



**Fig. 1:** Underside of the skull, 2 Jugular foramina indicated (left side), measurements and a closer look (right side).

presenting an accuracy of 0.01 cm was used. Specimen inspection and examination was authorized by the Research Ethics Committee of the Democritus University of Thrace and the local Municipal Authorities.

## DISCUSSION

Various studies confirm that the diameter of the right sided JF is greater. This asymmetry provoked researchers to study foramina dominance and tried to connect JF size with skull capacity. Wysocki et al in 2006 noted that the case of right-sided domination exists, however, the correlation between the skull capacity and the size of both jugular foramina was negative. The larger the skull cavity, the less the asymmetry between foramina [3]. Cases of extreme asymmetry were reported, noted as anatomical variation or congenital defect most probably associated with excessive development of the jugular bulb and internal jugular vein [3-4]. Jugular tumors are rare cranial base lesions which are deeply located, requiring thus a challenging diagnosis and management with various micro-neurosurgery modalities. Lesions in the cerebellopontine angle cistern with a small projection into the jugular foramen, or a case of small intrajugular tumors, require a retrosigmoid suprajugular approach to the jugular foramen [5]. JF diameter and foramen volume had not been yet studied in relation with microsurgery accessibility and post-operative results.

**Epilogue:** Right sided JF is usually bigger in diameter and volume in comparison with the left one. However, no significant physiological or surgical importance is reported. Microsurgery of the skull base evolution may lead to novel techniques, rendering JF size as a significant factor for better surgical results.

## Conflicts of Interests: None

### Authors contributions

Conception and design TG, VA  
Writing of the manuscript TG  
Data collection TV, VA  
Supervision TV, FA

## REFERENCES

- [1]. Ayeni SA, Ohata K, Tanaka K, Hakuba A. The microsurgical anatomy of the jugular foramen. *J Neurosurg* 1995;83(5):903-909.
- [2]. Freitas CAF, Santos LRMD, Santos AN, Amaral Neto ABD, Brandão LG. Anatomical study of jugular foramen in the neck. *Braz J Otorhinolaryngol* 2020;86(1):44-48.
- [3]. Wysocki J, Reymond J, Skarzyński H, Wróbel B. The size of selected human skull foramina in relation to skull capacity. *Folia Morphol (Warsz)* 2006;65(4):301-308.
- [4]. Hatiboglu MT, Antil A. Structural variations in the jugular foramen of the human skull. *J Anat* 1992;180:191-196.
- [5]. Constanzo F, Gerhardt J, Ramina R. How I do it: retrosigmoid suprajugular approach to the jugular foramen. *Acta Neurochir (Wien)* 2019; 161(11):2271-2274.

**How to cite this article:** Tsoucalas G, Vasilopoulos A, Fiska A, Thomaidis V. An Enlarged Right Jugular Foramen. *Int J Anat Res* 2021;9(4):8179-8180. DOI: 10.16965/ijar.2021.181

## Case Report

# An Enlarged Right Jugular Foramen

Tsoucalas G \*, Vasilopoulos A, Fiska A, Thomaidis V.

Anatomy Department, School of Medicine, Democritus University of Thrace, Alexandroupolis, Greece.

### ABSTRACT

Jugular foramina are two openings in the base of the skull. Difference in diameter between two sides is noted, while right sided foramen is usually mentioned as the larger one. Rare cases have been reported with an enlarged jugular foramen. We report such a case with a right jugular foramen of a diameter 24mmX13mm. Microsurgery in the near future may exploit cases with greater openings.

**KEY WORDS:** Base of the skull, Dry bone, Microsurgery.

**Corresponding Author:** Gregory Tsoucalas, Profiti Helia str 3, 38500 PC, Nees Pagases Volos, Greece. E-Mail: [gregorytsoucalas@yahoo.gr](mailto:gregorytsoucalas@yahoo.gr)

Access this Article online	Journal Information
<b>Quick Response code</b>  DOI: 10.16965/ijar.2021.181	<b>International Journal of Anatomy and Research</b> ISSN (E) 2321-4287   ISSN (P) 2321-8967 <a href="https://www.ijmhr.org/ijar.htm">https://www.ijmhr.org/ijar.htm</a> DOI-Prefix: <a href="https://dx.doi.org/10.16965/ijar">https://dx.doi.org/10.16965/ijar</a> 
	Article Information
	Received: 11 Oct 2021 Peer Review: 12 Oct 2021 Revised: None
	Accepted: 14 Nov 2021 Published (O): 05 Dec 2021 Published (P): 05 Dec 2021

### INTRODUCTION

Jugular foramen (JF) is an opening in the base of the skull, which provides an exit for the intracranium structures, a transition zone between structures of the ear, posterior fossa and cervical region. On the other hand it provides an entrance in the case of neurosurgery for interventional practitioners to reach within the cranium volume. JF is located in the petrooccipital fissure formed by the junction of the petrous portion of the temporal bone of the skull and the lateral border of the occipital bone. To picture the exact anatomical relations of the JF in the area, we may note that it is placed lateral to the foramen magnum, posterior and medial to the base of the styloid process of the temporal bone, slightly lateral and posterior to the carotid canal and lateral to the hypoglossal nerve canal. A cluster of structures passes through JF, the internal jugular vein, the main venous drainage pathway of the brain, and three cranial nerves, the glossopharyngeal nerve or cranial nerve IX, the vagal nerve or cranial

nerve X and the accessory or cranial nerve XI, all create a complex area coloring JF's significance [1-2].

Important anatomical variations have been reported concerning JF lower opening, while a range of its diameter had been reported to be 2.8mm up to 13mm. According to various studies, this diameter is considered to be greater in the right side than in the left [2]. We present such a case discovered in a cadaveric skull.

### CASE REPORT

A cadaveric skull (dry bone) donated in the Laboratory Anatomy of the School of Medicine in Democritus University of Thrace was examined. JFs were studied, resulting in a rare finding of a highly enlarged right JF. The highest diameter of the lower opening of the right JF was calculated in 24 mm, while the smallest 13mm. Left side diameter was calculated in 14mm in its largest diameter and 8mm in its smallest [Figure 1]. For the measurements performed, a digital caliper