

Retromolar Foramen in Human Dry Mandibles - A Morphological Study

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Abstract: Retromolar foramen is an variable foramen present in the retromolar trigone bounded by the anterior border of the ramus of the mandible and the temporal crest. It transmit the branches of the inferior alveolar nerves and vessels and sometimes the Retromolar canal can communicate with the mandibular canal. Very few literature and sparsity in the Anatomy textbooks regarding the details of the presence and importance of Retromolar canal is noted. In this study, 60 dry human adult mandibles is taken and the incidence, diameter of the Retromolar canal and its distance from last molar tooth cavity has been studied and documented. The clinical importance and implications of the retromolar canal has been discussed as it is of paramount importance to the dental surgeons, anaesthetist and the physicians.

Keywords: Retromolar foramen, mandible, inferior alveolar nerve

1. Introduction

The retromolar foramen (RMF) is an variable structure present in a triangular area behind the lower last molar socket teeth¹. The foramen is situated in the retromolar trigone which is bounded anteriorly by the base of the third molar teeth, medially by the temporal crest and laterally by the anterior border of the ramus of the mandible. The Retromolar foramen is an inconstant foramen which has got high dento-surgical implications as sometimes it leads to a canal communicating with the mandibular canal and the inferior alveolar nerve can be injured following dental extraction of last lower molar teeth, osteotomy surgeries and other dental procedures^{2,3}. A wide range of incidence has been reported in the literature and the frequency of Retromolar foramen shows a incidence ranges from 3% to

72%.^{4,5,14}. In this study, the incidence, diameter and its distance with the last molar teeth was measured and its clinical implications were discussed.

2. Materials and Methods

Sixty dry mandibles of adult age with normal morphology and unknown sex were taken into study. This study was conducted in Department of Anatomy, Government Stanley Medical College, Chennai. All the mandibles were tagged and the presence of retromolar foramen were photographed and the incidence were calculated (fig 1). The diameter of the foramen and the distance of the retromolar foramen from the last molar teeth socket were measured using digital vernier caliper, were measured.

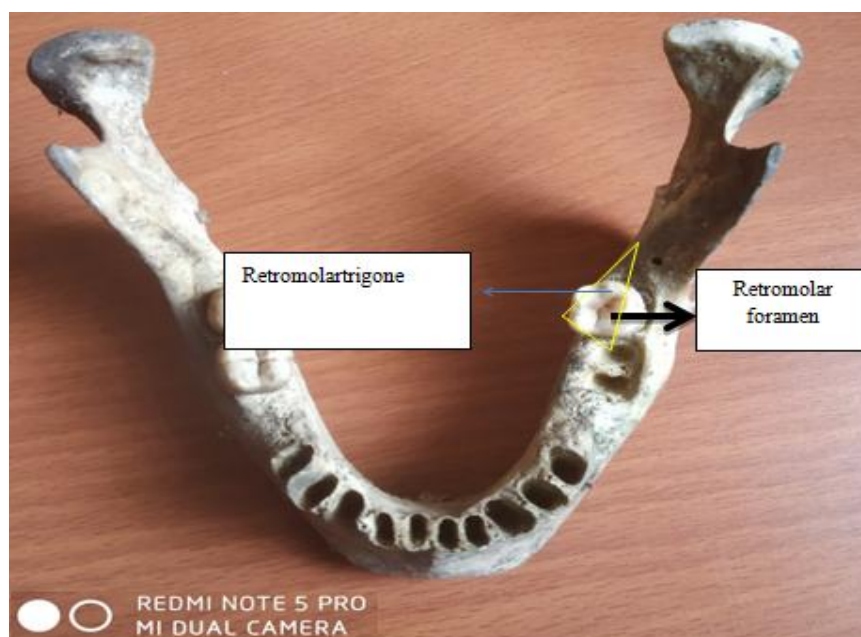


Figure 1: Retromolar foramen in the retromolar trigone

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3. Results

Incidence of Retromolar foramen:

The retromolar foramen was found in six specimens out of sixty specimens(10%) taken for the study. In one specimen, it was found on the right side(1.6%) and in remaining five specimens it was found on the left side(8.3%). No bilateral representation has been noted.

Diameter of the Retromolar foramen:

The diameter of the retromolar foramen were measured using verniercaliper(fig 2). The measurement were tabulated and mean diameter were found out. The mean diameter of the retromolar foramen in the present study was 1.96mm and it ranges from 1.36mm to 2.46mm.



Figure 2: Measuring the diameter of the Retromolar foramen

Distance of the Retromolar foramen from the last molar tooth

The distance of the retromolar foramen from the last molar tooth were measured using verniercaliper and the mean

distance were calculated(fig 3). The mean distance of the retromolar foramen from the last molar tooth is 6.48mm and with the range from 3.2mm to 11.48mm.

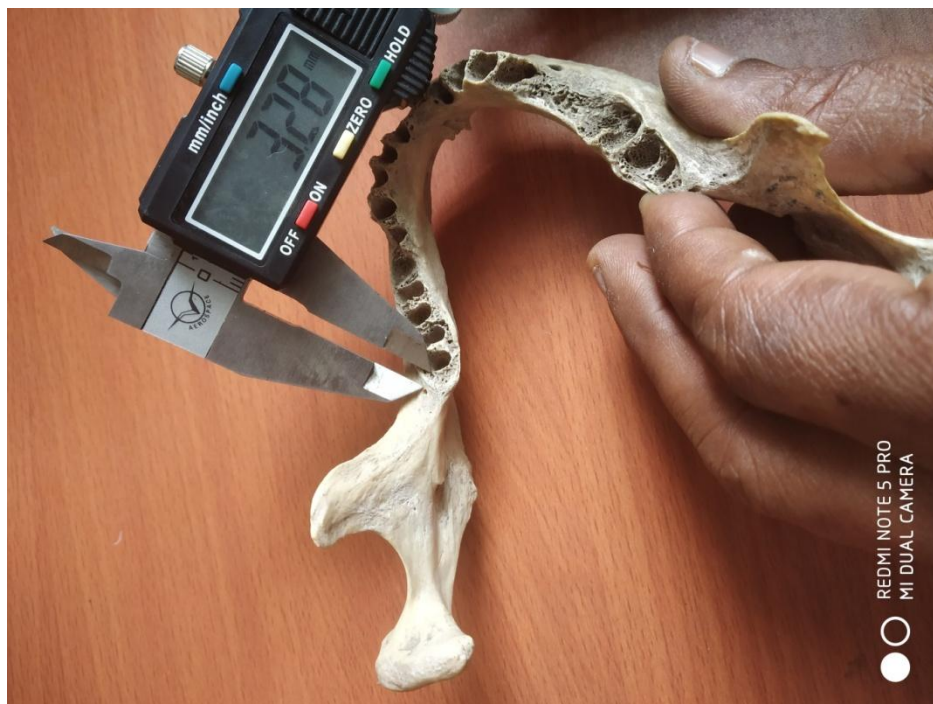


Figure 3: Measurement the distance of RMF from last molar tooth socket

4. Discussion

Very little literature and documentation in the medical books has been recorded regarding about the presence and importance of Retromolar foramen. The retromolar foramen is inconstant and shows lot of variability in its presence and morphological pattern. Various authors have observed the incidence of retromolar foramen in dry mandibular bones. The incidence of the Retromandibular foramen from various authors has been tabulated in table no 1.

Authors	No of Mandibles	Percentage observed
NarayanaNayak et al ⁸ 2002	242	21.9%
Priya et al ⁹ 2005	157	171.83
Senthil Kumar, Kesavi ⁶ 2010	150	17.3%
Shantharam et al ⁷ 2013	115	3.48%
Present Study	60	10%

The incidence of occurrence of retromolar foramen in the present study is 10% in 60 specimens. The incidence shows wide range of values studied by different authors and here we conclude that Retromolar foramen is not an constant foramen. The retromolar foramen was found to occur more commonly in North American population than in other population⁷. The presence of retromolar foramen has clinical implications as the inferior alveolar nerve and vessels can be injured during surgical and orthodontic procedures like extraction of third molar tooth, sagittal split osteotomy etc.^{3,4,10}.

The mean diameter of the retromolar foramen in the present study is 1.96mm. Very few authors has studied the mean diameter and the results of the study is tabulated below.

Author	No of specimens	Mean diameter in mm
SumanTiwari et al ¹¹ 2015	100	1.4
Shantharam et al ⁷ 2013	115	2.97
Senthil Kumar, Kesavi ⁶ 2010	150	1.3
Present Study	60	1.96mm

The major components of the retromolar foramen are the neurovascular bundle which enters from the mandibular canal. The artery in the canal is a branch from inferior alveolar artery. The nerve in the retromolar canal is a branch from the trunk of inferior alveolar nerve and it supplies the third mandibular molar, the mucosa of retromolar triangle, the buccal mucosa, gingiva in the mandibular premolar and molar region¹¹. The mean distance of the retromolar foramen from the last molar teeth is 6.48mm and is comparable with SumanTiwari et al. Branches of the inferior alveolar nerve can be injured during dental extractions or during anaesthesia and it can present as paraesthesia of the buccal mucosa from the retromolar region¹². Anderson stated that the neurovascular bundle in the retromolar foramen also supplies the fibres of temporalis and buccinators muscle, so injury to the neurovascular bundle can disrupt the function of the temporalis and the buccinators muscles¹³. Also, Retromolar foramen also allows the spread of infection as it facilitate the vascular component which passes through the foramen and the infection can get access to the bloodstream from the buccal mucosa. So a thorough knowledge of the Anatomy of the Retromolar foramen is necessary for

physician, dentist and anaesthetist for avoiding injury to the neurovascular structure and especially during surgical procedures.

5. Conclusion

Very little knowledge and literature is available regarding the presence of Retromolar foramen. Clinical importance of Retromolar foramen is of paramount importance to clinicians, dental surgeons during intervention like dental extractions, osteotomy etc. The presence of neurovascular bundle in the retromolar foramen can provide alternate route of pain impulse even after the main inferior alveolar nerve is blocked with local anaesthetic drugs. In such case, infiltrations should also be carried out in the retromolar region for complete anaesthetic effects. In this study, the incidence of Retromolar foramen, its diameter and its distance has been studied and documented and the clinical importance and implications has been stressed out and the knowledge of the presence of Retromolar foramen is of great use to clinicians and dental surgeons.

Conflict of interest: None

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