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# Are Impacted Third Molars Always Necessary to be Removed? Part I - A Literature Review

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**Abstract**

The third molar is the last tooth to erupt in the oral cavity and it is also the most retained/impacted tooth of the jaws. Even though this tooth can remain asymptomatic causing no problems whatsoever to the patient, a series of disorders can be directly related with its presence. Throughout Dentistry history there have always been some doubts concerning the real need for asymptomatic impacted third molar removal and the best time to do it if indicated. This present article, Part I, has the objective to review the literature on the topic. A future to be published article, Part II, will discuss the still controversial issue and propose a conclusion. There is unanimity among oral and maxillofacial surgeons for impacted third molars removal when involved with pathological conditions. The concept of prophylactic extraction of third molars when the indications are not obvious, surgical extraction recommendation must be based on clinical experience and in adequate professional judgment, always taking into account the relation cost/benefits and if patient´s systemic condition is adequate for totally recover from surgical trauma.

**Keywords:** Impacted tooth; Retained third molar; Impacted third molar; Third molar removal

## Introduction

Among the alterations of the development of the face, dental inclusion or retention presents nowadays as a very important chapter inside Modern Dentistry specifically in the areas of Oral Pathology and Oral and Maxillofacial surgery.

It is understood by retained tooth a dental organ that even completely developed did not erupted in the normal time being so totally involved by bone (in other words, in his interior) or by both bone and mucous membrane.

The term inclusion is commonly used by Frenchmen, impaction more by North Americans, while retention by Hispanics and Germans.

Shafer [1] defined retained teeth those, separately or in groups, which for any reason did not manage to overcome mucous-bone structure because of absence of an eruptive force or for any mechanical impediment.

Nordenram et al. [2] quoted that impacted is any tooth that is totally immersed in tissue and has already passed its right time for eruption while tooth not erupted for a tooth immersed in tissue still in its normal development period with great probability for eruption.

Marzola [3] preferred the term retained classifying as such any tooth when its normal time for eruption has approached is partially or totally maintained in the interior of alveolar bone, preserving or not the entirety of the dental follicular sac.

For the few above reasons it will be used along this literature review article the term dental inclusion or impaction. And for those teeth found in normal eruption phase it will be used the expression physiologic inclusion or impaction.

The inclusion can be observed in both dentitions however it is predominant in the permanent one since during the formation and eruption of teeth the child is subject to several local or systemic factors which can determine the eruption or the inclusion of one or more teeth.

Dental inclusion is a frequent condition found in patients in dental offices. In spite of an impacted tooth to be able to remain asymptomatic without causing any problems to a patient a series of troubles can be straightly connected with its presence. In statistical terms the highest number of these dental inclusions is on account of the third molars, being lower molars in higher incidence than upper ones.

Many factors corroborate for this to happen such as: a) growth of the cranium to the detriment of the jaws, b) diet every day now less demanding of the stomatognathic system, c) coincidence of a preventive Dentistry in which patients suffer less mutilations, d) fluoridated water resulting in very important teeth decay reduction during infancy and adolescence, e) less teeth decay associated with less severe periodontal diseases when entering adulthood with patients maintaining all teeth in their dental arches producing lack of spacing and dental crowding.

## Literature Review

It is possible to logically understand that impacted third molars associated to pathological processes have formal indication for removal. However the questioning still remains about preventive removal or not for retained teeth that are not locally causing any alteration. In the literature we can find advocates for both arguments as shown below.

### Not surgical removal

Amler [4] studied the factor age in bone repair after dental extractions. The repair time in patients in the second decade of life was histologically compared with individuals with 50 years or more. During the period up to 10 days of post-operative there were no significant differences between two groups of patients. From the tenth day on the tissues of the youngest individuals accelerated the remodeling whereas that only took place to the twentieth day in the old individuals. Approximately to the thirtieth day bone repair was the same in both groups. Also the author affirmed that there are few evidences that extraction of third molars will minimize the present or future crowding of the lower anterior teeth for patients in orthodontic treatment as well for those not receiving the same type of treatment. Dental crowding is not a situation that indicates the extraction of third molars because it has no relation with the impaction of those teeth. So it was recommended that the third molars in total inclusion must be moved only when there is evidence of pathological conditions.

Accordingly with Lytle [5] counter-indications for dental extraction of retained molars can be summarized by the relation cost/benefit evaluated before indicating the removal. In the side of the risks the important factors are: a) age of the patient, b) his/her physical and psychological status. On behalf of the benefits it is necessary to find what are the problems related to the retained tooth which could be but not limited to: a) infection, b) pain, c) edema, or d) discomfort. The symptomatic impacted teeth must always be extracted even in patients with terminal diseases, if the patient tolerates the proceeding and it can make more comfortable his/her remaining period of life. Summarizing it can be said that the indications and counter-indications must guide the professional for choosing surgical or conservative treatment for third molars. Each patient must be considered individually. The majority of young people will benefit with the extraction of impacted third molars. With aging buccal diseases can determine the necessity of the extraction. The asymptomatic impactions with small potential risk for development of pathologies must be periodically followed up. However the author agreed that most of impacted teeth associated with a pathological condition must be surgically extracted to prevent future and more severe problems. Some impacted teeth can be maintained in position if the professional judges that surgery might cause more problems than the disease itself.

Nitzan et al. [6] studied the incidence of root resorption associated with impacted third molars through periapical X-rays. A total of one hundred ninety nine impacted third molars were evaluated. Of this total only 7.5% presented root resorption of adjacent tooth. Most of the cases affected patients between twenty one and thirty years of age and the frequency doubled for males. They came to the conclusion that from the clinical point of view indicating surgery with the intention of root resorption prevention in the adjacent tooth it is doubtful in those cases where the extraction should be a choice for impacted third molars, especially after thirty years of age.

The work of Lysell & Rohlin [7] carried out in Sweden with eight hundred and seventy patients with age of twenty seven years affirmed that the frequency of pathological entities as follicular cyst, tumors, second molars root resorptions and periodontal problems was low when compared to the impact of the extraction of asymptomatic third molars and the possible sequels derived from the surgical act. For the authors third molars deeply impacted without pathological evidences must be maintained until they cause some symptom that indicates the extraction. Third molars with roots completely formed and covered by bone must not be extracted simply because of being retained.

Stanley et al. [8] evaluated eleven thousand, five hundred ninety eight cases of impacted third of patients with twenty years of age, in the State of Florida - USA, through Panoramic X-rays. There was observed a total of 0.25% of cases of developments of cysts; 0.13% of internal resorption; 0.72% of damages to periodontal tissues and 0.72% of decays and resorptions in the second molars. In spite of the literature to affirm that an impacted third molar can cause serious pathological conditions in the future and that so being this tooth should be prophylactic extracted this single study did not agree with this philosophy due to the very low of pathological complications presented.

Eliasson et al. [9] affirmed that the risks of complications related to the impacted third molars do not increase in spite of patient aging. Fully impacted third molars can turn in a complicated surgery with risk of injury to the inferior alveolar nerve. So, they affirmed that it is not recommended the extraction of impacted third molars in the absence of clinical and radiographic indications.

The study of Von Wonwern & Nielsen [10] affirmed that the indication for surgical extraction of a retained third molar


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is clear if the tooth causes pain or if there are clinical and/or radiographic signs of existing pathology. If the third molar is asymptomatic the relation cost/benefit must be evaluated, i.e. all complications which the patient will be subjected to. As a benefit the surgical extraction can remove the development of inflammation, pathological injuries such as cyst, root resorption, tumors, decays, and periodontitis.

The work of Stephens et al. [11] concluded that there was an existing preoccupation of teaching that extraction of not erupted third molar, even asymptomatic and free of pathologies was not a proved preventive procedure. They then proposed that surgical extraction of those types of teeth must be limited to when present pathological indications are defined as: infection, cyst, tumor, resorption or decays not restorable. The study also emphasized the necessity of the professional to inform his/her patient the possibility of the post-operative complications.

Bricley et al. [12] also affirmed that there was a real concern to teach in School-hospitals an alternative treatment for asymptomatic third molars free of pathologies and that was the surgical removal of those teeth. This vision gained great support in the last years and reflected in a preoccupation about the validity of the preventive surgery. Meantime this study presented that the number of prophylactic extracted impacted teeth did not change in the decade of 90´s. Worried with the legitimacy of the preventive surgery the authors affirmed that if there were a reduction in at least 10% of not indicated lower third molars extraction this alone would reduce the morbidity of thousands of persons in England annually, providing an economy of millions of pounds to the Public and Private services. They ended up confirming that as in any area of surgery unless the intervention promotes profit in any patient´s health it is difficult to justify the necessity of a preventive surgery.

Venta et al. [13] affirmed that from a practical point of view it is not possible to prophylactic remove all inferior third molars in a patient´s young age. It would be more reasonable to surgical remove lower third molars partially erupted, with presence of follicular space extended between the tooth and the adjacent molar and third molars in distoangular position which were presenting great risks of acute diseases. So they came to the conclusion that the extraction of asymptomatic impacted third molars is indicated if there is high probability of development of future pathologies.

Brickley & Shepherd [14] determined that the option for impacted third molars without associate pathologies is not intervention; soon, in a cost/benefit analysis the preventive surgical extraction is probably unjustified. The study also reports that the predominance of future pathologies associated to impacted third molars which remain in the oral cavity is small with aging.

Accordingly with Koerner [15] the decision of an impacted third molar surgical extraction is based on countless factors being the most important the patient´s signs and symptoms. When the indications are not obvious, the recommendation for extraction of these teeth is based more on the clinical experience and in the professional judgment, always taking into account that the age of the patient interferes not only with the surgery difficulty but also with postoperative.

The objective of the study done by Chiapasco et al. [16] was to compare incidences of complications in three age groups: from nine to sixteen, from seventeen to twenty four and above twenty five years of age in order to obtain more information on the choice of the best moment for surgical extraction of impacted third molar. The study concluded that the germectomy must only be carried out when: 1) In the presence of morphostructural alterations or ectopic impactions; 2) Dental eruption is hindered by dysplastic alterations of the dental germ or pathological processes of the mandible; 3) Is desired to gain space in the posterior segment of the mandible when distalization of the first and second molars are necessary; 4) Excessive anteroposterior mandibular growth or severe dentoalveolar discrepancy present. If there is none of the quoted indications the preventive removal of impacted third molar must be carefully evaluated and preferably postponed up to the age group between seventeen and twenty four years when it is easier to correctly establish the real necessities for the surgery.

Basile & Gregori [17] affirmed that the fact of the tooth be impacted does not demand any treatment since the find means an abnormal condition which suggests only periodic clinical and radiographic control each ten or twelve months. Being so it does not represent pathological picture to which it is necessary to apply surgical therapeutics. The surgical or conservative treatments must be chosen by the professional weighing all the benefits and risks involved for each patient, determining case necessity and opportunity.

Song et al. [18] evaluated articles found in the literature on preventive extraction of impacted third molars. The authors concluded that there are few reliable evidences on the validity of such procedure. In the absence of good evidences that support the anticipated surgical extraction it seems certain to affirm that there is no justification for this attitude towards impacted third molars free of associated pathologies.

The study of Kostopoulou et al. [19] was carried evaluating impacted third molars with different degrees of eruption and angulations in patients of both sexes, in groups with age from nineteen to twenty five, from twenty six to forty, and from forty one to sixty years old. It was summarized that there is no way to predict the development of local pathologies in asymptomatic impacted third molars.

One year later Kostopoulou et al. [20] declared that the decision of indicating or not for surgical extraction of an impacted third molar is based on the experience of the professional, in his daily practice. Since there are no clear evidences in the


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literature in order to predict if a pathology will be installed in a symptomatic third molar, the decision making is extremely subjective.

Haddok & Flower [21] affirmed that the use of general anesthesia for the extraction of impacted asymptomatic third molars is not a sufficient justification for the extraction of other impacted third molars without pathologies in the same surgical time. An evaluation of clinical strategies also concluded that the preventive extraction is not recommendable since it is supposed that the patient must always return for routine clinical and radiographic consultations, and that the diagnosis of any pathology associated to the third molar would be done in the beginning and so to indicate or not the extraction. Indications well defined for preventive impacted third molar removal must be studied.

## Prophylactic surgical removal

Laskin [22] evaluated the indications and counter-indications for impacted third molars surgical extractions. He mentioned that in spite of an impacted third molar be able to remain asymptomatic for the whole life of an individual frequently this tooth can be involved in pathological process and because of that is his opinion that a preventive extraction has much less transoperative complications when the impacted third molar is not associated with pathologies. So he recommended that this tooth be extracted as soon as it insufficient space is detected for its eruption. Since the mandibular and maxillary growth, accompanied by resorption of the anterior edge of the ramus, are completed between sixteen/seventeen years of age, the decision of preventive extraction can be done during this phase.

Lytle [5] categorically affirmed that an extraction of impacted third molars would have a higher benefit than not extracting based on the great number of problems connected with its retention. Any tooth that has not assumed the appropriate position and function in dental arch is a not erupted tooth which probably will become impacted if not reaching the position and desirable function after the period of time considered normal for eruption which is two years on average.

Hinds & Frey [23] affirmed that as Dentistry always aimed oral health, regarding impacted third molars, any tooth that is not assuming its own position and function in the arch should be removed; or when not possible of transplanting this tooth, or using it as an orthodontic anchor, or for a prosthesis support, or still in the absence of counter-indications because of systemic complications which the patient might present. The difficulty, complications, and inherent risks of the surgery in old patients indicate that the impacted third molars should to be carried out in young age when most of the dental problems have already been manifested.

Stephens et al. [11] determined that the fundamental reason for a prophylactic surgical is the prevention of lesions such as but not limited to: a) dentigerous cyst, b) ameloblastoma, c) epidermoid carcinoma, d) infection, and e) root resorption of adjacent tooth. However the incidence of dentigerous cyst is less than 1%. Rarer still is the formation of ameloblastoma. There are no clear conclusions about the incidence of root resorption of adjacent teeth. There are few scientific studies on the incidence and recurrence of pericoronaritis in spite of existing available information on the relation to dental position and the probability of infection incidence. Concluding, the author confirms that there are no scientific data on which the impacted third molars would cause crowding of the lower anterior teeth.

For Brokaw [24] if the extraction of an impacted third molar is indicated it is not advisable to wait until the referred tooth becomes symptomatic because post-operative pain, infection, edema, and other possible consequences appear with much less frequency in adult patients. It was demonstrated that third molar does not assume a functional and healthy position in 95% of cases. They reported that is responsibility of the professional to inform his/her patients the potential problems associated to impacted third molars and explain the recommendations for surgical extraction as early as possible.

Accordingly to Mercier & Precious [25] the best treatment adopted by an oral surgeon is the extraction of a not erupted third molar in developing patients, generally between fourteen and twenty two years of age when the eruption chances are minimal.

Samsudim & Madson [26] related that recurrent pain resulted from pericoronaritis, pulpitis or periodontitis, edema and trismus associated to a third molar eruption frequently demand use of antibiotics and results in loss of days of work. A great number of patients who had surgical extraction of their third molars experienced all these symptoms which could have been avoided with a prophylactic extraction conduct.

For Koerner [15] the indications for impacted third molar removal are: a) abnormal positions such as vestibular, lingual or palatal, mesial and distal inclinations, b) specially when accompanied by pathologies, c) pain resulted from pericoronaritis, periodontitis, periapical abscess, neoplasms, d) resorption of second molar, e) third molar caries or in the distal face of second molar, and f) inflammation caused by compression of soft tissue by an antagonist tooth.

Boer et al. [27] reported that dental arches needed to have an anteroposterior growth to accommodate all permanent molars. Due to the fact that mandibular third molars tend to erupt relatively late and slowly, disturbances related to position, for example, pericoronaritis and impaction easily appear in the second and third decades of life. The prevention of these disturbances is the main reason for preventive removal of lower third molars.

From the clinical point of view, accordingly with Flick [28] the use of the term asymptomatic is incorrect when used to designate the absence of pathological condition because the majority of


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them develop in association with a third molar which initially is asymptomatic. Conditions such as cysts, caries and periodontal diseases give clinical symptoms only after a significant damage to adjacent tissues. Then the use of the term asymptomatic for absence of a pathological condition can produce doubts but it would be correctly used if was designating absence of symptoms even in the presence of any pathological condition.

Godfrey & Dent [29] determined that the term asymptomatic is used to describe when patient did not suffer pain or discomfort attributed to a third molar. However asymptomatic does not mean that third molar does not take risks of presenting any future pathologies. The term would best define a tooth that erupted in a satisfactory functional position without periodontal pathology or that remained deeply retained in bone tissue without sign of pathologies or eruptive movement during a long period. According to the authors the prophylactic surgical extraction is indicated in the following situations: a) prevention of lower anterior teeth crowding attributed to third molar eruptive forces; b) avoid risks of pathological sequels expected with the presence of partially erupted third molar, c) superior impacted third molar simultaneously extracted by the preventive reason to avoid resultant problems from the lack of contact between this tooth and the impacted mandibular third molar already extracted.

Kaminishi [30] determined that when there is doubt for treatment choice whether surgical or conservative for an impacted third molar there are two points to be evaluated: a) cost, and b) risk. What seems to be forgotten is the cost for maintaining an impacted third molar in oral cavity which requires periodic clinical and X-rays evaluations every two years for the entire patient´s life. Today it is common to observe pathologies in old patients with impacted third molars. If the cost of a Panoramic X-ray for any life of the patient is estimated or four periapical X-rays to every two years, in approximately 50 and 60 years it would exceed the costs for extraction of four impacted third molars today. The author conclusion is that it is not possible to hope that impacted third molars remain free of pathologies for the whole life. More prudent is the extraction of impacted third molars and the risk is much less if surgery is carried out in young age while the patient is in good health and his/her repairing capacity is at maximum.

## Risks and benefits of surgical removal and not intervention

Mercier & Precious [25] determined risks and benefits of surgical removal and not intervention.

**Risks of surgical removal:** A. Transitory: 1) alteration of sensory nerve, 2) alveolitis, 3) trismus, 4) infection, 5) hemorrhage, 6) dentoalveolar fracture, 7) tooth dislocation; B. Permanent: 1) infection of vital organ, 2) mandibular fracture and/or maxillary tuberosity, 3) total parestesia of inferior alveolar or lingual nerves.

**Risks of not intervention:** 1) dental crowding based on the predicted growth; 2) resorption of adjacent tooth; 3) destruction of periodontium; 4) development of pathological conditions such as infection, cyst and tumor.

**Benefits of surgical removal:** A) Regarding the age: 1) the newer is the patient the lesser morbidity of an impacted third molar extraction; B) Regarding the different therapeutic measures: 1) ample alveolus lavage with clorexidine after extraction to avoid alveolitis; 2) anti-inflammatory steroidal or no steroidal medication which reduce post-operative complications such as pain and edema.

**Benefits of not intervention:** 1) avoid transoperative risks during surgery; 2) preservation of function with future eruption; 3) transplant in case of premature teeth loss in the arch; 4) preservation of alveolar crest as support for future prosthesis.

For Koerner [15] surgical extraction of impacted third molar must not be carried out if: a) there is sufficient space for normal eruption, b) third molar will be useful as a prosthesis support, c) patient refuses to be subjected to surgery, and d) potential trauma to exceed the benefits of the extraction.

## Postoperative complications

After surgical removal of impacted third molars there are several complications that patient can present with. It is certain to say that all pre and postoperative recommendations as well as transoperative measures have the purpose of minimizing or avoiding such complications. However, it is known that there are few not explained factors that cause appearance of complication or even the surgical trauma itself imposed on the patient and his/her body response to it. Since complications were exhaustively studied it is the professional obligation to evaluate all of them the patient will be subjected to, connect them with the beneficial aspects surgery will bring to his/her health and then take the decision to extract or not. The risks which the patient will undergo must be lesser than the impacted third molar extraction benefits. It is of general agreement that for any surgical procedure, including surgical removal of impacted third molar, patient be informed of all the risks and complications which he/she will be subjected to. Patient´s opinion is decisive in choosing the type of treatment, whether surgical or conservative.

Authors such as Van Gool et al. [31], Bruce et al. [32], Osborn et al. [33], Sisk et al. [34], Sands et al. [35], Koener [15], Chiapasco et al. [16], Boer et al. [27], and Lopes et al. [36] presented the commonest complications after third molar removal such as: a) pain, b) edema, c) trismus; d) dysfagia, e) incapacity for working, f) alveolitis, g) trauma to nervous tissue, mainly inferior alveolar nerve paresthesia, h) secondary infection, i) abscess, j) halitosis, k) hemorrhage, l) ecchymosis, m) late bone repair, n) oro-antral fistula (for upper impacted molars), o) periodontal packet formation in the distal aspect of second molar.


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Van Gool et al. [31] carried out a study in order to compare different surgical techniques and their resultant postoperative complications. Among the complications these ones were presented:

**1) Pain:** the antibiotic usage, preoperative preventive medications, exaggerated force when using elevators, not intentional damages to periosteum, quantity of local anesthetics, odontosection with drill and osteotomies had not significant influence in pain level. The presence of acute inflammation such as pericoronaritis, periodontitis, submucous or pericoronal abscesses in the moment of the surgery resulted in significant increase postoperative pain. Great amount of bone covering the distal portion of the third molar crown and necessity of mucoperiosteal flap incisions resulted in more pain because of surgical time increase and more handling of soft tissues.

**2) Trismus:** type of incision and suture did not interfere in the presence of trismus. Position of tooth, presence of great quantity of alveolar bone to be removed in the distal portion of impacted lower third molar and necessity of odontosection influenced the presence of trismus probably because of the increase of surgical time.

**3) Edema:** caused by mucoperiosteal incision and flap reflection manipulation. The edema is straightly related to surgical time increase (osteotomy and odontosection) and damages to periosteum.

**4) Dysfagia:** it was more frequent in cases with flap incisions and increase in periosteum handling.

**5) Incapacity for working:** this is related to the surgery technique when flaps were performed. In the first days fever and malaise were the most important reasons and in the following days, edema and trismus more than the pain itself were the main reasons of missing work.

**6) Alveolitis:** with a percentage of 3.5% there was no relation of alveolitis with suture, type of incision, flap design, acute inflammation present, preoperative antibioticotherapy, surgery damage itself, oral hygiene, surgeon's skills, quantity of local anesthetics (vasoconstrictor) and alveolus filling out with blood in the moment of suture. On the other side usage of elevator exaggerated force increased frequency of alveolitis possibly for the damages in alveolar walls.

**7) Abscesses:** less of the half of the abscesses that took place were resultant of bone fragments and enamel present under periosteum, characteristics of late abscesses (from three to eleven weeks later).

**8) Trauma to nervous tissue:** paresthesia of inferior alveolar nerve is the most frequent complication. There is a narrow correlation to the roots positioning of lower impacted third molars with the nerve proximity and its respective injury and consequent expected paresthesia.

Bruce et al. [32] studied trans and postoperative complications after impacted third molars removal in three different groups of age. First group composed of individual up to twenty four years, second group, from twenty five to thirty four years and third group, above thirty five years of age). The main transoperative complications in nine hundred and ninety extracted molars were: a) hemorrhage, b) inferior alveolar nerve injury, c) fractured root, d) injury to adjacent tooth, and e) fracture of lingual bone plate. All trans and postoperative complications were in larger scale in the third group composed of most advanced age persons. Damages to the inferior alveolar and lingual nerves occurred in 1.5 to 3% of the cases. Alveolitis occurred in 3 to 30% of the cases. Infection with abscess formation occurred in 3% and secondary hemorrhage in 0.5% of the cases, respectively. Pain, trismus, edema, dysfagia reports were common in 50% of patients in the first four days. Damages to adjacent tooth and periodontium occurred in 3% of all cases.

Handelman et al. [37] compared the methodology of procedures and complications after surgical removal of impacted superior and inferior third molars by oral and maxillofacial surgeons and general practitioner dentists. The commonest postoperative complication was alveolitis. This complication occurred in 25.9% of all lower extractions and frequency was similar between the two groups of studied professionals. The diagnosis criterion for alveolitis was the postoperative patient return with constant pain and relief of this pain after placement of an anodyne medication inside the alveolus. The postoperative hemorrhage occurred in 2% of superior molars and 1.1% of inferiors. The middle number of postoperative visits was 1.56. Paresthesia occurred in 8.1% of the cases for both professionals and trismus in 9.5% for oral and maxillofacial surgeons and in 5.6 % for general clinicians. The authors were able to conclude that, statistically, there were no differences in the frequency of postoperative complications and in the factors for complications of both groups of professionals.

Berge and Boe [38] presented a correlation between pre and transoperative variables and inflammation factors, including patient sex, eruption stage, saggital angulation, presence of pericoronaritis, surgery duration and difficulty, hour of the day in which the surgery was carried out, use of oral contraceptives, tobacco and alcohol. However, after to consider all these factors it was believed that there are still unknown factors which considerably influence the postoperative response. In daily clinic it would be useful to predict when there would be a patient exacerbated response to begin preventive measures. The study concluded that the use of oral contraceptives showed to have no relation with postoperative reaction. And complications such as edema, pain and trismus were straightly connected with impacted teeth covered with bone and longer surgeries, horizontal angulation, and in higher frequency in female smoking patients. Depth, third molar angulation and surgery time can predict in a limited way postoperative morbidity. This study indicated that


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the influence of pre and transoperative variables, individually or simultaneously, is very small. The most commonly studied variables explained only from 8 to 17% in patient pain variation, edema, trismus, and days of incapacity for working. With the current knowledge it is not possible to exactly predict which patients will experience an exacerbated inflammatory reaction after surgery.

The study of Boer et al. [27] evaluated postoperative complications of one thousand, seven hundred and ninety seven patients who had their impacted third molars surgically extracted. The total of postoperative complications was 10.6%. These were the conclusions of this long study: 1) Patients above thirty years of age present high risk of postoperative complications after lower impacted third molars removal, independently of patient sex. This is due to the fact that bone tissue of an older person is denser than of a young one. Another explanation can be that erupted third molars in an advanced age person already suffered masticatory forces and those teeth are more stuck to alveolar bone by less periodontal ligament. 2) The more abnormal the position of a third molar the higher the risks for patients to have postoperative symptoms. This is due to the fact the need for odontosection and osteotomy was increased in a wider surface. 3) There were no statistically significant difference for postoperative complication rates between beginners and more experienced professionals.

In 1995 Lopes et al. [36] studied five hundred and twenty two patients in Eastman Dental and University College Hospitals, London - England, in one year period. Of this total of patients 23.2% presented postoperative complications. During the postoperative period 76.2% of the patients imagined that the original problems they had were reduced or solved through surgery. The middle number of missing days of working was 3 while 19% of operated patients did not missed work.

Armstrong et al. [39] emphasized that the risks associated to third molar surgery are already quite well established. The philosophy used by the authors emphasizes that treatment plan must be done in partnership with patient who needs to understand possible surgery complications and risks for example as: edema, trismus, pain, nervous tissue injury, which can be permanent. Besides complications relative to general anesthesia if that is the case. The information must be given to the patient in writing since very often he/she will absorb them and better reflect upon in a more familiar environment and not in a stressful environment as a doctor's office or hospital. The report of possible risks and complications of a surgery serves either to protect the professional of possible forensic risks and/or to reduce levels of patient anxiety.

In 1996 Shugars et al. [40] evaluated third molar surgery interference in patient´s skills for chewing, sleeping, having daily routine activities, speaking and working. According to this work most of the adults, young and healthy, experienced some symptoms and limitations in their activities for five days after the surgery. Interferences in daily activities, work or school, occurred in the first three days after the surgery with pain symptom mitigating up to the fifth day. Bleeding, edema, and nausea were relatively minimum and limited to the first two postoperative days. Hematomas were rare. Problems with food impaction in spite of initially be minimal were gradually increased during postoperative days and disappeared up to two weeks after. This is due to the diet change then returning to normal food habits.

The objective of Blomqvist et al. [41] study was to evaluated when it is possible to recognize patient´s contribution to signalize when it was really pain or simply a discomfort sensation during impacted inferior third molar removal procedures under local anesthesia. The most frequent pain was reported during the injection of local anesthetics and women complained more about pain during the procedures that men. The preoperative factors such as smoke and pericoronaritis and the transoperative one such as surgery time were negative important factors for prognoses. The results of this study indicated that third molar surgery effects can influence several aspects related to the quality of patient´s life during the first postoperative week. Patients must be orientated as for the possibility of a difficulty of mouth opening and mastication even after a week. However, skill for swallowing must have returned to normal during this period. Some patients can have difficulties while speaking and changes in the taste even after the seventh day postoperatively and approximately 50% of patients will feel pain even with analgesic therapy until the same period of days. After a week almost half of patients thought that it wasted considerable time of work and 20% of all patients would not recommend the surgery for third molar extraction. The reasons would be related to pain, missing of work and fear of the procedure. The interferences in food intake were considered an adverse effect of higher impact in patient´s quality of life followed by pain. Probably pain was not put in first place because all patients naturally expect pain to be present in the postoperative days. Meanwhile professionals established pain as the worst adverse effect and on the contrary of what patients realized the interferences in daily activities were the least. The study concluded that patients are not routinely informed about pain, edema, trismus, and possible parestesia of lower lip or tongue. Patients would express less dissatisfaction with surgery effects if they were informed of all possible adverse effects related to the maintenance of quality of life.

Irvine & Hapangama [42] aimed to reduce the number of postoperative visits for patients undergone third molars extractions. A total of a hundred and thirty patients were studied who undergone third molar extractions under general anesthesia and sutured with resorbable suture. The cost spent with postoperative visits is always a reason to be quoted in order to routine scheduling be avoided. Not scheduling a patient for a postoperative consultation not only economizes expenses as it releases time-table for other consultations for new patients.


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From the point of view of public health, it was detected that the postoperative consultations were causing great expense. This study concluded that there is no need for routinely schedule postoperative consultations for patients who had their impacted third molars surgically removed without transoperative complications. However, the authors affirmed that a good postoperative analgesia is necessary, that the professional must go over again to give patients clear recommendations and postoperative cares, and explain that they should have to contact the professional if and when necessary.

Conrad et al. [43] affirmed that before accepting surgery patients must be informed of risks and benefits of having their third molars surgically extracted. At present patients demand more information and more options for decision of their health treatment.

Yuasa et al. [44] determined that difficulty of impacted third molar extraction is associated with the depth in which the tooth is immersed in the interior of bone tissue, the space between second molar and the available mandibular ramus, the biggest root diameter or the combination of these factors. Difficult surgeries result in more tissue handling, increased surgical time, and increase in postoperative complications.

## References


1. Shafer WG, Hine MK, Levy BM (1987) Tratado de patologia bucal. 4th (edn), Koogan, Rio de Janeiro, Guanabara.
2. Nordenram A, Hultin M, Kjellman O, Ramström G (1987) Indications for surgical removal of the mandibular third molar. Swed Dent J 11(1-2): 23-29..
3. Marzola C (1988) Técnicas exodontica. 2nd (edn), Pancast, São Paulo, p. 51-67.
4. Amler MH (1977) The age factor in human extraction wound healing. J Oral Surg 35(3): 193-197.
5. LYTLE JJ (1979) Indications and contraindications for removal of the impacted teeth. Dent Clin North Am 23(3): 333-346.
6. N Nitzan D, Keren T, Marmary Y (1981) Does an impacted tooth cause root resorption of the adjacent one? Oral Surg Oral Med Oral Pathol 51(3): 221-224.
7. Lysell L, Rohlin M (1988) A study of indications used for removal of the mandibular third molar. Int J Oral Maxillofac Surg 17(3): 161-164.
8. Stanley Hr, Alattar M, Collet Wk, String fellow Jr Hr (1988) Spiegel Eh. Pathological sequelae of neglected impacted third molars. J Oral Pathol 17(3): 113-117.
9. Eliasson S, Heimdahl A, Nordenram A (1989 ) Pathological changes related to long-term impaction of third molars. A radiographic study. Int J Oral Maxillofac Surg 18(4): 210-212.
10. Von wowern N, Nielsen HO (1989) The fate of impacted lower third molar after the age of 20. A four-year clinical follow-up. In J Oral Maxillofac Surg 18(5): 277-280.
11. Stephens RG, Kogon SL, Reid JA (1989) The unerupted or impacted third molar- a critical appraisal of its pathological potential. J Can Dent Assoc 55(3): 201-207.
12. Brickley MR, McConnell D, Shepherd JP (1993) Lower third molar treatment planning for orthodontic cases. Br J Orthod 20(3): 255.
13. Venta I (1993) Predictive model for impaction of lower third molars. Oral Surg Oral Med Oral Pathol 76(6): 699-703.
14. Brickley MR, Shepherd JP (1993) Comparisons of the abilities of a neural network and three consultant oral surgeons to make decisions about third molar removal. Br Dent J 182(2): 59-63.
15. Koerner Kr (1994) The removal of impacted third molars. Principles and procedures. Dent Clin North Am 38(2): 255-278.
16. Chiapasco M, Crescentini M, Romanoni G (1994) Estrazione dei terzi molari inferiori:germectomia o avulsione tardiva? Minerva Stomatol 43(5): 191-198.
17. Basile netto J, Gregoru C (1996) Dentes inclusos. In: Gregori C (Ed.), Cirurgia buco-dento-alveolar. Savier, São Paulo, pp.119-137.
18. Song F, Landes DP, Glenny AM, Sheldon TA (1997) Prophylactic removal of impacted third molars: an assessment of published reviews. Br Dent J 182(9): 339-346.
19. Kostopoulou O, Brickley MR, Shepherd JP, Knutsson K, Rohlin M (1997) Agreement betweem practitioners concerning removal of asymptomatic third molars. Community Dent Health 14(3): 129-132.
20. Kostopoulou O, Brickley MR, Shepherd JP, Newcombe RG, Knutsson K, et al. (1998) Intra-observer reliability regarding removal of asymptomatic third molars. Br Dent J 184(11): 557-559.
21. Haddock A, Flower A Symptomatic third molar removal. Br Dent J 186(6): 262.
22. Laskin DM (1987) Cirurgia bucal y maxillo facial. Panamericana, Buenos Aires, p. 17-30.
23. Hinds EC, Frey KF (1980) Hazards of retained third molars in older persons: report of 15 cases. J Am Dent Assoc 101(2): 246-250.
24. Brokaw WC (1991) The third molar question: when and why should we recommend removal? Va Dent J 68(4): 18-21.
25. Mercier P, Precious D (1992) Risks and benefits of removal of impacted third molars. A critical review of the literature. Int J Oral Maxillofac Surg 21(1): 17-27.
26. Samsudin AR, Mason DA (1994) Symptoms from impacted wisdom teeth. Br J Oral Maxillofac Surg 32(6): 380-383.
27. de Boer MP, Raghoebar GM, Stegenga B, Schoen PJ, Boering G (1995) Complications after mandibular third molar extraction. Quintessence int 26(11): 779-784.
28. Flick WG (1999) The third molar controversy: framing the controversy as a public health policy issue. J Oral Max Surg 57(4): 438-444.
29. Godfrey K, Dent HD (1999) Prophylactic removal of asymptomatic third molars: a review. Aust Dent J,Sydney 44(4): 233-237.
30. Kaminishi R (2000) A case for prophylactic removal of impacted third molars in young patients. J Oral Max Surg 58(3): 359.
31. Van Gool AV, Ten Bosch JJ, Boering G (1977) Clinical consequences of complaints and complications after removal of the mandibular third molar. Int J Oral Surg 6(1): 29-37.
32. Bruce RA, Frederickson GC, Small GS (1980) Age of patients and morbidity associated with mandibular third molar surgery. J Am Dent Assoc 101(2): 240-245.
33. Osborn TP, Frederickson G, Small IA, Torgerson TS (1985) Prospective study of complications related to mandibular third molar surgery. J Oral Maxilofac Surg 43(10): 767-769.
34. Sisk AL, Hammer WB, Shelton DW, Joy ED (1986) Complications following removal of impacted third molars-the role of the experience of the surgeon. J Oral Maxillofac Surg 44(11): 855-859.



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35. Sands T, Pynn BR, Nenniger S (1993) Third molar surgery: current concepts and controversies. Oral Health 83(5): 11-30.

36. Lopes V, Mumenya R, Feinmann C, Harris M (1995) Third molar surgery: an audit of the indications for surgery, port operative complaints and patient satisfaction. Br J Orla Maxillofac Surg 33(1): 33-35.

37. Handelman SL, Black PM, Desjardins P, Gatlin L, Simmons L (1993) Removal of impacted third molars by oral/maxillofacial surgery and general dentistry residents. Spec Care Dentist 13(3): 122-126.

38. Berge TI, BOE OE (1999) Predictor evaluation of postoperative morbidity after surgical removal of mandibular third molars. Acta Odontol Scand 52(3): 162-169.

39. Armstrong RA, Brickley MR, Evans DJ, Cowpe JG, Shepherd JP (1996) Patient perceptions regarding the risks of morbidity and complications of lower third molar removal. Community Dent Health 13(1): 17-21.

40. Shugars DA, Benson K, White RP, Simpson KN, Bader JD (1996) Developing a measure of patient perceptions of short-term outcomes of third molar surgery. J Oral Maxillofac Surg 54(12): 1402-1408.

41. Blomqvist JE, Isaksson S, Lundberg T (1997) Patient' s assessment of surgical removal of mandibular third molars-an inquiry study. Swed Dent J 21(3): 93-99.

42. Irvine GH, Hapangama N (1998) Post-operative follow-up following the removal of wisdom teeth. Br Dent J 185(12): 565-566.

43. Conrad SM, Blakey GH, Shugars DA, Marciani RD, Phillips C, et al. (1999) Patients' perception of recovery after third molar surgery. J Oral Max Surg 57(11): 1288-1294.

44. Yuasa H, Kawai T, Sugiura M (2002) Classification of surgical difficulty in extracting impacted third molars. Br J Oral Maxillofac Surg 40(1): 26-31.





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