



ISSN 2674-8169



Latindex



DOI



SUPRATROCHLEAR FORAMEN OF THE HUMERUS: MORPHOLOGICAL AND MORPHOMETRIC CHARACTERIZATION IN A BRAZILIAN OSTEOLOGICAL SAMPLE AND CLINICAL IMPLICATIONS

Lucas Gabriel Mota Sousa¹; Leonardo Barbosa Eliodoro Fernandes²; Adryel Assunção Ramalho Leite³; José Aderval Aragão⁴



<https://doi.org/10.36557/2674-8169.2026v8n8p1074-1092>

Artigo recebido em 20 de Julho e publicado em 20 de Agosto de 2026

ARTIGO ORIGINAL

RESUMO

Introdução: O forame supratroclear do úmero (FST) é uma variação anatômica caracterizada pela comunicação entre as fossas coronóidea e olecraniana através do septo supratroclear. Sua identificação apresenta relevância anatômica, radiológica e ortopédica, particularmente na interpretação de imagens e no planejamento de procedimentos envolvendo a extremidade distal do úmero. **Objetivo:** Determinar a frequência do FST e caracterizar seus padrões morfológicos e parâmetros morfométricos em úmeros humanos secos. **Materiais e Métodos:** Estudo anatômico observacional, descritivo e quantitativo realizado em 62 úmeros adultos secos, sendo 35 esquerdos e 27 direitos. Os forames foram classificados morfologicamente como ovais, redondos, irregulares ou duplos. O diâmetro horizontal, vertical e a área foram mensurados digitalmente no software ImageJ®. **Resultados:** O FST foi identificado em 19/62 úmeros (30,64%), sendo 11 esquerdos e oito direitos. Houve predomínio da morfologia oval, seguida das formas redonda, dupla e irregular. Nos úmeros direitos, os valores médios dos diâmetros vertical e horizontal e da área foram, respectivamente, 0,374 cm, 0,495 cm e 0,187 cm²; nos esquerdos, 0,458 cm, 0,604 cm e 0,242 cm². O diâmetro horizontal predominou sobre o vertical em ambos os antímeros. **Conclusão:** O FST apresentou elevada frequência e expressiva variabilidade morfológica e morfométrica. Seu reconhecimento é relevante para a diferenciação de imagens radiolúcidas e para o planejamento de procedimentos ortopédicos e de fixação intramedular do úmero distal.

Palavras-chave: Úmero; Forame supratroclear; Variação anatômica; Morfometria; Fixação intramedular.

SUPRATROCHLEAR FORAMEN OF THE HUMERUS: MORPHOLOGICAL AND MORPHOMETRIC CHARACTERIZATION IN A BRAZILIAN OSTEOLOGICAL SAMPLE AND CLINICAL IMPLICATIONS

ABSTRACT

Introduction: The supratrochlear foramen (STF) of the humerus is an anatomical variation characterized by communication between the coronoid and olecranon fossae through the supratrochlear septum. Its identification is of anatomical, radiological, and orthopedic relevance, particularly for image interpretation and the planning of procedures involving the distal end of the humerus. **Objective:** To determine the frequency of the STF and characterize its morphological patterns and morphometric parameters in dry human humeri. **Materials and Methods:** This observational, descriptive, and quantitative anatomical study was conducted on 62 dry adult human humeri, comprising 35 left and 27 right specimens. The foramina were morphologically classified as oval, round, irregular, or double. Horizontal and vertical diameters and foramen area were digitally measured using ImageJ® software. **Results:** The STF was identified in 19 of 62 humeri (30.64%), including 11 left and eight right specimens. The oval morphology was the most prevalent, followed by the round, double, and irregular types. In right humeri, the mean vertical diameter, horizontal diameter, and area were 0.374 cm, 0.495 cm, and 0.187 cm², respectively; in left humeri, the corresponding values were 0.458 cm, 0.605 cm, and 0.242 cm². The horizontal diameter was greater than the vertical diameter on both sides. **Conclusion:** The STF showed a high frequency and considerable morphological and morphometric variability. Recognition of this anatomical variation is relevant for the differential interpretation of radiolucent findings and for planning orthopedic procedures and intramedullary fixation involving the distal humerus. **Keywords:** Humerus; Supratrochlear foramen; Anatomical variation; Morphometry; Intramedullary fixation.

Instituição afiliada

¹ Medical Student, Department of Medicine, Federal University of Sergipe (UFS), Aracaju, Sergipe, Brazil.

² Medical Student, Department of Medicine, Federal University of Sergipe (UFS), Aracaju, Sergipe, Brazil.

³ Medical Student, Department of Medicine, Federal University of Sergipe (UFS), Aracaju, Sergipe, Brazil.

⁴ Titular Professor of Clinical Anatomy, Department of Morphology, Federal University of Sergipe (UFS), Aracaju, Sergipe, Brazil.

Autor correspondente: José Aderval Araújo adervalufs@gmail.com

This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).



INTRODUCTION

The supratrochlear foramen (STF) of the humerus, first described by Meckel in 1825, as reported by Kate and Dubey (1970), is an anatomical variation located in the bony septum separating the coronoid and olecranon fossae at the distal end of the humerus. It is characterized by perforation of this septum, resulting in communication between the anterior and posterior aspects of the distal epiphysis of the bone. During development, this region is normally represented by a thin, translucent bony plate; however, in some individuals, complete perforation occurs, giving rise to the supratrochlear foramen (Singhal and Rao, 2007; Nayak et al., 2009). In general, individuals with this anatomical variation may exhibit hyperextension of the elbow joint (De Wilde et al., 2004).

In the literature, this anatomical variant has also been referred to as the supratrochlear aperture, intercondylar foramen, epitrochlear foramen, and septal aperture. Among these terms, some authors consider septal aperture to be more appropriate because it reduces terminological ambiguity and avoids confusion with the supratrochlear foramen of the orbit, which is a distinct anatomical structure (Diwan et al., 2013; Blakely et al., 1968).

The STF exhibits considerable morphological variability and may present as oval, circular, triangular, irregular, cribriform, or multiple openings. This anatomical diversity has important clinical and surgical implications. The presence of the foramen may reduce the thickness and mechanical strength of the supratrochlear septum, alter the configuration of the medullary cavity of the distal humeral shaft, and produce radiolucent findings on plain radiographs that may be mistakenly interpreted as osteolytic lesions, bone cysts, or metastatic lesions (Nayak et al., 2009). In addition, preoperative identification of the STF is essential for planning orthopedic procedures involving the distal end of the humerus, particularly supracondylar fractures treated with intramedullary fixation, because the presence of the foramen may influence the choice of surgical technique and implant positioning (Paraskevas et al., 2010).

The etiology of the STF remains controversial. The main proposed hypotheses include failure of the ossification process of the supratrochlear septum, bone remodeling secondary to repetitive hyperextension of the elbow, post-ossification

cortical atrophy, alterations in calcium metabolism, and reduced local vascularization resulting from mechanical stress (Chagas *et al.*, 2016). From an embryological perspective, this anatomical variation has been suggested to result from incomplete bone resorption or alterations in cortical remodeling of the intercondylar septum during skeletal development (Singhal and Rao, 2007). In addition, genetic factors have also been implicated, particularly those involving members of the T-box gene family, especially Tbx3. Overexpression of Tbx3 promotes cell proliferation while suppressing osteoblast differentiation, thereby inhibiting the formation of mineralized nodules and potentially contributing to limb malformations (Govoni *et al.*, 2009). During postnatal development, the supratrochlear septum remains intact and lined by synovial membrane until approximately seven years of age (Hirsh, 1927). Perforation of the septum occurs only after this period, suggesting that postnatal bone-remodeling mechanisms may play an important role in the formation of the foramen (Silva *et al.*, 2018).

Despite the growing anatomical and clinical interest in this variant, its frequency and morphological characteristics vary considerably among different populations, highlighting the need for regional studies that contribute to a better understanding of its anatomical diversity and clinical implications.

In this context, the present study aimed to determine the incidence of the supratrochlear foramen of the humerus in dry human bones and to characterize its morphological and morphometric features, with the purpose of expanding anatomical knowledge of this variant and providing clinically relevant information for radiological assessment and orthopedic practice.

MATERIALS AND METHODS

This study was designed as an observational, descriptive, and quantitative anatomical investigation conducted using specimens from the osteological collection of the Department of Morphology, Federal University of Sergipe (UFS), Brazil.

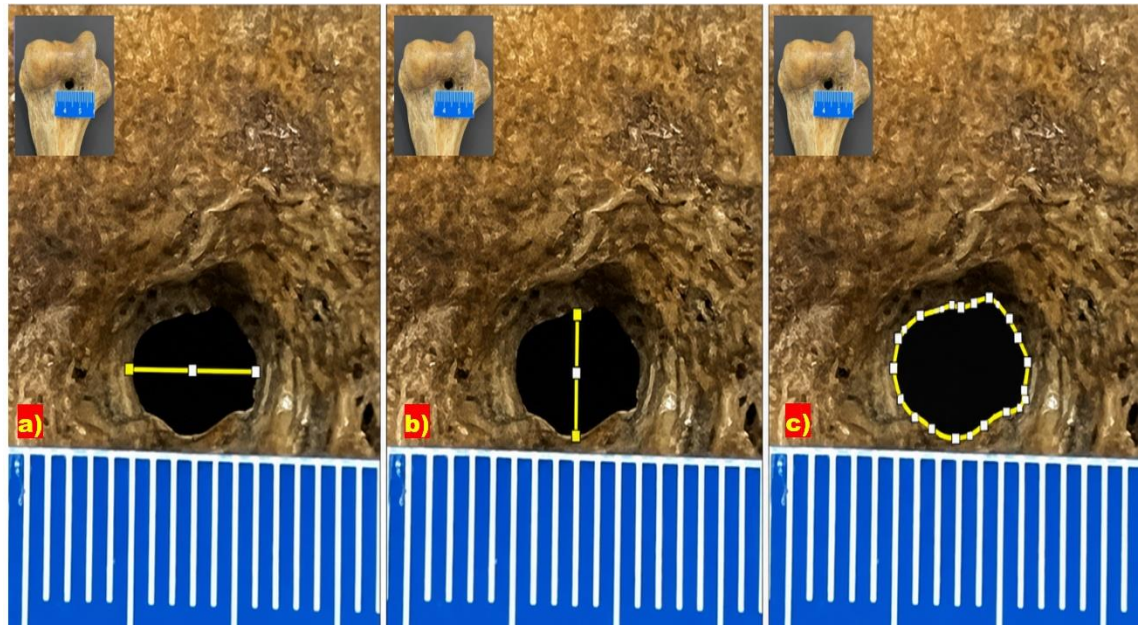
The sample comprised 62 dry human humeri, including 35 left and 27 right specimens. Specimens showing evidence of fractures, erosions, deformities, or degenerative changes that could compromise the integrity of the supratrochlear septum or interfere with morphometric measurements were excluded from the analysis.

Photographic documentation was performed using an iPhone 12 smartphone (Apple Inc., Cupertino, CA, USA) equipped with a 12-megapixel wide-angle camera (f/1.6 aperture), an image resolution of 4032 × 3024 pixels, and optical image stabilization. To standardize image acquisition, all specimens were positioned in posterior view against a non-reflective matte black background, providing high contrast between the bone surface and the background. The camera was maintained perpendicular to the plane of analysis and at a constant distance from the specimens to minimize perspective distortion and ensure image reproducibility. A millimeter ruler was positioned in the same anatomical plane as the humerus in all photographs, allowing spatial calibration of the images and standardization of the morphometric analyses.

Morphometric analyses were performed using ImageJ® software (National Institutes of Health, Bethesda, MD, USA). Each image was initially calibrated using the scale provided by the millimeter ruler. The contour of the supratrochlear foramen was then manually delineated using the software selection tools, enabling automatic calculation of the morphometric variables. Measurements were performed in duplicate by a single previously trained examiner, and the mean of the two measurements was used to minimize measurement error and improve data reproducibility.

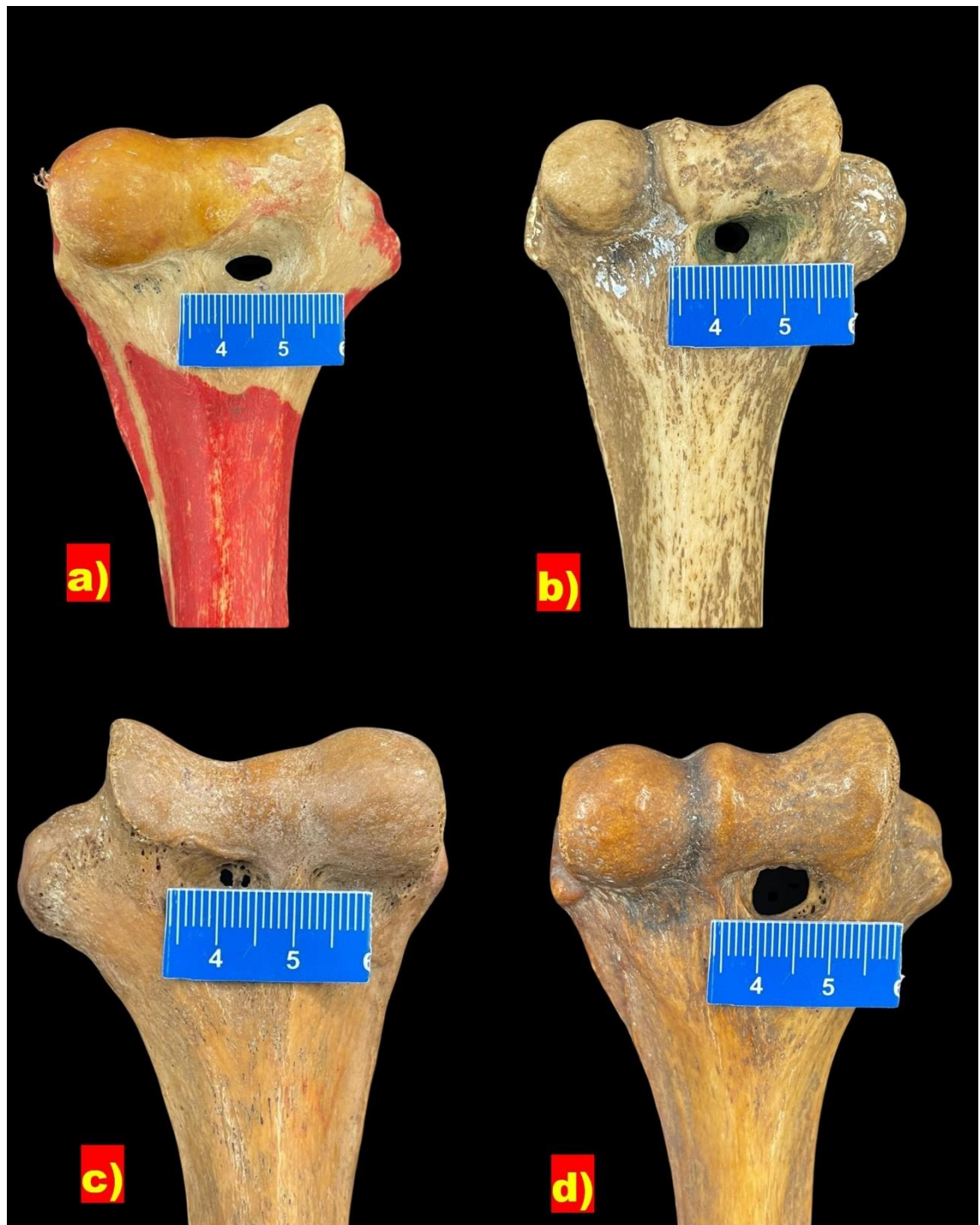
Three morphometric parameters of the foramen were assessed (**Figure 1**): horizontal diameter (HD), defined as the greatest distance between the medial and lateral margins (**Figure 1a**); vertical diameter (VD), corresponding to the greatest distance between the proximal and distal margins, measured perpendicular to the HD (**Figure 1b**); and area (A), defined as the surface enclosed by the internal contour of the foramen and expressed in square centimeters (cm²) (**Figure 1c**).

Figure 1. Morphometric parameters used for evaluation of the supratrochlear foramen.



Regarding morphology, the supratrochlear foramina (STFs) were assessed by visual inspection and classified into four types according to the configuration of their margins (**Figure 2**): oval, when the opening exhibited an elliptical outline, with one diameter greater than the other (**Figure 2a**); round, when it displayed an approximately circular shape (**Figure 2b**); double, characterized by the presence of two distinct and independent foramina within the same supratrochlear septum (**Figure 2c**), with each opening assessed individually according to its morphology; and irregular, when the foramen exhibited an asymmetric outline or a configuration that did not meet the criteria established for the other categories (**Figure 2d**).

Figure 2. Morphological types of the supratrochlear foramen



RESULTS

The STF was identified in 19 of the 62 humeri analyzed, corresponding to an incidence of 30.64%. Regarding side distribution, 11 cases (57.9%) were observed in left humeri and eight (42.1%) in right humeri.

Morphological classification of the STF showed a predominance of the oval type, followed by the round, double, and irregular types.

Morphometric analysis of the supratrochlear foramen revealed slight differences between sides. In right humeri, the mean vertical and horizontal diameters were 0.374 cm and 0.495 cm, respectively, with a mean area of 0.187 cm². In left humeri, the corresponding mean values were 0.458 cm for the vertical diameter, 0.605 cm for the horizontal diameter, and 0.242 cm² for the area.

Regarding morphology, the oval type predominated on both sides. Among right humeri, three specimens exhibited an oval foramen, four a round foramen, and one a double foramen. Among left humeri, seven oval, three round, and one irregular foramen were identified. Individual morphological and morphometric data are presented in **Tables 1** and **2**.

Table 1. Morphological distribution and morphometric measurements of the supratrochlear foramen in right humeri.

Humerus	Morphological type	VD (cm)	HD (cm)	Area (cm ²)
1	Double — Oval	Medial: 0.227 Lateral: 0.173	Medial: 0.167 Lateral: 0.101	Medial: 0.03 Lateral: 0.015
2	Oval	0.353	0.606	0.196
3	Round	0.438	0.584	0.211
4	Oval	0.349	0.797	0.251
5	Round	0.515	0.573	0.231
6	Round	0.302	0.301	0.077
7	Oval	0.732	1.116	0.629
8	Round	0.280	0.210	0.049
Mean	-	0.374	0.495	0.187

Table 2. Morphological distribution and morphometric measurements of the supratrochlear foramen in left humeri.

Humerus	Morphological type	VD (cm)	HD (cm)	Area (cm ²)
1	Oval	0.270	0.435	0.093
2	Oval	0.338	0.704	0.190
3	Oval	0.404	0.587	0.196
4	Oval	0.434	0.748	0.256
5	Round	0.456	0.491	0.177
6	Irregular	0.671	0.759	0.452
7	Oval	0.713	1.046	0.588
8	Oval	0.407	0.718	0.267
9	Round	0.287	0.291	0.070
10	Round	0.532	0.580	0.256
11	Oval	0.526	0.292	0.116
Mean	-	0.458	0.605	0.242

Overall, morphometric analysis according to morphological classification, irrespective of side, showed that irregular foramina had the highest mean values for area (0.452 cm²), horizontal diameter (0.759 cm), and vertical diameter (0.671 cm). Oval foramina exhibited intermediate values (area: 0.279 cm²; horizontal diameter: 0.705 cm; vertical diameter: 0.453 cm), whereas round foramina showed smaller dimensions (area: 0.153 cm²; horizontal diameter: 0.433 cm; vertical diameter: 0.401 cm). The single specimen classified as double exhibited the smallest morphometric measurements, with a mean area of 0.023 cm², horizontal diameter of 0.134 cm, and vertical diameter of 0.200 cm, calculated from the mean measurements of both foramina (**Table 3**).

Table 3. Distribution of mean area, horizontal diameter, and vertical diameter of the supratrochlear foramina according to morphological classification.

Morphological type	Area (cm ²)	HD (cm)	VD (cm)
Oval	0.279	0.705	0.453
Round	0,153	0,433	0.401
Irregular	0.452	0.759	0.671
*Double	0.023	0.134	0.200

* Values represent the mean measurements of both foramina.

DISCUSSION

The incidence of the supratrochlear foramen (STF) observed in the present study was 30.64%, placing it among the higher frequencies reported in the literature and indicating that this anatomical variation is not uncommon in the Brazilian osteological sample examined. The frequency found in our study is comparable to those reported in Central Indian (31.3%), Xhosa (Africa) (33%), and Indian populations overall (34.4%). Conversely, it is higher than the frequencies reported in Greek (0.304%), White American (4.2%), Turkish (8.6%), and Chinese (17.5%) populations, but lower than those described in certain African groups, such as the Sotho population (41%), and in Indigenous populations from Arkansas, in whom an incidence of 58% has been reported (Table 4).

Table 4. Frequency of the supratrochlear foramen in different populations.

Author/Year	Population	Frequency (%)
Papaloucas et al., (2011)	Greek	0.304
Hirsh, (1927)	White Americans	4.2
Koyun et al., (2011)	Turkish	8.6
Erdoğan et al., (2014)	Turkish	10.8
Ming-Tzu, (1935)	Chinese	17.5

Author/Year	Population	Frequency (%)
Raghavendra et al., (2014)	Indian	19.2
Krishnamurthy et al., (2011)	Indian	23.0
Diwan et al., (2013)	North Indian	24.1
Mathew et al., (2016)	South Indian	24.5
Sunday et al., (2014)	Nigerian	27.7
Singhal and Rao, (2007)	South Indian	28.0
Ananthi et al., (2011)	Indian	31.3
Ndou et al., (2013)	Xhosa (Africa)	33.0
Nayak et al., (2009)	Indian	34.4
Ndou et al., (2013)	Zulus (Africa)	37.0
Ndou et al., (2013)	Tswanas (Africa)	39.0
Ndou et al., (2013)	Sotho (Africa)	41.0
Hirsh, (1927)	Indigenous population of Arkansas	58.0
Present study	Brazilian	30.64

This wide variation indicates that the occurrence of the STF has an important population-related component and may be influenced by genetic, ethnic, and environmental factors, as previously reported by Mathew et al. (2016).

With regard to morphology, the oval type predominated, followed by the round, irregular, and double types. This finding is consistent with the results reported by Arunkumar et al. (2015), Chagas et al. (2016), Coşkun et al. (2023), and Valente et al. (2023), who likewise identified the oval type as the predominant morphological

configuration of the STF. This predominance suggests that remodeling of the supratrochlear septum may preferentially occur along its greater transverse axis, a hypothesis supported by the finding that the horizontal diameter was greater than the vertical diameter in most of the specimens analyzed.

The presence of a specimen classified as having a double foramen represents an uncommon morphological finding. Unlike the cribriform (“sieve-like”) pattern described by Mathew *et al.* (2016), which is characterized by multiple small perforations, the present study identified only two distinct and independent openings separated by a central bony remnant. Although rarely described, this configuration broadens the morphological spectrum of the STF and further emphasizes the considerable anatomical variability of this structure.

From an embryological and morphogenetic perspective, the irregular and double patterns may represent different stages in the remodeling process of the supratrochlear septum. Anatomical studies have shown that this region is initially formed by a thin, often translucent bony plate, which may undergo progressive perforation as a result of resorption of the bony trabeculae separating the coronoid and olecranon fossae (Erdoğan et al., 2014). Accordingly, the persistence of bony trabeculae traversing the foramen, as observed in the double-foramen specimen, may reflect incomplete resorption of the bony septum, a hypothesis consistent with the mechanisms proposed for the formation of the supratrochlear foramen (Hirsh, 1927; Kate and Dubey, 1970). This hypothesis provides a plausible explanation for the coexistence of different morphological patterns observed in the study sample.

The clinical implications of the STF deserve particular attention. From a radiological perspective, its presence produces a radiolucent area at the distal end of the humerus that, if unrecognized by the examiner, may be misinterpreted as an osteolytic lesion, bone cyst, or metastatic focus, potentially leading to unnecessary diagnostic investigations. Therefore, awareness of this anatomical variant is essential to avoid misinterpretation during evaluation by conventional radiography and computed tomography.

In orthopedic practice, several studies have demonstrated an association between the presence of the STF and a reduced diameter of the distal humeral

medullary canal (Paraskevas *et al.*, 2010; Chhabra *et al.*, 2023). This anatomical feature may directly affect surgical planning for supracondylar and humeral shaft fractures, particularly during intramedullary nail insertion, and therefore requires careful preoperative assessment of the local anatomy. Accordingly, knowledge of this anatomical variant is relevant not only from a morphological standpoint, but also for diagnostic interpretation and therapeutic planning.

Despite the relatively high frequency observed, several limitations should be acknowledged. The absence of information regarding the sex, age, and ancestry of the specimens precluded investigation of potential associations between these variables and the occurrence of the STF. In addition, the study was conducted using a regional osteological collection, which limits the generalizability of the findings to the broader Brazilian population. Nevertheless, the use of standardized digital measurements obtained with ImageJ® software provided reliable morphometric assessment and enabled a detailed characterization of the different anatomical configurations of the foramen.

Taken together, the findings of the present study indicate that the supratrochlear foramen is a relatively frequent anatomical variant in the Brazilian osteological sample examined, characterized by considerable morphological variability and relevant anatomical, radiological, and orthopedic implications. The observed frequency, together with the predominance of the oval pattern and the identification of a rare double variant, expands current knowledge of the morphological diversity of this structure and provides clinically relevant information for anatomists, radiologists, and orthopedic surgeons. This heterogeneity, summarized in **Table 1**, highlights the absence of a universal pattern and supports the hypothesis that MHB is a multifactorial trait influenced by genetic, environmental, and functional factors (Jidoi *et al.*, 2000; Eroğlu, 2011).

CONCLUSION

The present study demonstrated that the supratrochlear foramen of the humerus is a relatively frequent anatomical variant in the sample examined, with an incidence of 30.64%. The oval configuration predominated, and considerable morphological and



morphometric variability was observed, including the identification of a rare specimen with a double-foramen configuration.

From a clinical perspective, recognition of this anatomical variant is essential to avoid radiological misinterpretation on imaging examinations, particularly confusion with osteolytic lesions, and to support the planning of orthopedic procedures involving the distal end of the humerus, especially osteosynthesis using intramedullary fixation. Therefore, these findings contribute to the anatomical, radiological, and surgical understanding of the supratrochlear foramen and reinforce the importance of its recognition in both clinical practice and anatomical research.

FUNDING

This research did not receive any specific funding from funding agencies in the public, commercial, or not-for-profit sectors.

CONFLICT OF INTERESTS

The authors declare no conflict of interests.

ACKNOWLEDGMENTS

We thank Marcelo Diaz Nascimento, Gladson Gomes de Souza, and Luís Henrique Santos Fortes, anatomy laboratory technicians in the Federal University of Sergipe, for their support in preparing the cadavers, since without their collaboration, this work could not have been accomplished. The authors wish to sincerely thank those who donated their bodies to science so that anatomical re-search could be carried out. The results of this research can potentially improve patient care and increase the overall knowledge of humanity. Therefore, these donors and their families deserve our utmost

gratitude. The authors have reviewed and edited the output and take full responsibility for the content of this publication.

REFERENCES

Ananthi K, Manickam S, Vaithianathan G, Aruna S, Ramalingam R. Study of intercondyloid foramen of humerus. *Rev Argent Anat Clin.* 2011;3(1):32-6. doi: 10.31051/1852.8023.v3.n1.13911.

Arunkumar KR, Manoranjitham R, Raviraj K, Dhanalakshmi V. Morphological study of supratrochlear foramen of humerus and its clinical implications. *Int J Anat Res.* 2015;3(3):1321-5. doi: 10.16965/ijar.2015.233.

Blakely RL, Marmouze RJ, Wynne DD. The incidence of the perforation of the coronoid-olecranon septum in the middle mississippian population of Dickson Mounds, Fulton County, Illinois. *Proceedings of the Indiana Academy of Science* 1968;78:73-82.

Chagas CA, Gutfitzen-Schlesinger G, Leite TF, Pires LA, Silva JG. Anatomical and Radiological Aspects of the Supratrochlear Foramen in Brazilians. *J Clin Diagn Res.* 2016 Sep;10(9):AC10-AC13. doi: 10.7860/JCDR/2016/21846.8503.

Chhabra PK, Yadav S, Jangir RK, Mehta R, Anand M. The Impact of Supratrochlear Foramen on Humeri's Medullary Canal Diameter and Its Surgical Implications. *Cureus.* 2023 Aug 21;15(8):e43864. doi: 10.7759/cureus.43864.

Coşkun ZK, Erkaya A, Kuçlu T, Peker TV, Baran Aksakal FN. Morphological evaluation and clinical significance of the supracondylar process and supratrochlear foramen: an anatomic and radiological study. *Folia Morphol (Warsz).* 2023;82(4):869-874. doi: 10.5603/FM.a2022.0090.

De Wilde V, De Maeseneer M, Lenchik L, Van Roy P, Beeckman P, Osteaux M. Normal osseous variants presenting as cystic or lucent areas on radiography and CT imaging: a



pictorial overview. Eur J Radiol. 2004 Jul;51(1):77-84. doi: 10.1016/S0720-048X(03)00180-3.

Diwan RK, Rani A, Rani A, Chopra J, Srivastava AK, Sharma PK, Verma RK, Pankaj AK. Incidence of supratrochlear foramen of humerus in North Indian population. Biomed Res. 2013;24(1):142-5.

Erdogmus S, Guler M, Eroglu S, Duran N. The importance of the supratrochlear foramen of the humerus in humans: an anatomical study. Med Sci Monit. 2014 Dec 13;20:2643-50. doi: 10.12659/MSM.892074.

Govoni KE, Linares GR, Chen ST, Pourteymoor S, Mohan S. T-box 3 negatively regulates osteoblast differentiation by inhibiting expression of osterix and runx2. J Cell Biochem. 2009 Feb 15;106(3):482-90. doi: 10.1002/jcb.22035.

Hirsh IS. The supratrochlear foramen: clinical and anthropological considerations. Am J Surg. 1927;2(5):500-5. doi: 10.1016/S0002-9610(27)90533-9.

Kate BR, Dubey PN. A note on the septal apertures in the humerus of Central Indians. East Anthropol. 1970;33:105-10.

Koyun N, Aydinlioğlu A, Gümrukçüoğlu FN. Aperture in coronoid-olecranon septum: A radiological evaluation. Indian J Orthop. 2011 Sep;45(5):392-5. doi: 10.4103/0019-5413.83945.

Krishnamurthy A, Yelicharla AR, Takkalapalli A, Munishamappa V, Bovinndala B, Chandramohan M. Supratrochlear foramen of humerus: a morphometric study. Int J Biol Med Res. 2011;2(3):829-31.

Mathew AJ, Gopidas GS, Sukumaran TT. A Study of the Supratrochlear Foramen of the Humerus: Anatomical and Clinical Perspective. J Clin Diagn Res. 2016 Feb;10(2):AC05-8. doi: 10.7860/JCDR/2016/17893.7237.



Ming-Tzu PA. Septal apertures in the humerus in the Chinese. American Journal of Physical Anthropology. 1935 Jul;20(2):165-70.

Nayak SR, Das S, Krishnamurthy A, Prabhu LV, Potu BK. Supratrochlear foramen of the humerus: an anatomico-radiological study with clinical implications. Ups J Med Sci. 2009;114(2):90-4. doi: 10.1080/03009730802688819.

Ndou R, Smith P, Gemell R, Mohatla O. The supratrochlear foramen of the humerus in a South African dry bone sample. Clin Anat. 2013 Oct;26(7):870-4. doi: 10.1002/ca.22132.

Papaloucas C, Papaloucas M, Stergioulas A. Rare cases of humerus septal apertures in Greeks. Trends Med Res. 2011;6(3):178-83.

Paraskevas GK, Papaziogas B, Tzaveas A, Giaglis G, Kitsoulis P, Natsis K. The supratrochlear foramen of the humerus and its relation to the medullary canal: a potential surgical application. Med Sci Monit. 2010 Apr;16(4):BR119-123.

Raghavendra K, Reddy YAK, Shirol VS, Dixit D, Desai SP. Morphometric analysis of septal aperture of humerus. Int J Med Res Health Sci. 2014;3(2):269-72. doi: 10.5958/j.2319-5886.3.2.058.

Silva FA, Silva TS, Souza PRFB, Reis RS, Ferreira MRS, Magalhães CP. Morphological and morphometric study of the supratrochlear foramen. J Morphol Sci. 2018;35(1):54-7. doi: 10.1055/s-0038-1660487.

Singhal S, Rao V. Supratrochlear foramen of the humerus. Anat Sci Int. 2007 Jun;82(2):105-7. doi: 10.1111/j.1447-073X.2007.00172.x.

Sunday OO, Olusegun OS, Oluwabunmi BM. The supratrochlear foramen of the humerus: implications for intramedullary nailing in distal humerus. J Biol Agric Healthc. 2014;4(7):136-9.

Valente TJMBS, Galvão IFG, Soares ACC, Diógenes LL, Medeiros CBA, Campina RCF,



Supratrochlear foramen of the humerus: morphological and morphometric characterization in a brazilian osteological sample and clinical implications.

Mota Sousa *et. al.*

Pacífico FA. Forame supratroclear: morfologia e implicações clínico-cirúrgicas. An Fac Med Olinda. 2023;1(10):12-21. doi: 10.56102/afmo.2023.277.