

Relationship between Third Molar Impaction and Extraction, and Awareness about the Associated Potential Risks

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Article History

Received: 11 September 2023

Accepted: 23 October 2023

Abstract

Background and Aim: Third molar teeth usually erupt during the late adolescence or early adulthood and may cause various dental problems, such as impaction or overcrowding, if they do not erupt properly. This study aimed to explore the relationship between third molar impaction, and extraction, and to evaluate the impact of awareness about the associated potential risks and benefits on post-extraction complications.

Materials and Methods: A cross-sectional study was conducted at Baghdad College of Dentistry, targeting undergraduate dental students. A questionnaire was sent to 333 dental students. The collected data were then analyzed using SPSS version 27. The Spearman and Kendall's tau rank correlation coefficients were used to measure the strength and direction of the relationship among the variables.

Results: Third molar impaction was more common in individuals aged 19 to 21 years. A significant correlation was found between the age of onset of symptoms related to third molars and the occurrence of impaction ($P=0.006$, correlation coefficient=0.144). Also, a significant correlation existed between age and extraction of impacted third molars ($P=0.01$, correlation coefficient= 0.268). The linear regression R^2 value indicated that 14.1% of the reduction in complications was attributed to the level of awareness regarding the associated potential risks and benefits.

Conclusion: This study highlighted the high prevalence of third molar impaction in young adults and the importance of its early detection and intervention. The findings underscored the significance of age and awareness in predicting and managing complications associated with impacted third molars.

Keywords: Tooth, Impacted; Tooth Extraction; Molar, Third

Cite this article as: Hameed Alwan M, Zaki SM. Relationship between Third Molar Impaction and Extraction, and Awareness about the Associated Potential Risks. *J Res Dent Maxillofac Sci.* 2024; 9(2):110-116.

Introduction

Third molars are among the most commonly impacted teeth, and their impaction is associated

with signs and symptoms such as periodontitis, discomfort, pain, swelling, and other dental problems [1,2].

Impaction of third molars is influenced by several factors such as the jaw dimensions and structure. Impaction may occur in some individuals when the jawbone is unable to adequately accommodate the erupting tooth. Hormonal fluctuations, poor dental hygiene, and genetic predispositions are additional contributing factors [3,4]. Additionally, the angle of eruption of third molars may play a role in this regard. If the tooth is developing sideways instead of straight upwards, it may be more likely to become impacted. The position of the tooth relative to the adjacent teeth and the bone is also a consideration, as impaction may occur if there are obstructions in the path of the erupting tooth [5].

Moreover, third molar impaction is significantly influenced by age. The development of third molars typically starts between the ages of 6 and 12 years, with the formation of tooth roots starting around the age of 16 years. In general, as an individual ages, full development of their third molars is more likely to occur [6].

Evidence shows that early detection and extraction of impacted third molars can help avoid complications associated with impaction, such as the risk of infection, gingival inflammation, and nerve damage. Many dental professionals recommend removing the impacted third molars between the ages of 16 and 25 years to prevent potential problems [7,8].

Awareness is an essential factor in decreasing the potential risks associated with the extraction of impacted teeth. Patients who are well aware of the risks and benefits associated with tooth extraction tend to be more cautious and take extra precautions to avoid possible complications [9].

Additionally, being aware helps patients comprehend how crucial it is to follow the dentist's post-extraction instructions, which is one of its many important advantages. The risk of complications including bleeding, infection, and

dry socket can be minimized by smoking cessation, avoiding the use of straws, eating specific foods, and maintaining good oral hygiene [10]. Furthermore, being aware of the positive and negative aspects of tooth extraction can help patients realize how critical it is to seek immediate medical assistance if they have any unexpected symptoms, such as extensive bleeding, excruciating pain, or persistent swelling [11]. Conversely, ignorance may result in serious complications after tooth extraction. Patients who are unaware of the risks may contempt the post-extraction instructions, which could result in problems such as infection, hemorrhage, or dry socket [12].

Understanding the factors associated with third molar impaction is essential in determining the appropriate course of treatment for impacted teeth. With this knowledge, dental professionals can provide the best advice to their patients and prevent potential complications associated with the extraction process.

This study aimed to investigate the correlation between the impaction and extraction of third molars and to assess how understanding the potential risks and benefits can influence complications following the extraction procedure.

Materials and Methods

This study followed the ethical guidelines set forth by Baghdad University College of Dentistry. All participants of the study agreed to participate willingly, and confidentiality and anonymity were ensured throughout the data collection process. The study adhered to the rules outlined in the Helsinki Declaration [13,14].

Research design

In this cross-sectional study, the target population included undergraduate first-year and second-year dental students. They were asked to complete the questionnaire at their convenience, allowing them to provide thoughtful and thorough responses.

Sample size calculation

The desired level of statistical power was set at 80%, and the type I error was equal to 0.05. The sample size was calculated to be 333 participants.

Data collection

To ensure the validity and reliability of the questionnaire for the study population, we conducted thorough validation procedures including the calculation of content validity ratio (CVR) and content validity index (CVI). The CVR was calculated by consulting a panel of experts in the field, who rated each item in the questionnaire for its essentiality. The CVR value was found to be 0.68. Moreover, the CVI was calculated to assess the relevance and clarity of the items. The values obtained were within the acceptable range of >0.80, indicating good content validity.

Test-retest reliability: A pilot study was conducted with a sample of participants who completed the questionnaire twice with an interval of 2 weeks. The responses were compared using statistical methods to determine the test-retest reliability of the questionnaire, which was found to be satisfactory.

Face validity: The questionnaire was reviewed by a group of target respondents to assess the clarity, relevance, and comprehensibility of the items. Their feedback was incorporated into the final version of the questionnaire to ensure face validity.

Content validity: The questionnaire was reviewed by a panel of experts to ensure that it covered all the relevant aspects of the research topic and measured what it intended to measure. Their feedback was used to refine and finalize the questionnaire.

The questionnaire had three sections: the first section asked about gender and age and the time when third molars show noticeable signs and symptoms:

- Pain or swelling of your jaw or face.
- Red, swollen, or bleeding gums

- A bad taste in your mouth
- Bad breath (halitosis)
- Difficulty in maximum mouth opening

The second section had two questions about impaction and extraction:

- Have you experienced third molar impaction?
- Did you experience any complications after extraction?

The third section evaluated the effect of awareness about potential risks and benefits to decrease post-extraction complications

- How satisfied are you with the guidance or advice provided by your instructors regarding third molar extraction?
- How well-informed do you feel about the risks and benefits associated with third molar extraction?
- How aware are you of the potential risks and benefits associated with third molar extraction?

Table 1 summarizes the items of the questionnaire.

Table 1. Items of the questionnaire

Gender	Male Female
Age at which third molars show noticeable signs/symptoms (yrs.)	<16 16-18 19-21 22-24
Have you experienced third molar impaction?	Yes No Not sure
Did you experience any complications after extraction?	Yes No
How satisfied are you with the guidance or advice provided by your instructors regarding third molar extraction?	Low Medium High
How well-informed do you feel about the risks and benefits associated with third molar extraction?	Low Medium High
How aware are you of the potential risks and benefits associated with third molar extraction?	Very aware Somewhat aware Not aware

Statistical analysis

A three-point Likert scale with answer choices of low, medium, and high was used. Each response was allocated a score, and the total score was calculated by adding the sum of the scores of the items. The mean score acquired for each item was also calculated. The collected data were analyzed using SPSS version 27. The Chi-square test was used to evaluate the relationship between two categorical variables. The Spearman and Kendall's tau rank correlation coefficients were used to measure the strength and direction of the relationship between the variables. The relationship between the variables was analyzed by linear regression.

Results

A total of 333 undergraduate students participated in this study. The response rate to the questionnaire was 83.5%. Of the respondents, 65.3% were females, and 34.7% were males.

More than half of the students (59.9%) reported their third molar tooth show signs at the age of 19–21 years, with the lowest percentage reporting such signs at the age of 22–24 years. Among them, 61.4% suffered from impaction. Furthermore, 68.21% of the students with impaction had undergone extraction of their third molars. Moreover, 61.36% stated they did not experience any complication after the extraction. The responses to the questions about how satisfied the students were with the guidance or advice provided by their instructors, how well-informed they felt, and how aware they were of the potential risks and benefits associated with third molar extraction were all above 70% (Table 2).

A significant correlation existed between the age of onset of noticeable signs and symptoms of third molars and the occurrence of impaction ($P=0.006$; coefficient correlation=0.144).

Table 2. Demographic characteristics of the participants

Questions		N (%)	Mean± std. deviation	P value
Gender	Male	(116) 34.7	1.65±0.477	0.00
	Female	(218) 65.3		
Age of onset of noticeable signs of third molars	<16	(48) 14.4	2.55±0.795	0.00
	16-18	(70) 21.0		
	19-21	(200) 59.9		
Have you experienced third molar impaction?	22-24	(16) 4.8	1.61±0.488	0.00
	Yes	(129) 38.6		
Did you extract your impacted third molars?	No	(205) 61.4	1.74±0.441	0.00
	Yes	(88) 68.21		
Did you experience any complication after the extraction?	No	(41) 31.78	1.85±0.473	0.00
	Not sure	(16) 18.1		
	Yes	(18) 20.4		
How satisfied are you with the guidance or advice provided by your instructors regarding third molar extraction?	No	(54) 61.36	6.07±2.43	0.00
	Low	(75) 22.5		
	Medium	(88) 26.3		
How well-informed do you feel about the risks and benefits associated with third molar extraction?	High	(171) 51.2	5.55±1.87	0.00
	Low	(23) 6.9		
	Medium	(128) 38.3		
How aware are you of the potential risks and benefits associated with third molar extraction?	High	(183) 54.8	2.13±0.66	0.00
	Very aware	(100) 29.9		
	Somewhat aware	(179) 53.6		
	Not aware	(55) 16.5		

Additionally, there was a significant correlation between the age of onset of noticeable signs and symptoms of third molars and extraction of an impacted tooth ($P=0.00$, coefficient correlation=0.268).

There was a significant difference in impaction rate between males and females ($P=0.05$), and females had a higher prevalence of impaction. There was no significant difference in the rate of extraction of impacted teeth between males and females ($P>0.05$).

An R-squared value of 0.141 indicates that 14.1% of the variation in the dependent variable (post-extraction complications) can be explained by the independent variable (awareness about the risks and benefits associated with third molar extraction) in the regression equation.

Discussion

Third molars are the last permanent tooth to erupt in the oral cavity. It usually erupts between the ages of 17 and 25 years, and even later in some individuals. However, the age at which third molars show signs and symptoms can vary widely based on genetics, gender, and other environmental factors [15].

It is important to assess how the eruption, impaction, and extraction of third molars are related, as well as whether being informed about the benefits and hazards of the procedure may decrease the difficulties that may arise later. Impaction, which occurs when the molars fail to erupt due to a lack of space in dental arch, is one of the main determinants of third molar extraction. Impacted molars can lead to several dental problems, including periodontitis, dental caries, and development of cysts or tumors. Semi-erupted third molars that do not participate in mastication should be removed as well [16-18]. Timing is a key factor in this process.

The present results revealed that third molars that show some signs and symptoms below the age of 21 years are at higher risk of impaction.

This finding agrees with the results of Ryalat et al. [19] who reported higher frequency of vertical impaction of third molars under the age of 20 years. Additionally, females showed more tendency for impaction as compared to males, which agrees with the findings of previous studies [3, 20].

Surgical removal of third molars is a controversial topic in dentistry. Some dentists believe that it is vital to extract third molars to avoid impaction or other issues, while others think it should only be done in extreme cases [21]. Depending on several variables, including the degree of impaction, the stage of root development, and the patient's age, the time of third molar extraction differs from patient to patient. The present results showed a correlation between the age of onset of third molar signs and symptoms and extraction, which was in line with a previous study by Braimah et al. [22].

Also, surgical removal of third molars may result in several complications, including nerve injury, infection, bleeding, and traumatization of the adjacent teeth. The patient's age, impaction, surgical technique, and overall health status are all factors that can increase the likelihood of severe complications [23]. Complications can be minimized by a thorough preoperative evaluation, appropriate surgical technique, and postoperative instructions. The possible risks of third molar extraction must be understood by dental practitioners to take the necessary precautions and handle any difficulties that may arise [24]. Also, awareness about the potential risks and benefits is an equally important factor in decreasing post-extraction complications, which was proven in the present study.

Undoubtedly, patients who are well-informed and educated about the potential risks and complications are more likely to take the necessary steps to minimize these risks and achieve a successful outcome. Dentists should take the time to properly inform and educate

their patients about the potential risks and benefits associated with tooth extraction [25].

Assessing the correlation between third molar impaction and extraction as well as raising public awareness about the associated risks and benefits can help reduce complications following extraction. To make educated decisions regarding dental health, patients must be informed about the need for extraction, timing of extraction, and any associated complication. Third molar extraction should be decided ultimately based on patient condition, taking into account both the potential hazards and advantages of extraction.

The limitations of this study included the presence of confounding factors such as oral hygiene status, age, gender, and systemic health conditions that were not controlled for in this study. Additionally, variations in extraction techniques among different dental practitioners were not accounted for, which could potentially impact the outcomes and postoperative complications.

Conclusion

The study findings highlighted the importance of early monitoring and patient education in managing third molar impaction. A significant correlation was observed between the age of onset of symptoms and occurrence of impaction and extraction. The results also emphasized on the need for improved guidance and awareness among students regarding the risks and benefits associated with third molar extraction to reduce post-extraction complications.

Acknowledgments

We would like to express our sincere gratitude to all those who contributed to the conduction of this study.

Funding

This study did not receive any grant from any funding agencies in public, commercial, or non-profit sectors.

Declaration of competing interest

The authors declare no conflict of interests.

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