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Original Research Paper

Anatomy

VISIBILITY OF MANDIBULAR CANAL ON AN ADULT DRY OLD AGED EDENTULOUS MANDIBLE

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ABSTRACT

Introduction: The medial surface of ramus of mandible in its centre presents a mandibular foramen which transmits inferior alveolar vessels and nerve. The foramen leads downward and forward within the body of mandible into a canal called mandibular canal. **Aim:** The aim of the present study is to determine the exposed mandibular canal in an edentulous old aged mandible. **Materials and methods:** A total of 50 edentulous old age mandibles were collected from the department of anatomy, Panimalar medical college, hospital & Research institute at Chennai. The occurrence of the mandibular canal was observed manually by two investigators and the findings were noted. **Results:** Out of 50 edentulous old aged mandible, one mandible showed mandibular canal. The canal starts at the mandibular foramen, on the lingual side of the ramus and continues on buccal surface of body of the mandible. The canal pathway was followed anteriorly were it shows incisive canal and absence of mental foramen. It was a rare finding and this is the first study to show the exposed mandible canal in bone as there are many studies have showed this canal in radiography. **Conclusion:** The invention of new imaging technologies has allowed the visualization of anatomical structures in different planes especially the cone beam computer tomography (CBCT) although the anatomical study on dry bone plays an important role in understanding the pathway of the canal. In the present study the normal anatomy of the mandibular canal was studied on dry mandible which will be useful for the students and clinicians.

KEYWORDS : Mandibular foramen, Body of mandible, Mandibular canal, Incisive canal.

INTRODUCTION:

The mandible forms the lower jaw. It consists of a horizontal horse shoe shaped body and two broad and oblong rami projecting upward. The body shows external and internal surfaces, upper or alveolar border and lower border or base. The ramus presents two surfaces medial and lateral surface [3].

The medial surface of ramus of mandible has in its centre a mandibular foramen which transmits inferior alveolar vessels and nerve. The foramen leads downward and forward within the body of mandible into a canal called mandibular canal. The canal runs forward within the body below the alveolar border and provides branches to the roots of the teeth of lower jaw. At the interval between the first and second premolar teeth the canal divides into mental and incisive canals. The mental canal curls upward, backward and laterally and transmits mental vessels and nerve through the mental foramen. The incisive canal conveys the corresponding vessels and nerve extends further forward to supply the canine and incisor teeth [1].

In the present study, the mandibular canal was studied in the dry adult edentulous old aged mandible.

MATERIALS AND METHODS:

The present study was designed as a descriptive study. A total of 50 edentulous old age mandibles were collected from the department of anatomy at Panimalar medical college, hospital and Research institute, Chennai. The criteria of selection of edentulous old age mandibles were absence of teeth and atrophy of the alveolar border.

The damaged mandibles and bones with pathological conditions were excluded from the study. The mandibles were kept on a plane table covered with asbestos sheet for observation. The investigator examined the position of mental foramen and mandibular canal.

RESULTS:

Out of 50 edentulous old aged mandible, one mandible showed mandibular canal (Fig:1). The canal starts at the mandibular foramen, on the lingual side of the ramus and continues on buccal surface of body of the mandible. The canals pathway was followed anteriorly were it shows incisive canal and absence of mental foramen (Fig:2).

Fig 1: Edentulous old aged mandibles with one mandible showing mandibular canal (single in row).

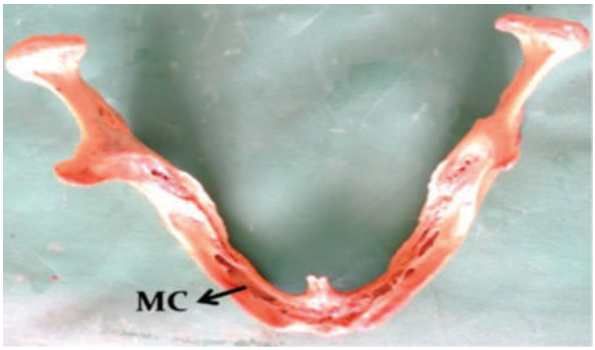

Fig 2: The arrow points out the Mandibular canal (MC)

DISCUSSION:

The mandible is the lower jaw bone which plays a major part in the contour of the face. Mandible determines the shape and attractiveness of lower face. It develops from first pharyngeal arch.

The mandible has a horse shoe- shaped body which lodges the teeth, and a pair of rami which project upwards from the posterior ends of the body. The body of the mandible is U-shaped, and has external and internal surfaces separated by upper and lower borders [3].

The ramus of the mandible has two surfaces namely lateral and medial. The mandibular foramen lies along the centre of the medial surface of ramus of mandible. It leads into the mandibular canal (or inferior alveolar canal) inside the body of the mandible and conducts the inferior alveolar nerve and vessels which send branches to the roots of the lower row of teeth.

At the level of the 2nd premolar tooth the canal divides into a mental canal (which opens out at the mental foramen) and an incisive canal which continues below the incisor teeth. Mandibular canal starts at the mandibular foramen, on the lingual side of the ramus, continues on buccal surface of body of the mandible below the alveolar sockets. At the interval between the first and second premolar teeth the canal divides into mental and incisive canals.

The mandibular canal conveys inferior alveolar nerve and vessels. The inferior alveolar nerve terminates into two branches, incisive and mental branches. The incisive branch continues forward in a bony canal called mandibular incisive canal. The incisive nerve gives off branches to the first premolar, canine and incisor teeth and the associated labial gingivae. Mental branch emerges upward and laterally through the mental foramen, and supplies the skin of the chin and the lower lip [1]. The present study shows the anatomical location of mandibular foramen in an adult dry edentulous old age mandible.

Mardinger et al reported that anterior to mental foramen the mandibular canal is referred as incisive canal through radiological study [7]. Similarly, the present study reports the incisive canal on the dry mandible through osteological study. Polland et al (2001) observed mandibular canal in edentulous specimens of seven cadavers using panoramic radiographs and reported that it was composed mainly of cancellous bone with only occasional single osteons. The inferior alveolar nerve near the mandibular foramen was a large trunk, consisting of three to four nerve bundles with connective tissue sheaths. It became more loosely arranged toward the mental foramen. Medial to the mental foramen, the nerves were frequently in the form of small bundles in the marrow. Any incisive canal was ill-defined and neurovascular bundles, when present, ran through a labyrinth of intertrabecular spaces [9]. The present study corroborates with their findings and varies as it was observed in adult dry edentulous old age mandible. Since it was observed on dry bone, the structures passing through it cannot be found.

Kieser ja, Paulin M, Law B observed the vertical positioning and intra bony branching patterns of the inferior alveolar nerve (IAN) in 39 edentulous human cadaveric mandibles by buccal microdissection [4]. Kieser J et al studied the course of inferior alveolar nerve in the edentulous mandible through radiographic study [5]. Stella J.P and Tharanon.W determined the location of the inferior alveolar canal in the posterior edentulous mandible through radiographic study which will be useful during implant technique [10]. Christiano Oliveira-Santos et al assessed the visibility of the MC in different regions on CBCT cross-sectional images [2]. Paes Ada SF reported a comparative study of single and multislice computed tomography for the assessment of the mandibular canal [8]. Lofthag-Hansen S, Gröndahl K, Ekestubbe A reported a Cone-beam CT on the posterior mandible to visible the anatomic landmark before planning implant [6].

Therefore, all these studies are radiographic study but the present study varies in that, as it was studied in dry bone. The mandibular canal was observed in dry adult edentulous mandible and the normal anatomy of the canal was studied which will be useful for the students and clinicians.

CONCLUSION:

The invention of new imaging technologies has allowed the visualization of anatomical structures in different planes especially the cone beam computer tomography (CBCT) although the anatomical study on dry bone plays an important role in understanding the pathway of the canal. In the present study the normal anatomy of the mandibular canal was studied on dry mandible which will be useful for the students and clinicians.

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