

# Finding of Third Lower Molar in Prosthetic Croatian Patients.

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## ABSTRACT

**Background:** The third molar is different in many ways from all the other teeth. The aim of this study was to examine how often the third lower molars are chosen as abutment tooth. **Methods:** A total of 228 OPG was analyzed. The number of lower third molars (M3s) present per person as well as on the right or the left side of the mandible and their relationships, for both males and females were examined, taking into account personal data, collected from clinical records. Collected data were subjected to statistical analysis set to  $p \leq 0.15$ . The patients were aged 30 to 87 years ( $\bar{x} = 49.22$ ;  $sd.13.06$ ) with equal representation of all ages. **Results:** 188 patients, or 82%, has both lower third molar. Angulations of third molar was measured from 0 - 90° ( $\bar{x}=69.65$ ,  $sd.11.67$ ). On more retained tooth higher angulation is measured ( $p=0.17$ ). It was extracted 18 (8%) left and 22(10%) of right third molar. More extracted third molars ( $p=0.21$ ) and healing tooth ( $P=0.18$ ) were found in elderly patient. Higher percentages were recorded for females but based on  $\chi^2$  statistics this difference was not found to be statistically significant. 205 findings or 90% was with vital third molar. Endodontic treatment was done on 7 left and 15 right wisdom teeth, more in men than in woman. As abutment teeth 37 third lower molar or 16% left and 13% right were found. **Conclusion:** Lower third molar can be adequate abutment tooth for fixed prosthetic appliances and that is something that needs to be evaluated in prosthetic treatment planning.

**Keywords:** Third molar, angulations, abutment tooth.

## INTRODUCTION

Attention of saving the natural teeth to the elderly age is one of the progress in dental science and prevention, because adequately biomechanical weapon is the optimum size of bone around natural teeth. However, everything is changing by extraction of any tooth. First, it is changing the bone morphology, shape of extraction pocket. The bone, with neighbouring tooth is going to throw reabsorption from lingual part.<sup>[1]</sup> Within a few year height of the bone reduce about 1 mm. In addition, chewing efficiency is changing. Therefore, prior to each oral treatment it is very important to evaluate quality bones from anatomic, metabolic, functional and prosthetic views. Easier are prevention then correction consequences of teeth extraction. Significantly are simpler and cheaper ways of treating a tooth for endodontic or restoring than prosthetic therapy.

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The third molar is often called the wisdom tooth, which means knowledge. It is important to highlight that the third molar is different in many ways from all the other teeth. Wisdom tooth has his differences in form, time of eruption, shape of clinical crown, morphology of the root and often of

a genesis. Number of roots and channels in the lower third molar varies from one, often two, but also three.<sup>[2]</sup> Third molar erupts in adolescent age or later. During development of this tooth he is constantly changing position and is subject of pre eruption rotation, which particular comes when wisdom teeth touches another tooth. Based on the radiographic analyses, Winter's or Pell and Gregory's classifications have been used to determine the position of third molars and to predict possible disorders or modifications.<sup>[3,4]</sup> Teeth most favorable for eruption are those which initially have angulations of less than 50° to occlusal plane. A specially percentage of angulations, (Ahmed and all. measured 94°), is deciding moment which applies does orthodontic therapy or extraction is needed.<sup>[5]</sup> Tooth should be perceived as a person. The tooth is often used in identifying tooth age of unknown persons. The study of development third molar can be detected chronological age.<sup>[6]</sup> In Malaysia population has been proved that root of third lower molar is developing sooner in male than in female population.<sup>[7]</sup> No significant differences were found in third molar eruption between males and females on Bosnian and Herzegovinian population, but third lower molar can be used for assessing the dental age.<sup>[8]</sup>

The third molars are frequently impacted because they are the last teeth to erupt in the oral cavity.<sup>[9]</sup> An impacted tooth is one that fails to erupt into the dental arch within the specific time. Because impacted teeth do not erupt, they are retained throughout the individual's lifetime unless

extracted or exposed surgically. Teeth may become impacted because of adjacent teeth, dense overlying bone, excessive soft tissue or a genetic abnormality. Most often, the cause of impaction is inadequate arch length and space in which to erupt, when the alveolar arch is smaller than the tooth arch. Depending on the angulations, the tooth might be classified as medial angular, horizontal, vertical, distal angular, palatal, buccal or lingual. Reported by Ahmed et al in 43% of the cases impacted lower third molar is medial angulated.<sup>[10]</sup> More frequent impaction is bilateral than one sided. Mandibular third molars are more commonly impacted than their maxillary antagonist<sup>[11]</sup> but impaction of lower third molar is symptomatically and violates normal life routine. Some tendency for crowding in the anterior part of lower arch has been more expressed in the persons with the presence of third molars, but in the study of Antanas and Giedre it has not be proved.<sup>[12]</sup> Hassan found greater and high prevalence of impaction in the Mandibular and with no sex predilection.<sup>[13]</sup> Third molar agenesis is more frequent in women.<sup>[5]</sup> Congenital tooth loss can be attributed to evolutes changes that result in changing the jaw and of changes of nutritional habits.

In the past, the extraction of third molars was indicated as a prophylactic measure.<sup>[2,14]</sup> Ten million third molars are extracted from approximately 5 million people in the United States each year.<sup>[14]</sup> Around 35% of third molars, free of disease, have been removed for prophylactic purposes in the UK.<sup>[15]</sup> Lower third molar removal is one of the most common treatments conducted at oral and maxillofacial surgery clinics in Sweden. During the 1980's and 1990's, 20-25,000 Mandibular third molars were removed annually, which represents about 60% of the total operation volume.<sup>[16]</sup> There is no evidence of widespread third molar infection and pathology to justify so much surgery. Prophylactic surgical extraction of third molars is not a common practice in Nigeria.<sup>[17]</sup> An important role has cultural and economic differences. Preventive extraction of the third molar teeth has no justification from prosthetic view<sup>[18]</sup> except if the tooth create an objective and/or subjective problems, because it can be fully adequate abutment teeth for fixed dental restoration or for in partial denture, and often in that tooth persons concentrate their largest torque of the masticator forces.<sup>[19]</sup>

Patients are not tending to extract a third molar. Panoramic radiographs can be used as a valuable predictor of the outcome of the impacted third molar position.<sup>[20]</sup> Christensen et al. concluded that no additional satisfaction had been obtained by showing and explaining the radiograph to the patient before lower third molar surgery.<sup>[21]</sup> Caries and periodontal diseases occurring in relatively older age group were the major reasons for non-

surgical extraction of third molars while recurrent pericoronitis occurring in relatively younger age was the major reason for surgical extraction of impacted third molars. Patient's age doesn't mean the indication for extraction if there is no disease. The patients' age is the only factor that had a significant effect on the assessment of the indication for molars without the disease. The indication is higher for patients of younger age group than for patients in the oldest age group.<sup>[22]</sup>

What are the possible consequences of extraction wisdom tooth and should we do something after extraction or not? Impacted tooth is recommended for extraction before 24 years of age, especially in women, because greater risk of complications is more often in old age. Extraction of wisdom tooth is linked with pain, edema, truisms and general oral dysfunction during wound healing. Possible complications are also in the form of bleeding, ostitis, early post-operative infection, extensive postoperative bleeding. Fracture of the lower jaw, damaging of neighboring teeth, periodontal damage, shift teeth, fistula and/or damage of nerve are less likely.<sup>[22]</sup> Extraction of lower third molar may, with changes of the mandible, cause significant buccal movement of mandibular second molar following surgery<sup>[23]</sup> decline upper molar which may cause changing in occlusal harmony. The tooth can twist, lean or incline to distal or medial way. Loss of occlusal or antagonistic contact, the consequence is caries, fracture of clinical crown, loss of fillings, wear of teeth or restorative materials. Consequently may occur compression of the condyle at articulated nerve and pterygoideus lateralis muscle. Extracting of wisdom teeth can be damaging for bone of neighboring tooth.<sup>[24]</sup> Augmentation of extracted wound with dematerialized bone powder reduces risk of loss for the epithelial attachment of second molar. Among patients who have healthy epithelial attachment of the second molar, should consider whether to extract third molars or not, due to a significant deterioration of periodontal index.<sup>[25]</sup> However, the higher is the number of authors who speak enhanced of periodontal index after extraction of third molar. Krauzs et al.<sup>[27]</sup> prove the increase of distal mineral bone level with second molar and a small loss in tooth on the other hand. Kugelberg et al<sup>[27]</sup> considered that early extraction of impact wisdom tooth decrease periodontal problems. After extraction of the wisdom tooth, it is significantly visible buccal angulations of second molar. This angulation is more visible on preliminarily lingual angulated tooth.<sup>[23]</sup> The hypothetical, medial angular impacted third molar operates in the sense of lingual moving of second molar. Extracted wisdom teeth can this inclination change and the functional forces could return tooth. Orthodontic therapy should be included at the unwanted inclinations before prosthetic therapy.<sup>[28]</sup>

and it have a crucial role in parallelization of the potential abutment tooth. Moss et al. considered that the clinical findings of wisdom tooth for periodontal and caries in elderly population is useful guideline for clinician and his younger patients in the decision whether to extract or leave third molar.<sup>[29,30]</sup> Blakey et al cited frequent pathological asymptomatic changes of periodontal in young people.<sup>[31]</sup> All of these authors believe that wisdom tooth is equally prone to periodontal changes as well as other teeth and that there is no evidence that the caries or periodontal diseases will arise more in third molar than on the other tooth in front.

There is little evidence about the third lower molar as abutment tooth. The aim of this study was to determine the frequency of extraction or the prosthetic rehabilitation of the lower third molar. The initial panoramic radiographs from patients treating in one private surgery in Zagreb were analyzed. The radiographs were part of the standard diagnostic records, and were not taken with the same equipment.

## MATERIALS AND METHODS

A total of 228 Orthopantomograms (OPG) of patients was analyzed. The number of lower third molars (M3s) present per person as well as on the right or the left side in the mandible and their relationships, for both males and females were examined, taking into account personal data, collected from clinical records. Angular relationship of third molar to the adjacent second molar was measure.

Collected data were subjected to statistical analysis using SPSS software (v 19.0; SPSS Inc, Chicago, IL) and the level of significance for all analyses was set to  $p \leq 0.15$ .

## RESULTS

The 228 OPGs were analyzed. The patients were aged 30 years to 87 years ( $\bar{x}=49.22$ ;  $sd.13.06$ ) with equal representation of all ages. The females were 133 (58%), aged from 35 to 61, and males 95, aged from 38 to 87 (42%). 188 respondents or 82% has both lower third molar. Of the 228 OPGs, only six persons had at least one impacted third molar with no differences between males and females [Figure 1].

It was measured angulation of third molar from 0 - 90° ( $\bar{x}=69.65$ ,  $sd.11.67$ ). The most common angulation of third molars was mesial. On more retained tooth higher angulation is measured ( $p=0.17$ ).

It was extracted 18 (8%) left and 22 (10%) of right third molar. In an elderly patient is measured more extracted third molar ( $p=0.21$ ) [Graph 1].



Figure 1: Distal inclination of impacted third molar

and endodontic treated tooth ( $P=0.18$ ) [Graph 2]. Higher percentages were recorded for females, but based on  $\chi^2$  statistics this difference was not found to be statistically significant. Women have earlier and more extracted wisdom teeth than men. 205 findings or 90% was with the vital third molar. Endodontic treatment was on 7 left and 15 right wisdom teeth, more in men than in woman. One person had both third molar devitalized.

Thirty-seven abutment teeth as third lower molar has found or 16% left and 13% right [Figure 2].

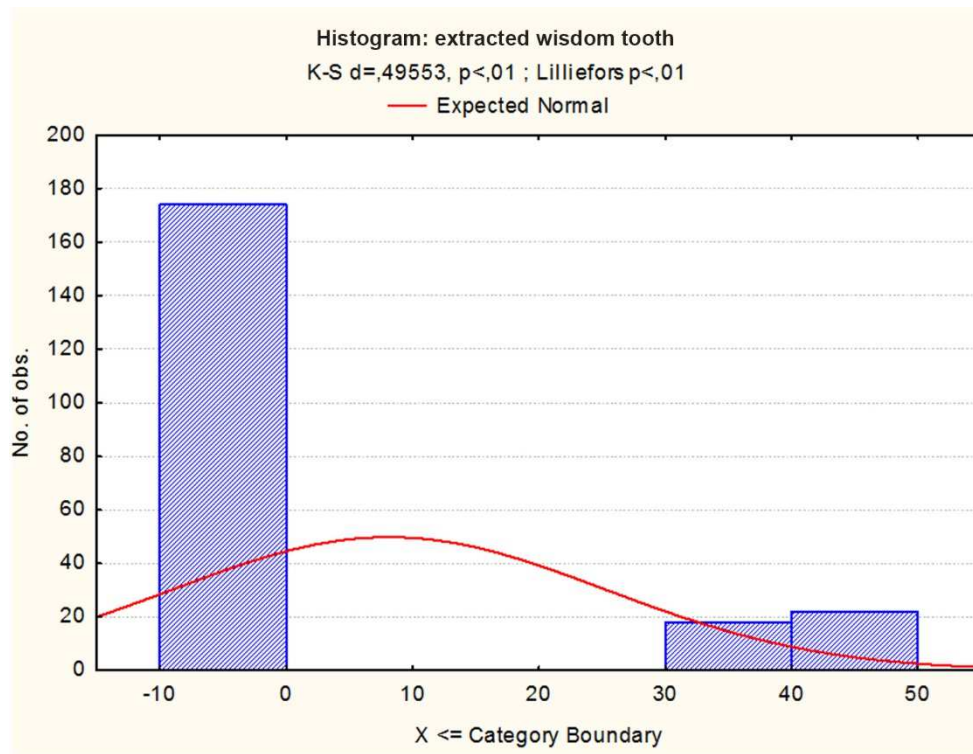


Figure 2: Third molar as abutment tooth

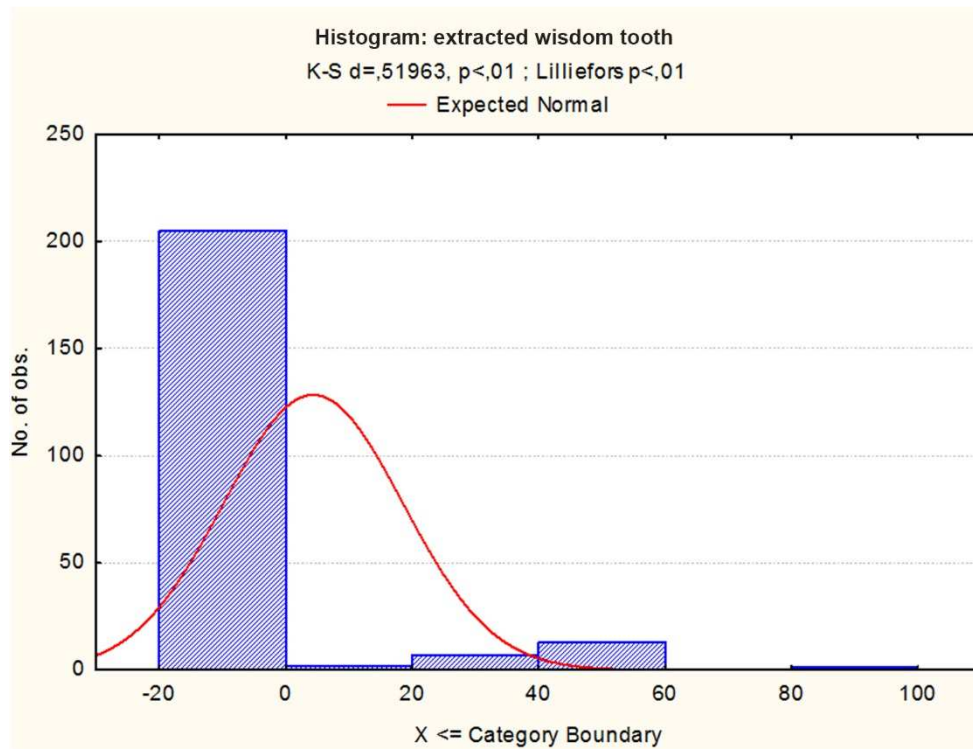
Lower third molar is more frequent as abutment tooth in woman than in man. Prosthetic therapy on third lower molar as abutment teeth is more often in elderly males.

## DISCUSSION

The presence of the third molars, their position within the jaw and or dental arches, the condition of the teeth and associated teeth and structure, the presence or pathology associated with the third molar must be considered carefully. Panoramic radiographs are becoming increasingly viable for dentist and they help in the evaluation of third molar development.<sup>[20]</sup> Begtrup et al. suggested prediction of the third molar eruption based on association between cephalometric measurements on profile and panoramic radiographs.<sup>[32]</sup> It would be helpful to make orthopantomogram analyze in children at the age of 6-7 to avoid problems later. In young Libyan students, 33% of the third molars were fully erupted and 66% were in various stages



**Graph 1:** Correlation between age and extracted teeth



**Graph 2:** Correlation between age and endodontically threatened third molar

of eruption and 5% were congenitally missing.<sup>[33]</sup> Two mandibular M3s were found in 85.5% in orthodontic patients from Greek. The distribution of M3s was equal for both sides and no significant difference was found in the number of M3s according to sex.<sup>[34]</sup> The study of Sandhu and Kaur

showed that at the baseline (mean age, 19.3 years), 24% of third molars were erupted, 76% were in various stages of eruption, and 11.5% were congenitally missing in the Asian-Indian student population.<sup>[35]</sup> They all selected students with ages ranging from 16- 28 years. Our patients are older

and two lower molars were found in 82% what shows rare indication of extraction in younger population.

Many studies have documented the presence of periodontal disease around asymptomatic third molars, in both younger and older patient populations. Caries or periodontal pathology on the third molars was significantly associated with these findings detected on another tooth.<sup>[36]</sup> We found 90% third lower molars as vital tooth what is very significant according the age of our samples.

According Blackey et al. erupted third molar teeth are as likely to have increase in probing depths as impacted third molars.<sup>[37]</sup> They found a sample group with visible asymptomatic third molars which was 2.5 times (odds ratio, adjusted for age) more likely to have periodontal pathology in the first and second molar region when compared to a group without visible third molars. Similarly, Moss et al. used a sample of 6,793 patients having a mean age of  $62.4 \pm 5.6$  years. They reported a correlation between visible third molars ( $PD \geq 4\text{mm}$ ) and increased probing depths on first and second molars.<sup>[30]</sup> Early extracted first lower molar allows normal erupted third molar.<sup>[38]</sup>

More complications associated with mandibular third molar impaction could occur in younger groups till 30 years. Impacted M3s adjacent to M2s lead to periodontal defects that are deepest at the lingual side and almost recover in 12 months after extraction. The first 3 months is considered the cutoff for periodontal healing. Young adults with high-risk periodontal M3 impactions may benefit from early extraction, which increases spontaneous periodontal healing.<sup>[39]</sup> Civilization with the attendant change of diet in Nigerian urban population may be as an important contributing factor for tooth/jaw disproportion usually associated with third molar impaction.<sup>[11]</sup> They found the same distribution of lower third molar impaction in urban and rural areas. Further follow-up on clinical and radiological parameters is required for better understanding of the long-term effect of third molar extraction on the periodontal health of the adjacent second molar.<sup>[26]</sup>

The most common angulations in the mandibular are medial angular (33.6%) and 41% were in the vertical position.<sup>[13]</sup> A highly significant correlation in the inclination angles was observed between the right and left side of the mandible.<sup>[40]</sup> Ahmed et al reported that mandibular third molar angulations is less in non extraction and more in extraction cases but not significant.<sup>[5]</sup> Richardson reported on changes in third molar position from 39 degrees to 46 degrees in medial distal dimension in 41 young adult. Ten M3s did not change their angulations.<sup>[41]</sup> Third molar angulations in the impacted group (69 subjects with 101 third molars) averaged 16.28 degrees, with no significant gender differences.<sup>[42]</sup> Early removal of impacted lower third molars with

large angulations and close positional to the adjacent 2nd molar proved to have a beneficial effect on periodontal health. Of our 228 OPGs analyzed, only six persons had at least one impacted third molar with an average angle of 69.65 degrees, with no differences between males and females. In 58% angulations were medial.

The mandible position of the impacted third molar may be able to correlate to the development complications resulting from impaction removal.<sup>[4]</sup> Giglio et al. reported improvement in plaque and gingival scores in impacted teeth with and without symptoms following extractions.<sup>[42]</sup> Adeyemo et al. were investigating patients at the age from 15-92 years old and they found 58% extracted wisdom teeth in woman population. Surgical extraction was carried out in 28.7% patients, while the other 71.3% had non-surgical extractions.<sup>[17]</sup> Lower third molar surgery significantly affects patient quality of life, particulate during the first three days after the extraction, caused inability to work.<sup>[43]</sup> Several authors don't suggest the extraction of third lower molars.<sup>[3,14,18]</sup> Wong et al. didn't found significant changes of periodontal pocket depth, clinical attachment level and alveolar bone height at the adjacent second molar before and after impacted lower third molar extraction.<sup>[9]</sup>

Caries and his consequential are the most frequent reason for extraction tooth (63.2%), then pericoronitis (26.3%) and periodontal disease (9.2%).<sup>[17]</sup> Extractions of third molar after the age of 25 is itself risk factor for incomplete healing and the need for additional treatment. Our patients prefer outcomes of third molar non-removal as compared to outcomes following removal as in Sweden.<sup>[16]</sup>

We do agree with Shugars et al. that after extraction of tooth in posterior region does not have to come to pathological changes<sup>[44]</sup> but patient need to attend to recall. If the situation after extraction decompensate, it is needed to suggest orthodontic therapy with younger patients and implant prosthetic or prosthetic therapy, depending on the situation of elderly patients. In the situation of the compensating situation without visible clinical changes, lack of a single tooth can remain unthreaded. The third lower molars without serious morphological deviation are, from the prosthetic point of view, valuable tooth, as a single unit or as abutment in simple bridges.<sup>[45,46]</sup> Devitalized tooth collapses faster as abutment tooth then vital tooth. That information is very valuable for lower third molar. Counting on a limited biological durability of the devitalized tooth as distal abutment tooth it is needed to strengthen with the post. Open bifurcation needs hemi section and separate posts in each root of the tooth [Figure 3].



**Figure 3:** Hemisection on third lower molar with open bifurcation

## CONCLUSION

The lower third molar is the only tooth that is unpredictable in his form, position and time of eruption. Most often have proven changes of these teeth are horizontal or medial angular impaction or periodontal damage. It is not possible to predict reliably whether impacted third molars will develop pathological changes if they are not removed. Higher angles are present in more impacted tooth. In cases where right lower third molar is endodontically treated, then usually is the left one too. Control and good oral hygiene could prevent a lot of extraction. The clinical value of third molars in some selected clinical situations cannot and should not be overlooked. If the third lower molar already exists there are several therapeutic possibilities, depends on the clinical report, our experience and our knowledge. Some orthodontic patients gain functional benefit from third molars if their orthodontic treatment involves the extraction of permanent first or second molars. Prosthodontists meet such patients in their older age. Some patients gain functional benefit from the restoration of third molars when, for example, a third molar is used as an abutment for a fixed or removable prosthesis when other more functional molars have been lost due to disease or trauma. Women are common prosthetic patients, but men are the older prosthetic group. Lower third molar can be and it is fully adequate abutment tooth for fixed prosthetic and that is something that is needed to evaluate in treatment planning.

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