

Systemic Review: Mandibular Third Molar Impaction: Prevalence, Causes, Classifications, Complications, and Managements

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Review Article

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Abstract: Systemically reviewing the topic Mandibular Third Molar Impaction and its components: prevalence, causes, classifications, complications, and managements. All studies pertaining to the topic and its components were included. Exclusion criteria were applied to exclude studies that were not PubMed indexed. The materials and methods used for this systemic review were to search in the PubMed database, using specific words "Mandibular Third Molar Impaction, Prevalence, Causes, Classifications, Complications, and Managements" and published in the English language. The articles were reviewed, 25 papers were identified in PubMed but a total of 20 papers were included in the final systemic review according to the specific keywords and materials mentioned above. The occurrence of Mandibular Third Molar Impaction can be seen in everyday routine oral surgery practice. The prevalence of Mandibular Third Molar Impaction is remarkable but varied from one study to another. Causes were investigated showing a multifactorial tendency. Classifications are very essential for diagnosing different types of impaction. Diverse Complications related to Mandibular Third Molar Impaction are possible, yet avoidable. Management was reviewed showing a variety of treatment modalities.

Keywords: Mandibular Third Molar Impaction, Prevalence, Causes, Classification, Complications, Management.

INTRODUCTION

Tooth impaction is a pathological situation in which a tooth cannot or will not erupt into its normal functioning position [1]. Mandibular third molar is considered to be the most common impacted tooth in the oral cavity [2].

The prevalence of mandibular third molar impaction can vary between 16.7% to 68.6%, based on the population of the study [3, 4]. The etiology of mandibular third molar impaction is said to be due to the inadequate space between the distal of the second mandibular molar and the anterior border of the ascending ramus of the mandible [5]. Proper case identification and treatment planning using well-known classifications is considered a crucial step in avoiding complications. Mandibular third molar impaction can be presented with pre-operative and post-operative complications which may vary in severity from minor to major ones. Understanding treatment modalities directed toward impacted mandibular third molar is essential for proper management. In this systemic review article, we will be reviewing the literature regarding mandibular third molar impaction and its components: prevalence, causes, classifications, complications, and managements.

Prevalence of mandibular third molar impaction

The incidence of mandibular third molar impaction was investigated in several studies and showed various results. Breik O *et al.* [6] suggested an

overall rate of mandibular third molar impaction of (58.76%). Regarding gender differences, the results showed a rate of (43%) erupted in males as compared with (45%) erupted in females. He also reported a significant relation between mandibular third molar impaction and skeletal facial profiles. He suggested that mandibular third molar impaction is more prevalent in brachycephaly facial profile, followed by dolichocephaly and lastly mesocephaly. Furthermore, Kumar VR *et al.* [2] reported that the average age of patients in his study found to be 30 years, with the 20 to 30 years age group being the most affected (67.4%). Females (53.3%) were affected more than the males (46.7%). He also emphasized the difference in incidence in different geographic locations and races. For instance, people from the Asmara region showed significantly more prevalence (79.7%) than the adjoining areas (20.3%). Another study conducted by Maryam A. Hashemipour *et al.* [1] found that the prevalence of mandibular third molar impaction ranges from (16.7%) to (68.6%), indicating that it is highly affected by the target group "population" of the study. Moreover, Soukaina Ryalat *et al.* [7] concluded that mandibular third molars are the most commonly

impacted teeth, with an average worldwide rate of impaction of (24%) and showed to be more common in females. For the Saudi population, Ali H Hassan *et al.* [8] suggested a prevalence of (40.5%) with no significant difference between males (52.6%) and females (47.4%).

Causes of mandibular third molar impaction

The literature has discussed many various reasons behind mandibular third molar impaction. Grimanis GA *et al.* [9] suggested the most common causes of the impaction of mandibular third molar to be the abnormal positioning of the tooth bud, lack of space in the dental arch, supernumerary tooth ankylosis of the deciduous or permanent tooth, nonresorbing bone due to local or systemic causes. Furthermore, Chandresh Jaiswara *et al.* [10] reported that It is mainly due to bony obstruction in the pathway of eruption or the local adjacent tooth causes hindrance. Another study conducted by Grover PS *et al.* [11] found that the gradual evolutionary reduction in the size of the human mandible has resulted in too small mandible that may accommodate the corresponding molars. Moreover, Matsuyama J *et al.* [12] concluded that the modern diet does not offer a decided effort in mastication, resulting in loss of growth stimulation of jaws, and thus the modern man has impacted and unerupted teeth. Ajith SD *et al.* [13] suggested that the major basic cause of impacted teeth in the adults of Western Europe, Great Britain and Ireland, U.S.A, and Canada is due to artificial feeding of babies, the habits developed during childhood, due to cross breeding, more consumption of sweet food by the children and youth which produces disproportion in the jaws and thus the teeth.

Classification of mandibular third molar impaction

The most popular classifications are winters, and Pell and Gregory's. In this section we will be reviewing different literature for each classification.

Winter's classification

It is based on the inclination of the mandibular third molar impacted tooth to the long axis of the mandibular second molar. It is classified as vertical impaction (10° to -10°), mesioangular impaction (11° to 79°), horizontal impaction (80° to 100°), distoangular impaction (-11° to -79°), others (111° to -80°) and buccolingual impaction (Any tooth oriented in a buccolingual direction with crown overlapping the roots). V. K. Prajapati *et al.* [14] suggested that the most common angulation of impaction in the mandible was mesioangular impaction (48.3%) followed by horizontal (29.3%), vertical (15.5%) and distoangular impaction (6.3%). For the Saudi population, Ali H Hassan *et al.* [8] concluded that the most common angulation of impaction in the mandible was the mesial (33.4%), followed by the horizontal (27.5%), vertical (20.6%) and distal (16.6%).

Pell and Gregory's classification

It is based on the vertical and horizontal relationship of the impacted mandibular third molar to the mandibular second molar and ramus, respectively. It is categorized into vertical and horizontal relations. First, vertical classification: (A Position): highest position of the tooth is on a level with or above the occlusal line, (B Position): highest position is below the occlusal plane, but above the cervical level of the second molar, and (C Position): highest position is below the cervical level of the second molar. Second, horizontal classification: (Class I) : sufficient space available between the anterior border of the ascending ramus and the distal side of the second molar for the eruption of the third molar, (Class II): the space available between the anterior border of the ramus and the distal side of the second molar is less than the mesiodistal width of the crown of the third molar, and (Class III) : the third molar is totally embedded in the bone from the ascending ramus because of absolute lack of space. V. K. Prajapati *et al.* concluded that for the vertical classification (B Position "64 %") was the most common followed by (A Position "36%"), and lastly (C Position "0%"). In regard to the horizontal classification (Class I "83 %") was the most common followed by (Class II "17 %"), and lastly (Class III "0 %"). For the Saudi population, Sara M. El-Khateeb *et al.* [15] suggested that for the vertical classification (A Position "45%") was the most common along with (B Position "45%"), and lastly (C Position "10%"). In relevance to the horizontal classification (Class II "77 %") was the most common followed by (Class I "18 %"), and lastly (Class III "5 %").

Management of mandibular third molar impaction

In relevance to the management options related to impacted mandibular third molar, proper treatment planning should be established in advance to ensure the most desirable outcome. Barraclough J *et al.* [16] concluded that orthopantomogram (OPT) is the baseline special test for assessing this and numerous signs on an OPT can predict an increased risk of injury to the nerve. Cone beam computed tomography (CBCT) is being more frequently used to assess this relationship further and can influence treatment planning. Furthermore, P Santosh *et al.* [5] suggests different treatment modalities to address the problem. First, observation: If the impacted mandibular third molar is embedded in bone with no perceptible to the follicle, as may be seen in an older individual and has no history or signs of associated pathology. Second, exposure: if there is probability that it may erupt into useful occlusion but is obstructed by follicle, sclerotic bone, hypertrophic soft tissue, odontoma, or other lesions. Third, transplantation: by utilizing the variety of crown and root shapes of the impacted third molar make them suitable for transplantation to other molar sites, bicuspid and even the cuspid locations depending on the anatomy of the coronal and radicular surface. Fourth and last, removal: mainly if associated with pathology

and to intercept reasonably expected pathological process. Different removal technique was reported in the literature, Vibha Singh *et al.* [17] concluded the most commonly used techniques for impacted mandibular third molar extraction to be lingual split technique using chisel and mallet, buccal approach technique using chisel and mallet, and buccal approach technique using rotary instruments.

Complications of mandibular third molar impaction and extraction

In regard to the complications associated with mandibular third molar impaction, V. K. Prajapati *et al.* [14] suggested that the most common complications of mandibular third molar impaction to be decayed tooth (66%) followed by pain (59%) food lodgment (62.5%), pus discharge (46%), and halitosis (21%). Additionally, other associated pathologies were observed and reported by P Santosh *et al* [5]. First, pericoronitis as he reported to be the main cause of extraction. Second, odontogenic cysts and tumors which could be observed in some patients with impacted mandibular third molar. Third, periodontitis which had a reported incidence that ranges from 1% to 5%. Forth, root resorption which has been shown in some studies that an impacted mandibular third molar may cause resorption of the distal root of the adjacent second molar. On the other hand, extraction of impacted mandibular third molar also carries some risk. François Blondeau *et al.* [18] reported the overall complication rate after impacted mandibular third molar extraction to be 6.9%. The overall incidence of complication and the severity of these complications are associated most directly with the depth of impaction and the age of the patient, as reported by EG Deliverska *et al.* [19]. Moreover, Osunde *et al.* [20] concluded the most common complications related to impacted mandibular third molar extraction to be delayed healing (5.8%), followed by dry socket (2.7%), injury to alveolar nerve (0.6%), and injury to the lingual nerve (0.3%).

CONCLUSION

To sum up, mandibular third molar impaction is a common pathological condition. The etiology is considered to be multifactorial. Classifications of mandibular third molar impaction are useful tools to properly plan the treatment strategy. Complications related to impacted mandibular third molar are possible. Different treatment modalities are reported to manage mandibular third molar impaction. In this study, we are investigating mandibular third molar impaction and it is related factors including prevalence, causes, classifications, complications, and managements.

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