

TITLE: BILATERAL MANDIBULAR CORONOID FORAMINA WITH BILATERAL ACCESSORY FORAMINA ON THE LATERAL ASPECT OF THE RAMUS; AN UNSEEN VARIANCE DISCOVERY IN HUMANS.

Abstract:

The mandible or the submaxilla is a "U"-shaped pivotal structure, considering the attachment of the muscles of mastication with relation to mastication itself. The coronoid process is a variably shaped beak-like projection at the anterosuperior aspect of the ramus. The anterior border of which is convex and continuous with that of the ramus. Posteriorly, the border is slightly concave and contributes to the mandibular notch. The entire border of the coronoid along with the medial surface provides attachment for the temporalis muscle. Previous studies have shown that the size and shape of the coronoid are correlated to the bite force required by an individual and is dependent upon the mechanical force acting upon it during development. However, little is known about the developmental program leading to the specification of the process. The relative size & shape of the coronoid process varies considerably across individuals. *The author in this poster aims to present his unique discovery of 'Coronoid Foramina' bilaterally along with bilateral accessory foramina over the lateral aspect of the mandibular ramus, which has never been seen or documented in the literature to date.*

Key words:

Mandible, Coronoid variance, Coronoid Foramina, Lateral Mandibular Foramina, Mandibular Foramen, Mandibular Canal.

Introduction :

Accessory mandibular foramina are constant structures of the human mandible. They are the openings present in the mandible, other than alveolar sockets, and mandibular and mental foramina.¹ They are prevalent in the posterior mandible and the area of the symphysis, are found more frequently on the internal than the external surface² of the mandible, and are most commonly observed on the medial surface of the mandible than on the lateral surface. The majority of the time, bilateral symmetry is common, but variations exist in size, shape, and number. Nerves, neurovascular bundles, arterioles, and venules have been found to occupy the accessory canals and foramina.³

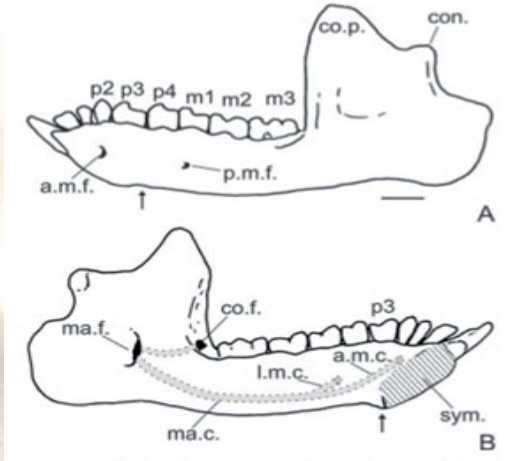
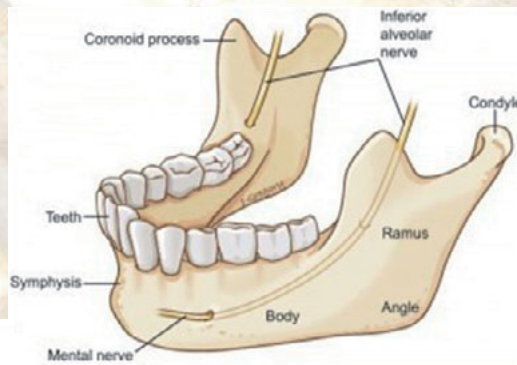
The aim of this case report is to present **unique and first-ever** findings of 'foramina on the coronoid process' and 'accessory lateral foramina on the lateral aspect of the ramus' of the mandible.

Materials & Methods:

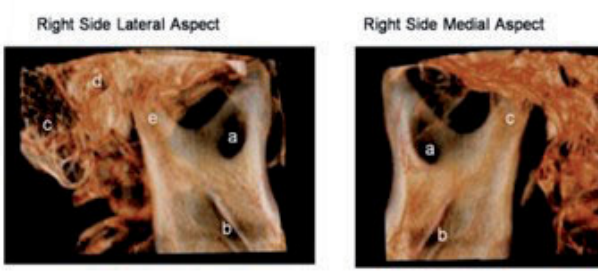
This case is of a 43-yr-old male patient from the central part of the Kingdom of Saudi Arabia who presented to the Department of Oral & Maxillofacial surgery with limited mouth opening, although without apparent symptoms. The patient was partially edentulous (18,28,38,36,46 & 48) and exodontia of the remaining grossly destructed root stumps (25 & 47) was indicated as part of an oral rehabilitation plan. A clinical examination and clinical interview were performed. An investigatory panoramic radiograph was suggested, and an unusual and peculiar finding in the coronoid process and the ramus of the mandible was noticed by the author. Thereafter, cone beam computed tomography (CT) was performed, emphasizing the importance of complementary investigations in the diagnostic phase. Analysis of the cone beam CT scan confirmed the structural alteration in the bilateral coronoid processes of the jaw along with the bilateral accessory foramen on the lateral aspect of the ramus of the mandible, which could possibly explain the limited mouth opening. The author went ahead with a full facial bone CT & MRI as part of the extensive evaluation and confirmation of this alteration and variance in the coronoid and the ramus of the mandible along with stereolithographic 3D reconstruction model for a better understanding and evaluation.



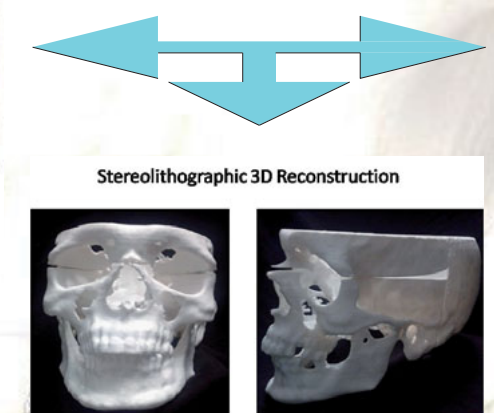
OPG
a: Coronoid foramen right side
b: Accessory mandibular foramen on lateral aspect of ramus
c: Coronoid foramen left side
d: Accessory mandibular foramen on lateral aspect of ramus



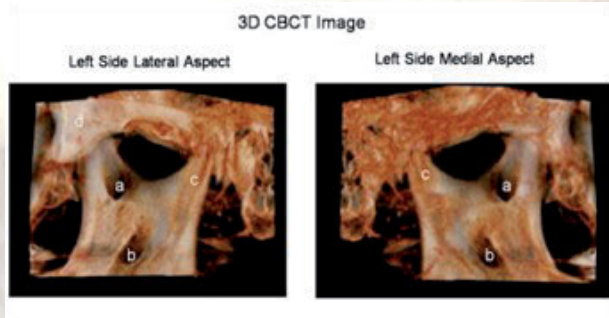
Schematic representation of the mandible of the basal proboscidean *Phosphatherium escullei* depicting the principal anatomical characters of the coronoid and mandibular canals and their associated foramina in proboscideans (modified from Gheerbrant *et al.*, 2005b). A, labial view; B, lingual view. The courses of the mandibular and coronoid canals in *P. escullei* are hypothetical and were reconstructed based on the position of the external foramina and by comparison with *Moeritherium*. Abbreviations: a.m.c., anterior mental canal; a.m.f., anterior mental foramen; con., condyle; co.f., coronoid foramen; co.p., coronoid process; l.m.c., lateral mental canal; m.a.c., mandibular canal; m.a.f., mandibular foramen; p.m.f., posterior mental foramen; sym., symphysis (section). Arrow indicates the position of the posterior border of the symphysis.



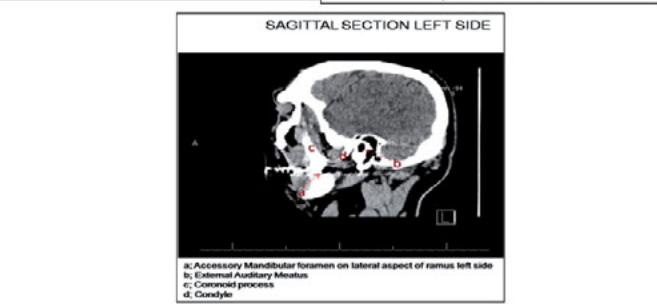
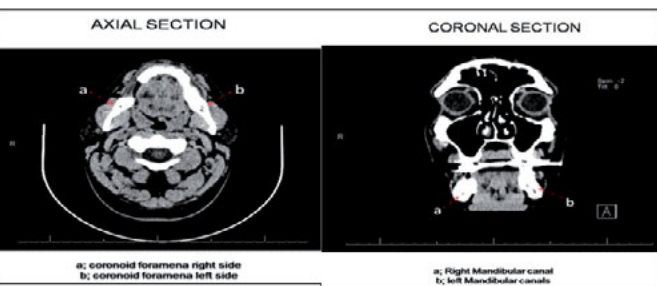
a: Coronoid Foramina
b: Accessory mandibular foramen on lateral aspect of ramus
c: malleolus process
d: External Auditory Meatus
e: Condyle



a: Coronoid Foramina
b: Mandibular foramen
c: Condyle



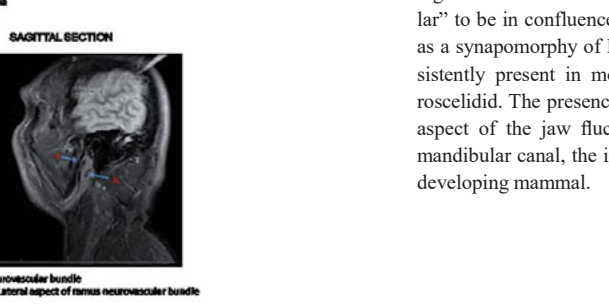
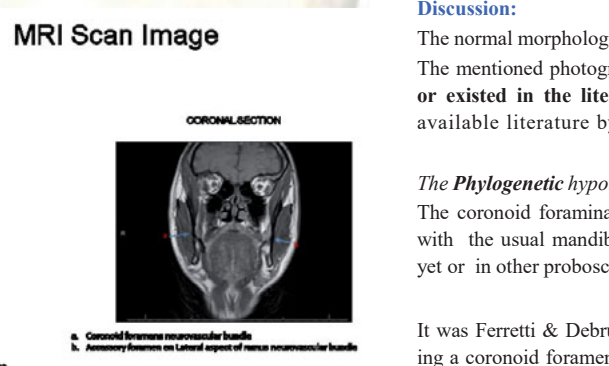
a: Coronoid Foramina
b: Accessory Mandibular foramen on lateral aspect of ramus
c: Condyle
d: Zygomatic Process



a: coronoid foramina right side
b: coronoid foramina left side

a: Right Mandibular canal
b: Left Mandibular canal

a: Accessory Mandibular foramen on lateral aspect of ramus left side
b: External Auditory Meatus
c: Coronoid process
d: Condyle



a. Condylar process
b. Coronoid process
c. Neurovascular bundle within the Coronoid foramina

a. Coronoid foramina neurovascular bundle
b. Accessory foramen on Lateral aspect of ramus neurovascular bundle

Discussion:

The normal morphological position of foramina of the mandible The mentioned photographs reveal the kind of variation which has never been reported or existed in the literature. However, a possible hypothesis as understood from the available literature by the author is mentioned as follows :

The Phylogenetic hypothesis:

The coronoid foramina and foramina on the lateral aspect of the ramus communicating with the usual mandibular foramina bilaterally have never been observed in humans as yet or in other proboscideans, excluding elephants.

It was Ferretti & Debruyne who interpreted a specimen of *Elephas maximus* as possessing a coronoid foramen which "merged with the alveolus of the distal most erupting molar" to be in confluence to form a coronoid canal. This coronoid canal was first identified as a synapomorphy of Paenungulates by Tassy & Shoshani in 1988. This structure is consistently present in most adult paenungulates and has been reported in a fossil macroscelid. The presence of spaces in the dentary connecting the oral cavity to the internal aspect of the jaw fluctuates during ontogeny, and connections still exist between the mandibular canal, the internal aspect of the coronoid process, and the tooth alveoli in any developing mammal.

Conclusion:

This case report has intrigued the author because of multiple variances in a live human mandible with the presence of multiple accessory foramina. Such an accidental discovery of these foramina will only result in procedural changes while operating & surgical planning in order to avoid failure in anesthesia techniques by a regional block of IAN & also operative complications and implications thereafter. Moreover, the diagnostic to prognostic evaluation of such patients needs to be studied further for a better understanding of the outcome.

References :

- Sutton RN. The practical significance of mandibular accessory foramina. *Aust Dent J.* 1974 Jun; 19(3):167-73.
- Agnieszka Przystańska, Małgorzata Bruska. Anatomical classification of accessory foramina in human mandibles of adults, infants, and foetuses. *Anat Sci Int.* 2012 Sep; 87(3): 141-149.
- Apostolos N. Eliades, Kalliopi H. Manta, Anastasios T. Tsiirlis. Neurovascular Content of the Mandibular Canal and Its Clinical Relevance: A Literature Review of the Related. Anatomical and Radiological Studies. *Balk J Dent Med.* 2014; 18:124-132.
- Marco P. Ferretti, Regis Debruyne. Anatomy and phylogenetic value of the mandibular and coronoid canals and their associated foramina in proboscideans (Mammalia). *Zoological Journal of the Linnean Society.* 2011, 161, 391-413.

Acknowledgments:

With Sincere gratitude I would like to acknowledge Dr. Siddique Ahmed . MD DNB for the timely guidance rendered in framing this poster



Author: Dr. Nyer Firdoose C S. BDS, MDS
Consultant Oral & Maxillofacial Surgeon
Department of Oral & Maxillofacial Surgery
East Riyadh Specialist Centre
Ministry of Health, Riyadh, Kingdom of Saudi Arabia.