMBASE, Excerpta Medica
-SCOPUS
-Índice Médico Español
-IBECs

Fuster-Torres MA, Gargallo-Albiol J, Berini-Aytes L, Gay-Escoda C. Evaluation of the indication for surgical extraction of third molars according to the oral surgeon and the primary care dentist. Experience in the Master of Oral Surgery and Implantology at Barcelona University Dental School. Med Oral Patol Oral Cir Bucal. 2008 Aug 1;13(8):E499-504.

© Medicina Oral S. L. C.I.F. B 96689336 - ISSN 1698-6946

<http://www.medicinaoral.com/medoralfree01/v13i8/medoralv13i8p499.pdf>

Abstract

Introduction. Third molar extraction is the most frequent procedure in oral surgery. The present study evaluates the indication of third molar extraction as established by the primary care dentist (PCD) and the oral surgeon, and compares the justification for extraction with the principal reason for patient consultation.

Patients and method. A descriptive study was made of 319 patients subjected to surgical removal of a third molar in the context of the Master of Oral Surgery and Implantology (Barcelona University Dental School, Barcelona, Spain) between July 2004 and March 2005. The following parameters were evaluated: sex, age, molar, type of impaction, position according to the classifications of Pell and Gregory and of Winter, and the reasons justifying extraction.

Results. The lower third molars were the most commonly extracted molars (73.7%). A total of 69.6% of the teeth were covered by soft tissues only. Fifty-six percent of the lower molars corresponded to Pell and Gregory Class IIB, while 42.1% were in the vertical position.

The most common reason for patient reference to our Service of Oral Surgery on the part of the PCD was prophylactic removal (51.0% versus 46.1% in the case of the oral surgeon).

Discussion and conclusions. Our results show prophylaxis to be the principal indication of third molar extraction, followed by orthodontic reasons. Regarding third molars with associated clinical symptoms or signs, infectious disease – including pericoronitis – was the pathology most often observed by the oral surgeon, followed by caries. This order of frequency was seen to invert in the case of third molars referred for extraction by the PCD.

A vertical position predominated among the third molars with associated pathology.

Key words: *Third molars, third molar surgery, prophylactic removal, primary care dentist.*

Introduction

Third molar extraction is the most frequent procedure in oral surgery. This is because molars show a high incidence of impaction and are often associated to highly diverse disorders such as pericoronitis, periodontal defects in the distal aspect of the second molar, caries of the third molar or the second molar, different types of cysts and odontogenic tumors, and neurogenic pain (1-3). In addition to the pathology sometimes caused by these teeth, other criteria may also justify their removal – including orthodontic and prosthodontic or restorative considerations, and preventive or prophylactic removal (4-6).

While consensus is practically complete on the advisability of removing impacted third molars that cause important pathology or clinical manifestations, the convenience of prophylactically removing molars when they are still asymptomatic has been the subject of debate for years (7, 8). The decision whether or not to remove these teeth should be based on the evaluation of those molars that may be expected to develop pathology over time. Current clinical evidence relates the position of the third molars within the maxillae to the type of clinical manifestations that may result from their impaction (9,10). Identification of the third molars posing a greater risk of inducing pathology would facilitate the adoption of priority preventive measures.

Prior to extraction of an asymptomatic third molar, three levels within the decision taking process can be identified. Firstly, the primary care dentist (PCD) must diagnose impaction and decide whether it is advisable to refer the patient to an oral surgeon. Secondly, the oral surgeon must evaluate the indication of prophylactic removal on an individualized basis. Finally, consideration is also required of the opinion of the patient on the influence of surgery in terms of personal oral and general health (11).

Another aspect that requires consideration is the fact that general dentists (11) and oral surgeons (12) show great variations in the criteria justifying third molar removal. The present study evaluates the indication of third molar extraction as established by the PCD and the oral surgeon, and compares the justification for extraction with the principal reason for patient consultation.

Patients and Method

A simple descriptive study was made of 319 patients subjected to surgical removal of a third molar in the context of the Master of Oral Surgery and Implantology (Barcelona University Dental School, Barcelona, Spain) between July 2004 and March 2005. The only exclusion criterion was patients who needed more than one third molar extraction. Prior to the surgical procedure, a second year resident in the mentioned Department registered patient age at the time of extraction, sex, and the molar programmed for removal. The depth of the third molar in relation to the occlusal plane (A, B, C) was also documented, along with the distance between the ascending ramus of the mandible

or the tuberosity of the maxilla and the distal surface of the second molar (Class I, II, III), according to the classification of Pell and Gregory (13). Angulation of the molar with respect to the longitudinal axis of the second molar (mesioangular, distoangular, vertical and horizontal) was also recorded, based on the classification of Winter (14). The degree of impaction was defined as totally covered by bone, totally covered by soft tissues, partially covered by soft tissues, or fully erupted. Likewise, the study recorded whether the patient was referred to our center by the PCD because of signs or symptoms related to the third molar, or without any clinical manifestations associated with this tooth. Finally, oral surgeon criterion for third molar removal was also registered.

The reasons justifying third molar extraction were summarized as follows:

1. Prophylactic removal
2. Removal for orthodontic, prosthodontic or restorative reasons
3. Removal due to the presence of associated pathology:
 - 3.1. Pericoronitis
 - 3.2. Cysts or tumors
 - 3.3. Caries of the third molar or of the adjacent second molar
 - 3.4. Bone loss on the distal aspect of the second molar
 - 3.5. Reabsorption of the third molar
 - 3.6. Ulceration of the cheek or tongue mucosa
 - 3.7. Pain

The data were processed using the SPSS version 12.0 statistical package (license of the University of Barcelona). Following the descriptive analysis, the Pearson chi-square or Fisher exact test was used. Calculations were made of the odds ratios (OR) and their respective 95% confidence intervals for the appearance of symptoms or signs associated to the third molar in relation to patient sex, mandibular location of the third molar, and the degree of eruption. The level of significance was set at $p < 0.05$.

Results

A total of 319 third molars were removed; 84 (26.3%) were located in the maxilla and 235 (73.7%) in the mandible. In 198 cases (62.1%), the PCD referred the patient to our Service of Oral Surgery for third molar extraction, while in the remaining 121 cases (37.9%) the patient was referred to our Service for some other reason.

A little over one-half of all extractions (56.7%) were carried in females. The mean age of the patients was 26.5 years (standard deviation (SD) 9.2), with a range of 14-79 years. The patients were distributed into three age groups (14-20 years, 21-30 years and 31-79 years). Most extractions (52.4%) corresponded to patients in the 21-30 years age group.

Based on the classification of Winter (14), 99 third lower molars (42.1%) showed a vertical position, 75 (31.9%) presented mesioangular inclination, 33 (14.0%) were horizontal, and 28 (11.9%) were distoangular.

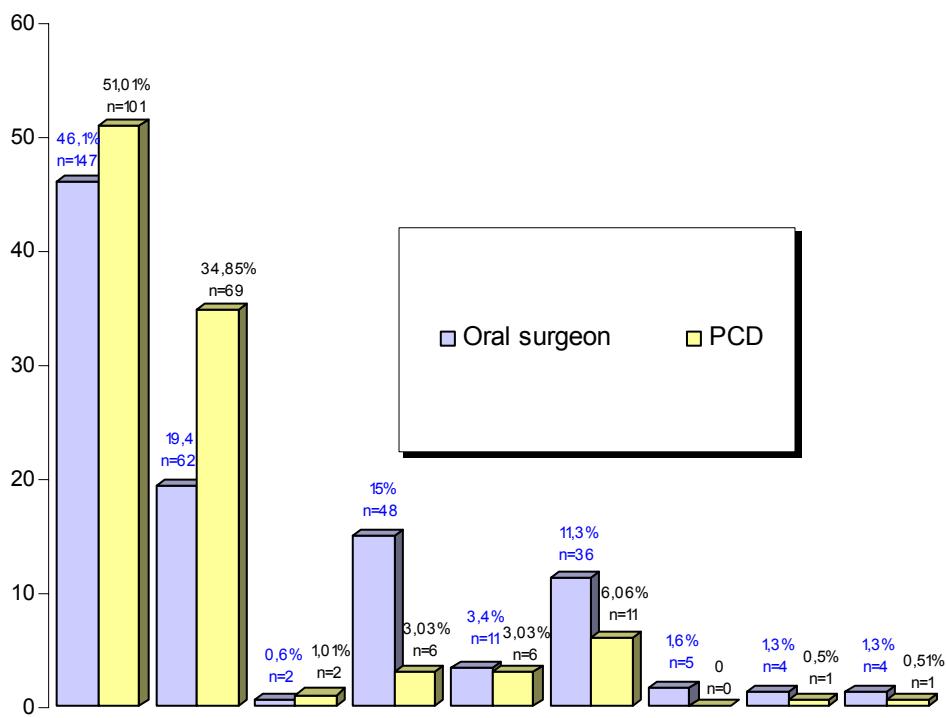


Fig. 1. Comparison of reasons justifying third molar extraction among oral surgeon and primary care dentists (PCD).

The predominant position of the lower molars according to the classification of Pell and Gregory (13) corresponded to Class IIB (56.0%), followed by Class IIA (21.3%) and IA (13.9%).

Considering the degree of impaction most third molars were partially covered by soft tissues (38,87%) or totally covered by soft tissues (30,72%), followed by fully erupted third molars (19,44%) and totally covered by bone (10,97%).

The principal reason for consultation was pain (50%), followed by infection (30.8%).

Third molar removal was fundamentally indicated for prophylactic reasons by both the PCD (51.0%) and the oral surgeon (46.08%). This was followed by orthodontic reasons, as can be seen in Figure 1.

In the patients belonging to the 14-20 years age group, the principal criterion among the general dentists for deciding removal was orthodontic or prosthodontic treatment (66.1%). Among the oral surgeons, this indication was as frequent (43.6%) as prophylactic molar extraction. In the 21-30 years age group, prophylactic removal was the most frequent indication (61.5% among the PCD and 52.1% in the case of the oral surgeons). Among the patients over 30 years of age, the PCD indicated third molar removal for prophylactic reasons in over half of all cases (54.3%), while the oral surgeons fundamentally justified extraction due to the presence of clinical symptoms (59.5%).

Based on the classification of Winter, the third molars in a

vertical position were the teeth that most often presented associated pathology (72% according to the PCD and 59.8% for the oral surgeons).

Considering the classification of Pell and Gregory applied to the mandibular third molars, those corresponding to Class IIB were the teeth most often removed by the oral surgeon. In turn, molars in position IIB were the teeth most frequently referred for extraction by the PCD, with the exception of the group of third molars presenting associated clinical symptoms or signs, where Class IA teeth were the most commonly involved (52.2%).

On considering the degree of impaction, the molars partially covered by mucosa were found to be the teeth most frequently removed (56.5%) by the oral surgeon due to the development of clinical symptoms or signs. For this same reason erupted molars were predominantly referred by the PCD (53.8%).

The results of the binary variables are reported in Table 1. Female sex, mandibular third molar and erupted third molar (according to the oral surgeon) showed a statistically significant association to the presence of clinical symptoms. An erupted third molar (according to the primary care dentists (PCD)) showed a statistically significant association to the presence of clinical symptoms.

The results corresponding to the variable age are shown in Table 2. In the bivariate analysis, age proved statistically significant for both the oral surgeon ($p < 0.05$) and for the primary care dentists (PCD) ($p < 0.001$).

Table 1. Results corresponding to the binary variables.

		OR of patients with symptoms (%)	OR of patients without symptoms (%)	OR (95%CI)	Bivariate
ORAL SURGEON	Female sex	88/84 (0.51%)	93/54 (0.63%)	0.61 (0.39 - 0.95)	0.03*
	Lower third molar	135/37 (0.78%)	100/47 (0.68%)	1.72 (1.04 - 2.83)	0.03*
	Erupted third molar	44/128 (0.26%)	18/129 (0.12%)	2.46 (1.35 - 4.49)	0.003*
PCD	Female sex	50/47 (0.52%)	59/42 (0.58%)	0.76 (0.43 - 1.33)	0.33
	Lower third molar	65/32 (0.67%)	66/35 (0.65%)	1.08 (0.60 - 1.94)	0.81
	Erupted third molar	24/73 (0.25%)	12/89 (0.12%)	2.44 (1.14- 5.21)	0.02*

OR: odds ratio; CI: confidence interval; *statistically significant

Table 2. Results corresponding to the variable patient age, in relation to the presence of clinical symptoms.

	Variable age (years)	No. patients with symptoms (%)	No. patients without symptoms (%)	Bivariate (p)
ORAL SURGEON	14-20	44 (56.4%)	34 (43.6%)	0.045*
	21-30	80 (47.9%)	87 (52.1%)	
	31-79	48 (64.9%)	26 (35.1%)	
PCD	14-20	39 (69.6%)	17 (30.4%)	0.001*
	21-30	37 (38.5%)	59 (61.5%)	
	31-79	25 (54.3%)	21 (45.7%)	

*statistically significant

Discussion

In 1979, the United States National Institutes of Health held a congress to debate a series of issues relating to the extraction of third molars (15). Although the congress established a series of well defined criteria for treatment once pathology proved manifest, it was concluded that there is no safe way to predict which asymptomatic third molars can be expected to eventually develop disease. Current clinical evidence relates the position of impacted third molars within the maxillae to the type of clinical manifestations that may result from impaction. A number

of studies (16-19) have reported a greater risk of pathology in the case of distoangular third molars. However, in our series, the molars most frequently removed because of associated pathology were in a vertical position according to both the PCD (73.1%) and the oral surgeon (60.2%). Likewise, in our study, the oral surgeons found molars with partial mucosal retention to be those most often associated with pathology (9,16,17). These findings coincide with the results published by Almendros et al. (10) in a retrospective study of patients subjected to surgical extraction of lower third molars in our Service of Oral Surgery. In effect, third

molars in a vertical position and with partial mucosal and bone retention were seen to be the teeth yielding the largest proportion of preoperative complications.

A number of factors can influence the decision to remove an asymptomatic third molar. Lysell et al. (19) reported that general dental practitioners and oral surgeons, based on radiological findings, perceived a high probability that asymptomatic mandibular third molars have to develop pathology, being the development of a dentigerous cyst the most commonly cited disorder among general dentists, and the second most frequent among oral surgeons. This high rate cannot be explained in terms of the prevalence of such cysts, which is low (2-4%) (1). The authors therefore postulated that the participants were more influenced by the potential hazards of the development of a large cyst or its malignant degeneration than by the actual incidence of such lesions. In our study, infectious disease, including pericoronitis, was the pathology most frequently observed by both the oral surgeon and the PCD.

Lysell and Rohlin (1) published the results of a study on the opinion of 25 Swedish oral surgeons in relation to the indications of mandibular third molar extraction. In this context, 27% of the extractions were performed on a prophylactic basis, versus 14% for orthodontic reasons. In our study these indications respectively accounted for 51% and 35% of all extractions among the oral surgeons, and for 46% and 19% among the PCD. These figures are in contrast to those obtained by Bataineh et al. (20), in a sample of Jordanian patients referred to a university Service of Oral and Maxillofacial Surgery. In effect, these authors found 47% of the extractions to have been performed due to the presence of pericoronitis, while prophylactic removal only accounted for 7.7%.

On the other hand, studies have been made of the probability of developing pathology associated to asymptomatic third molars based on the evaluation of periapical X-rays. Among general dentists, the clinical conditions that most influenced the decision to extract were dentigerous cysts, followed by pericoronitis. For the oral surgeon, and in coincidence with our own results, pericoronitis was the most influential factor, followed by the development of a dentigerous cyst or caries affecting the second molar (21).

Until recently, the decision of dental professionals to remove a third molar was largely influenced by the presence of associated pathology. A complicating factor, however, was the difficulty of distinguishing between the "incidence of pathology" and the "prevalence of pathology" (11). Knutsson et al. reported great variability among both general dentists (11) and oral surgeons (12) regarding the decision to remove asymptomatic mandibular third molars. A lack of concordance in terms of the indication of molar extraction was also seen between oral surgeons and general dentists in Wales, though a significant correlation was observed between the evaluations made by the same observer on two different occasions (21). In a more recent

study, no differences were recorded in the average number of lower molars programmed for extraction between general dentists in Sweden and Wales, though the Swedish oral surgeons indicated significantly more extractions than the Welsh surgeons (22). In our study, the principal indication of third molar extraction for both professional categories was the prevention of pathology, however we have to consider that Oral Surgeons only examine those patients that have already been pre-screened for extraction by a PCD.

In addition, a number of studies have found that providing dentists with selected literature on the pathology that may develop in association to third molars significantly influences their decision to treat asymptomatic lower molars (23).

Considering only the indications of oral surgeons for the extraction of asymptomatic molars, Liedholm et al. (24) found patient age to be the only variable with a significant effect ($p < 0.05$), with a greater proportion of indications among younger patients. In our study, age was statistically significant for both the oral surgeon ($p = 0.045$) and for the PCD ($p = 0.001$) in relation to the presence of pathology associated to the third molar. Prophylactic removal was the most frequently cited indication among oral surgeons in patients between 14 and 30 years of age, while in patients over 30 years of age the most frequent justification for removal was the presence of associated pathology (59.5%). This indication of prophylactic removal predominated among the PCD in patients over 20 years of age, while in younger individuals orthodontic or prosthodontic indications accounted for the largest proportion of extractions (66%). The opinion of the oral surgeon in favor of an increased indication of prophylactic third molar removal in younger patients (in this case under 30 years of age) may be based on the assumption that surgery should be performed once pathology is diagnosed, or even earlier. Another contributing factor may be the assumption that older patients subjected to third molar removal are at a greater risk of developing postoperative morbidity than younger subjects (25, 26).

According to Knutsson et al. (9), the odds ratio (OR) for developing pathological conditions is 5- to 12-fold greater for molars in a distoangular position versus other positions, while third molars with partial mucosal retention present a 22 to 34 times greater risk of complications. However, these authors consider that third molars with total mucosal or bone impaction should not be removed on a systematic basis, since both mucosa and bone constitute effective barriers against bacterial invasion. In our study, the odds ratio in relation to the presence of clinical signs or symptoms associated to third molars was about 2.5 times greater for an erupted third molar for both the oral surgeon and the PCD, though it must be taken into account that our series also comprised third molars located in the maxilla.

In the third molar removal, one should consider not only the indication for extraction but also the economical aspect of this procedure (27,28). The practical clinical guide NICE implemented in the United Kingdom has managed to substantially reduce the number of asymptomatic and pathology-free third molars removed for prophylactic extraction (28). The authors of this paper didn't use any kind of clinical guide or protocol to attain a consensus between the different levels of health care. When comparing the high prevalence of prophylactic removals present in our results with other studies, we should stress that we do not consider these figures to be common on the daily clinical practice of our country. Most reports focus on lower third molars whereas we also included upper third molars. Furthermore, there are no clinical trials that support the routine prophylactic removal, in fact, most authors agree that each particular situation should be analysed, and that impacted third molar removal should not be generalized.

Conclusions

Our results show prophylaxis to be the principal indication of third molar extraction, followed by orthodontic reasons, according to both the PCD and the oral surgeon. Regarding third molars with associated clinical symptoms or signs, infectious disease – including pericoronitis – was the pathology most often observed by the oral surgeon, followed by caries. This order of frequency was seen to invert in the case of third molars referred for extraction by the PCD. A vertical position predominated among the third molars with associated pathology.

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Acknowledgements

The authors thank Prof. Dr. Jose Maria Sampaio-Menezes for his contribution to the statistical analysis.