ORIGINAL ARTICLE

The prevalence of Rood and Shehab's classification in Qassim region: A Retrospective Cross-Sectional Study

Abdulrahman Altwaijri [1], Renad Awadh Alotaibi [2]

ABSTRACT

Introduction

Neurological harmmay be a basic complication related with surgical expulsion of affected mandibular third molars. Such wounds can happen specifically or in a roundabout way, emphasizing the significance of surveying the peril of post-operative second rate alveolar nerve (IAN) damage. The preoperative arranging included analyzing advanced radiographs utilizing Rood and Shehab classification, comprising different radiographic signs. We utilize Rood and Shehab's classification on this consider to get to the plausibility of nerve damage. We exhort for more symptomatic degree.

Methodology

The research employed a retrospective cross-sectional study design. A sum of 1298 participants were included in the study, conductedin the Qassim Province. Inclusion criteria specified patients with impacted mandibular third molars. Data was analyzed using the SPSS program.

Results

Among the surveyed participants, three prevalent conditions stood out prominently; canal narrowing (946, 73.8%), canal deflection (935, 73.0%), and canal darkening (684, 53.4%). Conversely, lower occurrences were noted for dark and canal apex bifid (15, 1.2%), canal diversion (2, 0.2%), and canal narrowing (56, 4.4%). Interruption of the white streak was observed in approximately one- third of the cases (412, 32.2%).

Conclusion

The high prevalence of narrowing, deflection, and darkening of the root underscores the clinical significance of these conditions, necessitating careful consideration in diagnostic assessments.

Keywords

inferior alveolar nerve injury (IANI), inferior alveolar nerve (IAN), mandibular third molars (MTM), preoperative planning radiographic signs (PPRS), rood and shehab classification (RSC), impacted mandibular third molar (IMTM).

INTRODUCTION

In the mandible, there is a canal that runs along the inferior alveolar nerve (IAN). The canals are usually located close to the molar apices. If the tooth is embedded, it is likely to be close to the canals. In some cases, the IAN of your lower lip is damaged due to the surgical removal of your MTM. This can lead to a loss of sensation. Indirectnerve injury can occur when the 3rd molar roots move unfavourably during the dislocation of your tooth. To determine if your 3rd tooth is close to your inferior alveolar, you will need to have a radiological assessment done prior to surgery. IANI can be decreased by assessing the topographic relationship between your 3rd molar root apices of your mandibular canal. There are many ways to assess a patient's health. One of them is through an orthopantomogram (OPG). OPG contains several radiographic indications that suggest a close relationship between your third molar and mandibular canal: Canal darkening Canal deflection Canal narrowing Canal apex bifidCanal diversion Canal narrowing and interruptionof your white streak

MATERIAL AND METHODS

A retrospective analysis including 1298 IMTM

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that required surgical excision was conducted. Thethird mandibular molars' age, gender, and impaction pattern were examined using panoramic radiography and medical data as a basis. An OPG revealed a connection between the third molar root of the jaw and the IAN. Based on seven radiographic indicators proposed by Rood and Shehab, canal darkening at the apex and bifid at the IAN region were regarded as canal darkening due to the difficulty of discriminating. A black stripe near the canal's tip has also been seen in several cases, which were also examined. Regarding the radiographic indicators, sevenobservations were made: (1) darkening of the canals at the IAN; (2) curved canals at the IAN area; (3) narrowing of the canals at the IAN area;

(4) dark streaks at the canal apex; (5) disappearing IAN lines at the canal area; (6) narrowing of the canal area; and (7) changing direction of the IAN. Tests of descriptive statistics were used in the analysis. The categorical variables' basic frequencies and percentages were computed and tallied. A detailed examination of each patient's digital panoramic radiographs was part of the preoperative strategy. A review of radiographic indicators was conducted using the Rood and Shehab classification, which includes root darkening, root deflection, root narrowing, dark line in the apex, loss of the white line, inferior alveolar nerve narrowing, and inferior alveolarnerve diversion (IAN). The aim of this study was to ascertain the prevalence in the Qassim region of the Rood and Shehab categorization that is linked to IMTM. Furthermore, a multivariate binary logistic regression model was developed in order to predict the likelihood of possessing certain dental markers. The model's results were shown as Adjusted Odds Ratios (AOR) along with the corresponding p values. A 95% ConfidenceInterval and a p-value of 0.05 or less were used to determine statistical significance. IBM's SPSS Software, version 27.0.1, was used for all statistical computations. A total of 1298 cases were reported.

RESULTS

Table 1 sought to describe the incidence of different dental problems. The following situations were investigated: White streak interruption, canaldiversion, canal narrowing, canal darkening, canalDeflection, and Canal Dark and Bifid Apex. According to the research, a sizable percentage ofrespondents said they had dealt with these dental issues. Three problems were most noticeable among them: canal darkening (53.4%), canal deflection (73.0%), and canal narrowing (73.8%). On the other hand, comparatively fewer instances of canal diversion (0.2%), canal constriction (4.4%), and dark and bifid root apex (1.2%) were seen. Approximately one-third of the instances (32.2%) had white line interruptions.

Table1: Prevalence of Rood and Shehab classification(n=1281)

	N (%)
Canal Darkening	684 (53.4%)
Canal Deflection	935 (73.0%)
Canal Narrowing	946 (73.8%)
Canal Darkand BifidApex	15 (1.2%)
Interruption of WhiteStreak	412 (32.2%)
Canal Diversion	2 (0.2%)
Canal Narrowing	56 (4.4%)

N: Frequency

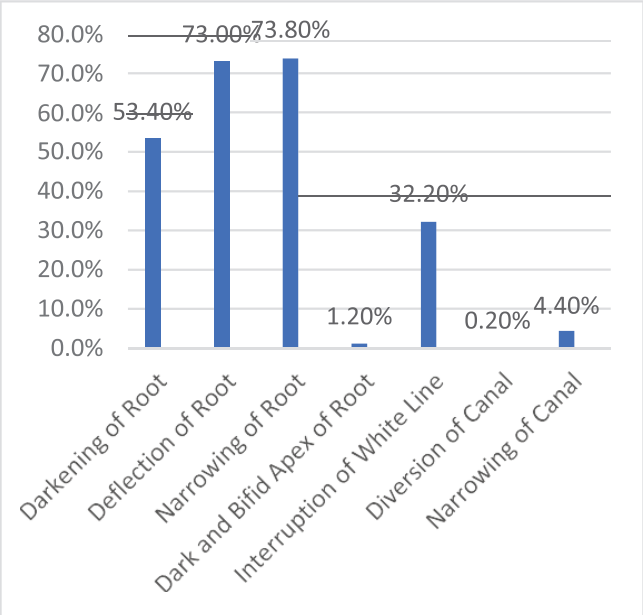

Fig 1: The prevalence of Rood and Shehab classification that is associated with impacted mandibular third molars in Qassim region.

Table 2: shows association between different dental characteristics and the Canal Darkening of. The interruption of the white streak seems to have a statistically significant association with the canal Table 3demonstrates the relationship between the Deflection of Root and several dental features. Of the variables that were looked at, "Canal Darkening" and "Canal Narrowing" show significant significance (p-values of <0.001 and 0.003, respectively). The adjusted odds ratio for "Canal Darkening" is 0.585, suggesting a drop in the odds, but the odds ratio for "Canal Narrowing"is 1.522, indicating an increase in the odds of the result. On the other hand, no statistically significant correlation has been found between theCanal Deflection and other dental diseases, including "Canal Dark and Bifid Apex," "Interruption of White Streak," "Canal Diversion,"and "Canal Narrowing."

Rood and Shehab classification	P value	Adjusted Odds Ratio	95% C.I	
			Lower	Upper
Canal Dark andBifid Apex	0.258	2.386	0.530	10.751
Interruption of White Streak	0.644	0.938	0.716	1.230
Canal Diversion	0.999	579601160.7	-	-
Canal Narrowing	0.232	0.700	0.389	1.257
Canal Narrowing	0.003*	1.522	1.154	2.007
Canal Darkening	<0.001*	0.585	0.450	0.759
*p<0.05, significant, *C.I:Confidence Interval*				

Table 3 Predictorsof Deflection of Root darkening. The adjusted odds ratio of 0.695 indicates that for each unit increase in interruption of the white streak, there is a 30.5% decrease in theodds of canal darkening. The canal narrowing alsoappears to have a statistically significant association with the canal darkening. The adjustedodds ratio of 0.443 suggests that for each unit increase in canal narrowing, there is a 55.7% decrease in the odds of canal darkening. Furthermore, Canal Deflection and Canal Narrowing also demonstrate significant associations with the outcome. However, Canal Dark and Bifid Apex and Canal Diversion does not exhibit a significant association with Canal Darkening.

Table 4 demonstrates the relationship between the Canal Narrowing and several dental features. With p-values less than 0.05, three of the investigated variables—"Canal Narrowing," "Canal Darkening," and "Canal Deflection" showedTable;2 Predictors of Darkening of Root statistically significant relationships with the result. According to the adjusted odds ratio of 0.350, the likelihood of canal narrowing decreases by 65% for every unit rise in canal narrowing. Theadjusted odds ratio for canal darkening, which is 0.448, indicates that the likelihood of the canal narrowing decreases by 55.2% for every unit increase in canal darkness. On the other hand, p- values over 0.05 for "Canal Dark and Bifid Apex,""Interruption of White Streak," and "Canal Diversion" indicated a lack of statistical significance.

Rood andShehab classification	P value	Adjusted Odds Ratio	95% C.I	
			Lower	Upper
Canal Dark and BifidApex	0.455	0.663	0.225	1.949
Interruption ofWhiteStreak	0.003*	0.695	0.545	0.886
Canal Diversion	0.999	<0.001	<0.001	<0.001
Canal Narrowing	0.006*	0.443	0.248	0.788
Canal Deflection	<0.001*	0.586	0.451	0.760
Canal Narrowing	<0.001*	0.448	0.342	0.587
*p<0.05, significant , *C.I:Confidence Interval*				

Table;4 Predictorsof Narrowing of Root

Rood andShehab classification	P value	Adjusted Odds Ratio	95% C.I	
			Lower	Upper
Canal Darkand Bifid Apex	0.809	0.865	0.268	2.791
Interruption of White Streak	0.423	1.122	0.847	1.486
Canal Diversion	0.999	0.000	<0.001	<0.001
Canal Narrowing	<0.001*	0.350	0.198	0.618
Canal Darkening	<0.001*	0.448	0.342	0.587
Canal Deflection	0.003*	1.517	1.150	2.001
*p<0.05, significant,*C.I:Confidence Interval*				

DISCUSSION

Our study aimed to define the prevalence of Rood and Shehab classification that is associated with IMTM in the Qassim region.

The high prevalence of narrowing of the root suggests a substantial impact of impaction on root morphology. This finding is proportionate with studies by Bhardwaj et al. (2022), indicating a recurring trend across diverse populations[1]. The increased prevalence emphasizes the need for thorough assessments in impacted molars, considering potential complications associated with root narrowing[2].

The prominence of root deflection highlights a common structural alteration in impacted molars in the Qassim region. This aligns with research by Juodzbalys et al. (2013), supporting the notion that root deflection is a prevalent consequence of impaction[3]. The high proportion highlights how important it is for clinicians to assess and treat root deflection in third molars that are affected [4].

The significant occurrence of root darkening suggests potential pathological changes associated with impacted molars. Study by Tantanapornkul et al. (2009) reported similar trends[5], emphasizing the need for close monitoring of darkening as an indicator of dental health. Understanding the factors contributing to root darkening can aid in developing targeted preventive measures and interventions.

The low prevalence of canal dark and bifid apex indicates that this condition is relatively uncommon in impacted molars in the Qassim region. This finding deviates from studies by Deshpande et al. (2013)[6], suggesting potential regional variations in the presentation of this dental characteristic. It is necessary to do more research to determine the causes of this discrepancy.

The minimal occurrence of canal diversion aligns with studies by Tassoker et al. (2019), supporting the notion that this condition is infrequently associated with impacted molars[7]. The rarity emphasizes the importance of recognizing and addressing diversion of the canal as a unique consideration in the clinical assessment of embedded third molars.

Relatively low prevalence of canal narrowing contrasts with findings by KalaiSelvan et al. (2020), suggesting potential variability in the presentation of this situation [8]. To understand the geographical elements causing the observed variations and to develop customized diagnostic strategies in the Qassim region, more research is required.

The frequent observation of interruption of the white line aligns with studies by Calin et al. (2014), emphasizing the clinical significance of this dental characteristic in impacted molars[9]. The prevalence suggests that interruption of the white line is a common manifestation, warranting attention in the diagnostic and management protocols for impacted third molars[10].

The statistically significant association between interruption of the white streak and canal darkening aligns with study by Savani et al. (2018), supporting the notion that interruption of the white streak may serve as a reliable indicator for potential root darkening[11]. The adjusted odds simplies that increasing interruption of the white streak correlates with a decreased likelihood of canal darkening, emphasizing the clinical relevance of this association.

There is a strong correlation between canal darkening and canal narrowing with findings by Szalma et al. (2011), highlighting the interconnected nature of these dental characteristics[12]. The adjusted odds ratio suggests that an increase in canal narrowing is associated with a substantial decrease in the odds of darkening of the root. This underlines the importance of considering both conditions in the diagnostic and treatment planning processes.

The observed significant associations of canal deflection and canal narrowing with canal darkening are consistent with studies by palma- carrio et al. (2010), indicating a multifactorial relationship between these dental characteristics[13]. Understanding these associations enhances our ability to predict and manage darkening of the root in patients with impacted molars.

The findings of this study carry important clinical implications for dental practitioners in the Qassim region. The high prevalence of narrowing, deflection, and darkening of the root in embedded mandibular third molars underscore the need for thorough and tailored diagnostic assessments. Dental professionals should prioritize vigilant evaluations for these specific conditions, especially when patients present with symptoms or risk factors associated with impacted molars. The statistically significant associations identified, important clinical signs include things like the white line breaking and the canal narrowing as the

root darkens Clinicians can utilize these associations to enhance diagnostic accuracy and develop targeted intervention strategies for individuals at risk of adverse dental outcomes.

Future research should build upon the current study to deepen our understanding of regional variations and contributing factors to dentalconditions associated with impacted molars. Longitudinal studies are essential to investigate theprogression and impact of these conditions over time, allowing for the development of more precise prognostic models. Additionally, comparative studies across diverse populations can elucidate whether the observed associations are region-specific or universal. Exploring the genetic and environmental factors influencing these dental characteristics may provide insights into their aetiology, paving the way for more personalized approaches to diagnosis and treatment. Furthermore, research focusing on the development and validation of predictive models based on the identified associations can contributeto the refinement of clinical judgment-making in the management of emdadded mandibular third molars.

Limitations

There are a couple obstacles with the consider thatshould be acknowledged. We are unable to establish worldwide linkages between dental diseases and their affiliations with impaired mandibular third molars because of the cross- sectional design of the study, which restricts our ability to establish causation. Because members might not accurately evaluate or report some oral diseases, the reliance on self-reported information may offer a review bias. The fact that the study focused on Qassim may limit the applicability of the findings to larger populations with potentially different oral health characteristics.

CONCLUSION

Due to the high frequency of canal narrowing, deflection, and darkening, diagnostic evaluations must give particular consideration to these symptoms due to their clinical importance. The relationship between the white streak interruption and the narrowing of the canal with darkening of the canal offers dental professionals important information for anticipating and controlling unfavourable consequences. In this study, we employ Rood and Shehab's categorization to assess the risk of nerve damage. The more criteria that are present, the greater the risk of nerve injury; if one of these criteria is present, the risk of nerve injury will be around 10%. This study opens the door to better clinical procedures and patient outcomes by deepening our awareness of the stateof oral health in the Qassim region.

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