

# Bilateral Multiple Mastoid Foramina Along With a Unilateral Occipito Mastoid Canal in an Adult Skull of North Indian Origin-A Rare Variation

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Date of Submission: 20-08-2017

Date of Acceptance: 14-11-2017

Date of Publishing: 21-05-2018

## ABSTRACT

The mastoid part of the temporal bone on its lateral surface usually has a mastoid foramen through which mastoid emissary vein and dural branch of the occipital artery passes. The foramen varies both in number as well as location. It can either be in the temporal or parietal bone, occipito mastoid suture or parieto mastoid suture. On routine osteology class in the department of Anatomy, SGRD Medical college, Amritsar, an adult human skull of North Indian Origin was found to have multiple mastoid foramina on both sides. There was a bony ossicle seen on the left side connecting tip of mastoid process to the occipital condyle of left side creating a bony canal can be named as occipitomastoid canal. This variation can have great clinical as well as surgical significance during neurological and otolaryngeal surgery. The knowledge of this variation will contribute to the epigenetic and anthropological study of the minor variations related to the mastoid foramen.

**Keywords:** Temporal, Mastoid, Canal, Epigenetic.

## INTRODUCTION

The mastoid part is the posterior region of temporal bone and has outer surface roughened by attachments of occipital belly of occipito frontalis and auricularis posterior. A mastoid foramen of variable size and position is present and is traversed by a vein from the sigmoid sinus and a small dural branch of occipital artery.<sup>[1]</sup> The number of the mastoid foramina are important not only as an epigenetic variation but because of vessels passing through it.<sup>[2]</sup> The transmastoid branch of the occipital artery is an important supply to the posterior cranial fossa, and is commonly involved in vascular malformations and tumors. This artery is difficult to catheterize due to tortuosity and trans foraminal course.<sup>[3]</sup> The mastoid emissary vein which connect the suboccipital venous plexus to the sigmoid sinus has its surgical significance in posterior cranial fossa approaches.<sup>[1,4]</sup>

Number and location of the mastoid foramina can also influence the interpretation during CT and MRI which can lead to the confusion during surgical interventions in the mastoid region.<sup>[5]</sup> Therefore the knowledge of the variations in the location and number of the mastoid foramina is essential for the ENT surgeons, neurosurgeons and radiologists concerned with the mastoid region.

## CASE REPORT

The present adult human skull showed bilateral multiple mastoid foramina. On the right side there were four (numbered 1,2,3,4) mastoid foramina. Mastoid foramina numbered 1, 2 were found near right occipitomastoid suture and rest 3, 4 were on the under surface of the right mastoid process. On the left side three mastoid foramina (numbered 1, 2, 3) were seen. Mastoid foramen numbered 1 was near the left occipito mastoid suture and rest of the two 2, 3 were in line with the first and also located below the level of the first foramen. Third numbered mastoid foramen is located below and medial to the second mastoid foramen. A mysterious canal (C) was formed by a bridge of bone from the tip of the left mastoid process to the condylar part of the left occipital bone. It

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probably transmits the tendon of posterior belly of digastrics muscle.



Figure 1: Showing multiple bilateral mastoid foramina and a osseous canal on the left side.

1,2,3,4-Mastoid foramina on the right side

1,2,3-Mastoid foramina on the left side

C=Canal formed by a bridge of bone between the tip of the left mastoid process and the condylar part of the left occipital bone.

FM-Foramen Magnum

## DISCUSSION

Mastoid foramina are well known to have the clinical and anthropological significance.<sup>[6]</sup> A surgical reminder of possible pitfalls are essential based on minor variations of the skull like morphology, number and location of the mastoid emissary foramina.<sup>[5]</sup> The trans mastoid artery is a major and important branch of the occipital artery passing through the mastoid foramina supplying the dura of posterior cranial fossa.<sup>[7]</sup> In various diseases like posterior fossa vascular malformation and tumors, the transmastoid branch is catheterized by repeated micro catheterization. Through this foramen also passes mastoid emissary vein.<sup>[8]</sup> This vein connects the suboccipital venous plexus to the sigmoid sinus. This can be a potential source of intense bleeding and air embolism during posterior fossa approaches. Dilated emissary vein can be a rare cause of vertigo.<sup>[9]</sup> Therefore the location and the position of the mastoid emissary foramina can be of utmost importance to the neurosurgeons approaching the structures passing through it. In one study multiple mastoid foramina were seen in a single Korean skull (1.5%) as seen in the present specimen. In another study the various average measurements of the mastoid emissary foramina were taken from asterion and mastoid tip.<sup>[6]</sup> These measurements were done to approach the mastoid emissary vein in endovascular procedures that involve sigmoid sinus.<sup>[4]</sup> The present rare variation can add to the knowledge of neurosurgeon about the

variation in the location and multiplicity of the mastoid foramina and the structures passing through it.

## CONCLUSION

The mastoid foramen is important because of the structures passing through it as these are usually approached surgically and are significant in posterior cranial fossa surgeries. The present specimen represented a rare variation in number of the mastoid foramina on both sides and an unusual bony canal between the left mastoid process and condylar part of left occipital bone. This can aid to the knowledge of the neurosurgeons and ENT surgeons operating in the mastoid region.

## REFERENCES

1. Williams PL, Warwick R, Dyson M, Bannister LH. External and Middle ear: In special senses. Gray's Anatomy, 40th Edn, Edinburgh: Churchill Livingstone.2008; 615.
2. Turgut HB, Anil A, Peker T, Pelin C, Sevim A. The incidence and localization of mastoid foramen and superficial parietomastoid canal and their relations with each other. Kaibogaku Zasshi. 1998; 73(3):223-31.
3. Kumar S, Sharma R, Goyal S, and Husain S. Occipital artery occlusion to facilitate transmastoid posterior fossa tumor embolization. J Neurosci Rural Pract. 2011; 2(2): 178-79.
4. Reis CV, Deshmukh V, Zabramski JM, Crusius M, Desmukh P, Spetzler RF, Preul MC. Anatomy of the mastoid emissary vein and venous system of the posterior neck region: neurosurgical implications. Neurosurg. 2007; 61(5):193-200.
5. Keskil S, Gözil R, Çalgüner E. Common surgical pitfalls in the skull. Surg Neurol. 2003; 59 (3):228-231.
6. Kim WS, Kim SI, Kim S, Zheng GD, Yang EJ, Han SR. Mastoid Foramen and Superficial Mastoid Canals of Korean Men. Korean J Phys Anthropol. 2000; 13(1):11-19.
7. Alvernia JE, Fraser K, Lanzino G. The occipital artery: A microanatomical study. Neurosurg. 2006; 58 (1)114-22.
8. Mortazavi MM, Shane Tubbs R, Riech S, Verma K, Shoja MM, Zurada A, Benninger B, Loukas M, Cohen Gadol AA. Anatomy and Pathology of the Cranial Emissary Veins: A Review With Surgical Implications. Neuro surg. 2012; 70 (5):1312-19.
9. Aisherhri H, Alqahtani, Alqahtani M. Case Report: Dilated petrosquamosal sinus, mastoid emissary vein and external jugular vein: a rare cause of pulsatile tinnitus, vertigo and sensorineural hearing loss. Ind J Otol. 2011; 17(3): 123-26.

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**How to cite this article:** Sehmi S. Bilateral Multiple Mastoid Foramina Along With a Unilateral Occipito Mastoid Canal in an Adult Skull of North Indian Origin-A Rare Variation. Acad. Anat. Int. 2018;4(1):11-13.

**Source of Support:** Nil, **Conflict of Interest:** None declared.