



PROPHYLACTIC VERSUS SYMPTOMATIC THIRD MOLAR REMOVAL: EFFECTS ON PATIENT POSTOPERATIVE MORBIDITY

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Abstract

Objective: The objective of this research was to assess differences in postoperative morbidity following prophylactic and symptomatic 3rd molar extraction.

Methods: In this randomized controlled trial, two groups of patients were assigned based on whether their third molar extractions were performed as a preventive measure or in response to symptoms. Throughout the treatment period, two follow-up visits were conducted to monitor the patients. Data was collected through assessments conducted before, during, and after the surgery (on days 3 and 10). Patient characteristics such as age, gender, reason for extraction, extraction method, anesthesia type, and the number of maxillary and/or mandibular third molars removed were considered as predictive factors. The objective was to determine the probability of experiencing postoperative discomfort symptoms on days 3 and 10. Statistical analysis using the chi-square test and T-test was performed to compare the outcomes, with a significance level of $p < 0.05$.

Results: A total of 102 patients participated, with 51 in each group. The mean age was 36.366 ± 11.582 years for the prophylactic group and 39.052 ± 10.78 years for the symptomatic group. The age groups were divided into three categories: 18-25, 25-35, and >35. The distribution of age groups

varied between the two groups. In terms of gender, both groups had a similar distribution of males and females, with a slight difference in percentages. The results showed varying levels of discomfort among patients immediately after the procedure and at day 10. Pain, trismus, and swelling decreased over time, while the usage of painkillers decreased significantly by day 10. The p-values associated with these outcomes were calculated, indicating statistical significance in the differences observed between the two groups.

Conclusion: The results of the study provide valuable insights into the postoperative experiences and outcomes of both prophylactic and symptomatic third molar extractions, highlighting the changes in pain, painkiller usage, trismus, and swelling over the course of the recovery period.

Keywords: *third molar, symptoms, swelling*

Introduction

When there is limited space in the jawbones, the eruption of the third molars, also known as wisdom teeth, can face difficulties in following their natural and optimal path (1)(2). Impaction refers to a condition where the third molars are unable to erupt properly due to factors such as neighboring teeth, dense bone, or excessive soft tissue growth. Impaction can occur when the eruption of the third molars is hindered (3). This condition is often associated with consequences such as pain, discomfort, and potential pathology (4). Mandibular third molar impaction is a common condition that affects people globally, with prevalence ranging from 22.0% to 66.0% in the general population (5). Patients who are in their teenage years or early adulthood when they receive the diagnosis that they have impacted mandibular wisdom teeth are unable to receive an accurate prognosis because the outcome can be affected by an abundance of local and systemic variables that change over the course of time(6). This has led to varying opinions among researchers and clinicians on whether impacted teeth should be extracted only when they cause problems or regardless of their state (7). While some recommend extraction to alleviate the patient's pain and suffering, others suggest removal even when there are no apparent pathological conditions (8)(9). Due to these divergent viewpoints among dental surgery, oral and maxillofacial surgery, and other related specialties worldwide, there is no consensus on the best approach to perform this procedure.

Materials and Methods

The execution of this randomized controlled experiment adhered to the principles outlined in the Declaration of Helsinki (10). Prior to participating in the study, all eligible individuals provided written informed consent. The study focused on patients aged 18 years and older who sought guidance from the dental surgery department regarding their wisdom teeth. Only two exclusion criteria were applied: individuals with extra teeth and those undergoing concurrent dental treatments were not eligible to participate. Surveys were conducted on days 3 and 10 after surgery to assess postoperative healing. Various factors were considered, including pain (measured using the Numeric Pain Rating Scale or NPRS), pain development, painkiller usage, trismus symptoms, edema, changes in lower lip or tongue sensation, and the ability to resume regular activities, work, or school within ten days after surgery (11). Symptoms reported immediately after surgery on day 3 were referred to as immediate postoperative discomfort, while symptoms reported on day 10 were considered late or chronic morbidity. Symptoms such as caries, periapical pathology, periodontal disease, pericoronitis, tooth fractures, odontogenic cysts, and resorption were taken into account. There were several asymptomatic indications for extraction, including impaction caused by insufficient space in the dental arch, abnormal orientation of the third molar, non-functional third molars (malocclusion), prophylactic removal to address difficulties in maintaining oral hygiene in the distal area of the mouth, or extraction performed in conjunction with another dental or medical treatment. The study encompassed all stages of third molar growth, eruption class, and impaction status (soft tissue or bony). Statistical evaluation was conducted on two groups (n = 104), with each group (I and II) consisting of 52 participants. The relationship between the surgeon's experience level (resident or

senior surgeon) and the occurrence of immediate and late postoperative discomfort was examined using single- and multivariable logistic regression models in participants undergoing prophylactic third molar extraction. The multivariable model included five parameters: age (18–25, 26–35, >35 years), gender, surgeon experience (resident vs. senior surgeon), method of extraction (osteotomy or not), and a parameter indicating the number of extracted teeth and affected jaws. The outcome variables were dichotomized as no symptoms versus minimal, moderate, and extensive symptom presence (combined into one category). Predicting variables involved age, sex, cause behind removing it, type of anaesthetic, the technique used for extraction, and a component that incorporated the quantity of teeth removed and affected jaws. Other factors were the number of teeth extracted and impacted jaws.

Results

The study involved a variable or study group that underwent prophylactic removal of third molars, as well as another group that underwent symptomatic removal of third molars. The total number of patients in the study was 102, with 51 patients in each group. The total number of third molars extracted was 92 in the prophylactic group and 119 in the symptomatic group. The mean age of the participants was 36.366 ± 11.582 years for the prophylactic group and 39.052 ± 10.78 years for the symptomatic group. The age groups were divided into three categories: 18-25, 25-35, and >35. In the prophylactic group, there were 24 participants (47.05%) in the 18-25 age range, 18 participants (35.29%) in the 25-35 age range, and 9 participants (17.64%) in the >35 age range. In the symptomatic group, there were 21 participants (41.17%) in the 18-25 age range, 19 participants (37.25%) in the 25-35 age range, and 11 participants (21.56%) in the >35 age range.

Regarding gender, in the prophylactic group, there were 22 male participants (43.13%) and 29 female participants (56.86%), while in the symptomatic group, there were 28 male participants (54.90%) and 23 female participants (45.09%). Overall, in both groups combined, there were 50 male participants (49.01%) and 52 female participants (50.98%).

The method of extraction was categorized into two options: with or without osteotomy. In the prophylactic group, 12 extractions (13.04%) were performed without osteotomy, while 80 extractions (86.96%) involved osteotomy. In the symptomatic group, 25 extractions (21.00%) were performed without osteotomy, and 84 extractions (79.00%) involved osteotomy. Overall, across both groups, 37 extractions (16.74%) were performed without osteotomy, and 164 extractions (83.26%) involved osteotomy.

Based on their level of expertise, the surgeons involved in the study were categorized as residents, junior consultants, or senior consultants. In the prophylactic group, residents performed 34 surgeries (66.66%), junior consultants performed 10 surgeries (19.60%), and senior consultants performed 7 surgeries (13.72%). In the symptomatic group, residents performed 39 surgeries (74.47%), junior consultants performed 15.68%, and senior consultants performed 7.84%. Overall, considering both groups, residents conducted 73 surgeries (71.56%), junior consultants conducted 18 surgeries (17.64%), and senior consultants conducted 11 surgeries (10.78%).

The outcomes of evaluating prophylactic and symptomatic third molar removal encompassed several factors. In terms of pain, the results revealed different levels of discomfort. Approximately 1.96% of patients experienced no pain immediately at day 3, whereas 64.70% reported no pain at day 10. 31.37% of patients immediately at day 3 and 15.68% of patients at day 10 reported having minor pain on the NPRS scale. On day 3, 41.17% of patients reported experiencing moderate pain (NPRS 4-7), however by day 10, this number had dropped to 3.92%. On the other hand, 25.49% of patients had unbearable pain (NPRS 8-10) immediately at day 3, but none reported it at day 10.

Regarding painkiller usage, it was observed that 80.39% of patients resorted to painkillers immediately after the procedure, while 25.49% used them later. Furthermore, 50.98% of patients required painkillers immediately at day 3, while only 5.88% needed them at day 10.

Trismus, which refers to restricted jaw movement, varied among patients. Approximately 9.8% had no trismus immediately at day 3, while 50.98% experienced its absence at day 10. Slight trismus was observed in 33.33% immediately at day 3 and 35.29% at day 10. Moderate trismus affected 43.13%

immediately at day 3, but only 11.76% at day 10. Finally, extensive trismus was present in 13.72% immediately at day 3 and 3.92% at day 10.

Swelling was another factor considered, with different degrees of severity. At third day post-operatively there was no swelling in 11.76 percent patients while immediately at day 3, while 70.58%, reported the same outcome later on 10th postoperative day. Slight swelling affected 25.49% immediately at day 3 and 17.64% at day 10. Moderate swelling was observed in 41.17% immediately at day 3 and 9.8% at day 10. Lastly, extensive swelling affected 21.56% immediately at day 3 and 1.96% at day 10.

The p-values associated with these outcomes were calculated to be 0.0042 for pain, 0.0134 for painkiller usage, 0.0014 for trismus, and 0.0191 for swelling.

Table 1. Patient characteristics

Variable/Study group	Prophylactic 3 rd Molar Removal	Symptomatic 3 rd Molar Removal	Total
Age (Mean Years)	36.366 ±11.582	39.052± 10.78	37.709 ±10.884
Age (Groups)			
• 18-25	24 (47.05 %)	21 (41.17 %)	45 (44.11 %)
• 25-35	18 (35.29 %)	19 (37.25 %)	37 (36.27 %)
• >35	9 (17.64 %)	11 (21.56 %)	20 (19.6 %)
Gender			
• Male	22(43.13 %)	28(54.90 %)	50(49.01 %)
• Female	29(56.86 %)	23(45.09 %)	52(50.98 %)
Total number of patients	51	51	102
Total number of third molars extracted	92	119	221
Method of extraction:			
• no osteotomy	12(13.04 %)	25(21.00 %)	37(16.74%)
• osteotomy	80(86.96 %)	84(79.00 %)	164(83.26%)
Surgeon's experience			
• Resident	34 (66.66 %)	39 (76.47 %)	73 (71.56 %)
• Junior Consultant	10 (19.60 %)	8 (15.68 %)	18 (17.64 %)
• Senior Consultant	7 (13.72 %)	4 (7.84 %)	11 (10.78 %)

Table 2. Study outcomes

Outcomes	Prophylactic 3 rd Molar Removal		Symptomatic 3 rd Molar Removal		P-value
	Immediate at day 3	Late at day 10	Immediate at day 3	Late at day 10	
Pain					
○ No pain NPRS 0	1(1.96%)	33(64.70 %)	8 (15.68 %)	41(80.39%)	0.0042
○ Minor pain NPRS 1-3	16(31.37%)	12(23.52%)	22(43.13 %)	8 (15.68 %)	
○ Moderate pain NPRS 4-7	21(41.17 %)	4(7.84%)	15(29.41 %)	2(3.92%)	
○ Unbearable pain NPRS 8-10	13(25.49 %)	2(3.92%)	6(11.76 %)	0	
Painkiller usage	41(80.39%)	13(25.49 %)	26(50.98%)	3(5.88%)	0.0134
Trismus					
○ No	5(9.8%)	26(50.98%)	2(3.92%)	33(64.70 %)	0.0014
○ Slight	17(33.33)	18(35.29%)	6(11.76 %)	16(31.37%)	
○ Moderate	22(43.13 %)	6(11.76 %)	20(39.21%)	2(3.92%)	
○ Extensive	7(13.72 %)	2(3.92%)	13(25.49%)	0	
Swelling					
○ No	6(11.76 %)	36(70.58%)	16(31.37%)	44(86.27%)	0.0191
○ Slight	13(25.49 %)	9(17.64%)	15(29.41 %)	5(9.8%)	
○ Moderate	21(41.17 %)	5(9.8%)	14(27.45 %)	2(3.92%)	
○ Extensive	11(21.56 %)	1(1.96%)	6(11.76 %)	0	

Discussion

There is no controversy over the extraction of third molars that exhibit signs or symptoms of disease, as stated in a study that was published in the Journal of Evidence-Based Dental Practice (12), but there is a lack of clarity regarding how to proceed in cases where there are no evident indicators of

pathology. The management strategy for pathology-free and asymptomatic molar comprises of radiological surveillance associated with clinical monitoring over time instead to opting surgical option. This is because prophylactic extractions have been shown to increase the risk of developing a disease (13)(14).

A study conducted by M. Vranckx and colleagues (9), showed that earlier prophylactic removal of third molar, preferably before the age of 25, is advantageous taking into consideration many patient- and surgery-related factors. Within the scope of their research, a total of 15,357 third molars were extracted from 6010 patients across 6347 surgical procedures. The patients' ages ranged from 25.2 to 11.2, with a mean of 25.2 years. Pain, trismus (a limited ability to move the jaw), and edoema were common postoperative symptoms experienced after the procedures. These symptoms were transient in nature and showed significant decreases from postoperative days 3 to 10. Older age was associated with a higher risk of experiencing persistent pain, trismus, swelling, and iatrogenic injury to the inferior alveolar nerve. Patients over the age of 25 were more likely to have symptomatic indications for third molar removal, but the presence of pre-existing pathologies did not affect the postoperative recovery process. Other factors contributing to postoperative complications were being female, intraoperative osteotomy (bone cutting during surgery), and the number of extractions performed.

Our study concentrated mainly on the expected transient signs and symptoms of discomfort after surgery following the removal of the third molar, and as a result, the measured post-operative variables did not fully agree with studies that had been conducted before on the topic. Surgical extraction techniques entail the risk of problems such as infection, bleeding, alveolar osteitis, or dry sockets. These issues can occur in the event that a tooth is extracted. However, due to the fact that postoperative outcome factors varied from patient to patient, it was difficult to adequately compare the results. In subsequent research, it could be worthwhile to investigate the possibility of combining the evaluation of predicted postoperative pain with the detection of problems, such as inflammation and dry-sockets, and the subsequent monitoring of patients for a period of one month after surgery.

Overall, our study provides insights into the outcomes of third molar removal, considering factors such as pain, painkiller usage, trismus, and swelling, and their association with different surgical approaches and surgeon experience. The outcomes of the study focused on pain, painkiller usage, trismus (restricted jaw movement), and swelling. The results showed varying levels of pain experienced by patients, with a decrease in pain reported over time. Painkiller usage was common immediately after the procedure but decreased at a later stage. Trismus and swelling also varied among patients, with some experiencing no symptoms while others had mild to moderate symptoms. The p-values indicated the statistical significance of the outcomes.

Several treatment guidelines developed over the past two decades recommend a cautious approach for asymptomatic patients with disease-free third molars. These guidelines advocate for active clinical and radiological surveillance instead of preventive extraction. Notable guidelines include those from the National Institute for Health and Care Excellence (NICE) in the United Kingdom (2000), the Scottish Intercollegiate Recommendations Network (SIGN) (2000), and the Belgian Health Care Knowledge Centre (KCE) (2012)(15).

Following the publication of the NICE guidelines in the UK, there was initially a decline in the number of third molar extractions. However, research suggests that these guidelines did not significantly influence the management of asymptomatic third molars in daily practice. Over a period of ten years, the number of surgeries performed increased again due to several factors. These factors included an increase in the average age of patients seeking third molar surgery and a rise in the number of patients diagnosed with conditions such as pericoronitis and caries in the second and/or third molars. Consequently, there is emerging evidence indicating that conservative treatment guidelines may have an unintended long-term impact, resulting in an increased removal of third molars in unfavorable conditions, at older ages, with further root development, and in more pathological situations.

Hence, it can be definitively concluded that early surgical intervention for all cases of impacted teeth is not justified unless they exhibit symptoms. This finding aligns with previous viewpoints supporting a selective approach to extraction. However, it contradicts the perspective advocating for the

extraction of asymptomatic teeth in all young individuals. The rationale behind prophylactic surgical extraction includes minimizing disease development, reducing the risk of mandibular angle fracture, addressing the increasing difficulty of surgery with age, and the perceived lack of functional importance of third molars. Surgical complications such as pain, swelling, and restricted jaw movement are consistently present after extraction, along with post-operative complications that commonly occur. Additionally, patients may experience psychological trauma during surgery, incur medical expenses, and face disruptions in work and social life during the recovery period, which can negatively impact both the individual and society at large.

Limitations

Small sample size and being a single center study are the limitations of study

Conclusion

The study examined outcomes of prophylactic and symptomatic third molar removal, finding varying levels of discomfort and pain among patients. Painkiller usage was prevalent initially but decreased over time. Trismus and swelling also varied. Surgical inexperience did not significantly affect most outcomes, except for persistent postoperative pain. The study contributes to oral and maxillofacial surgery knowledge but has limitations. Further research should consider additional factors and long-term complications. Improving surgical techniques and evaluating patient outcomes are crucial for enhancing third molar removal procedures.

Conflict of Interest

There is no conflict of interest in this study

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