

# GEORGIAN MEDICAL NEWS

---

ISSN 1512-0112

NO 1 (370) Январь 2026

---

ТБИЛИСИ - NEW YORK



ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии  
საქართველოს სამედიცინო სიახლენი

Ahmed Mohammed Ibrahim, Arwa Riyadh Khalil Albarhawi, Samar Saleh Saadi. ASSOCIATION PROPERTIES OF COMPLETE BLOOD COUNT FOR LEVELS OF THYROID STIMULATING HORMONE.....	123-129
Tuleubayev B.E, Makhatov B.K, Vinokurov V.A, Kamyshanskiy Ye.K, Kossilova Ye.Y. OSTEOREGENERATIVE POTENTIAL AND REMODELING OF A COMPOSITE BASED ON NANOFIBRILLATED CELLULOSE, XENOGRAFT, AND BUTVAR-PHENOLIC ADHESIVE: A HISTOLOGICAL STUDY UNDER NORMAL AND INFECTED BONE WOUND CONDITIONS.....	130-143
Zhanat Toxanbayeva, Nyshanbay Konash, Muhabbat Urunova, Zhamila Dustanova, Sveta Nurbayeva, Sabina Seidaliyeva. GC-MS PROFILING OF THE LIPOPHILIC FRACTION AND ACUTE SAFETY ASSESSMENT OF THE AQUEOUS EXTRACT OF <i>SCUTELLARIASUBCAESPITOSA</i> .....	144-152
Karen Martik Hambarzumyan, Rafael Levon Manvelyan. CHANGES IN LOWER LIMB FUNCTIONAL ACTIVITY AND TREATMENT OUTCOMES IN PATIENTS WITH PERIPHERAL ARTERIAL DISEASE FOLLOWING THE APPLICATION OF STANDARD AND MODIFIED TREATMENT PROTOCOLS. A COMPARATIVEANALYSIS.....	153-159
Asmaa Abdulrazaq Al-Sanjary. SALINE INFUSION SONOGRAPHY IN EVALUATION OF SUBFERTILE WOMEN AND ITS EFFECT ON REPRODUCTIVE OUTCOME.....	160-166
Nino Buadze, Maia Turmanidze, Paata Imnadze, Nata Kazakashvili. IMPACT OF THE COVID-19 PANDEMIC ON THE SURVEILLANCE OF INFECTIOUS DISEASES: ASSESSMENT OF THE LEPTOSPIROSIS SURVEILLANCE SYSTEM IN THE ADJARA REGION (2020–2024).....	167-174
Nurlan Urazbayev, Ruslan Badyrov, Nurkassi Abatov, Alyona Lavrinenko, Yevgeniy Kamyshanskiy, Ilya Azizov. EXPERIMENTAL EVALUATION OF TISSUE RESPONSE TO IMPLANT MATERIALS UNDER <i>ESCHERICHIA COLI</i> CONTAMINATION.....	175-184
Abdulaev M-T.R, Kachikaeva L.T, Murtuzaliev Z.R, Khokhlova M.S, Badalian M.A, Tskaev T.A, Abdulkhalikov A.E, Arutiunian N.A, Rustamov M.T, Yakhyaev R.S, Chuenkova T.S, Zolfaghari Yousef. THE ROLE OF SURGICAL INTERVENTION IN THE MULTIMODAL TREATMENT OF BREAST CANCER IN OLDER WOMEN.....	185-187
Ahmed Abdulraheem Ibrahim Dahy, Mohanad Luay Jawhar, Baraa Ahmed Saeed, Noor Yahya Muneer, Anwer Jaber Faisal. IMPACT OF GINGER SUPPLEMENTATION ON BLOOD PRESSURE AND GLUCOSE LEVELS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND CARDIOVASCULAR DISEASE.....	188-192
Marwan Ismail, Mutaz Ibrahim Hassan, Mosab Khalid, Jaborova Mehroba Salomudinovna, Assiya Gherdaoui, Majid Alnaimi, Raghda Altamimi, Mahir Khalil Jallo, Iriskulov Bakhtiyar Uktamovich, Shukurov Firuz Abdufattoevich, Shawgi A. Elsiddig, Ramprasad Muthukrishnan, Kandakurthi Praveen Kumar, Elryah I Ali, Asaad Babker, Abdelgadir Elamin, Srija Manimaran. DIFFERENTIAL ASSOCIATIONS BETWEEN PHYSICAL ACTIVITY AND GLYCEMIC CONTROL ACROSS BODY MASS INDEX IN TYPE 2 DIABETES: A COMPARATIVE ANALYSIS OF HBA1C AND FRUCTOSAMINE.....	193-199
Ketevan Tsanova, Malvina Javakhadze, Ekaterine Tcholdadze, Lia Trapaidze, Tamar Sokolova, Gvantsa Kvariani. SEVERE TOXIC EPIDERMAL NECROLYSIS COMPLICATED BY ACUTE KIDNEY INJURY: DIAGNOSTIC AND THERAPEUTIC CONSIDERATIONS.....	200-204
Torgyn Ibrayeva, Assel Iskakova, Togzhan Algazina, Gulnar Batpenova, Dinara Azanbayeva, Gulnaz Tourir, Issa Emir Ardakuly, Aizhan Shakhanova. ECZEMA AND TRANSEPIDERMAL MOISTURE LOSS: A SYSTEMATIC REVIEW AND META-ANALYSIS (REVIEW).....	205-212
Kalashnik-Vakulenko Yu, Kostrovskiy O, Aleksandruk N, Makaruk O, Kudriavtseva T.O, Lytovska O, Leliuk O, Alekseeva V. ANATOMICAL FEATURES OF THE CAROTID ARTERIES, OPHTHALMIC NERVES, MANDIBULAR NERVE AND EXTRAOCULAR ARTERY BASED ON MULTISLICE COMPUTED TOMOGRAPHY (MSCT) DATA.....	213-218
Rigvava Sophio, Kusradze Ia, Karumidze Natia, Kharebava Shorena, Tchgonia Irina, Tatrishvili Nino, Goderdzishvili Marina. PREVALENCE, PHYLOGENETIC DIVERSITY, AND ANTIMICROBIAL RESISTANCE OF UROPATHOGENIC <i>ESCHERICHIA COLI</i> IN GEORGIA.....	219-227
Babchuk O.G, Gulbs O.A, Lantukh I.V, Kobets O.V, Ponomarenko V.V, Lytvynova I.L, Lukashevych N.M, Minin M.O, Rogozhan P.Y, Pustova N.O. PECULIARITIES OF THE DEVELOPMENT OF THE PSYCHOLOGICAL STATE OF MEDICAL STUDENTS AND LAW ENFORCEMENT UNIVERSITYCADETS.....	228-233
Kirill I. Seurko, Roman A. Sokolov, Alexandr N. Kosenkov, Elena V. Stolarchuk, Kseniya I. Seurko, Elena N. Belykh, Mikhail I. Bokarev, Magomed E. Shakhbanov, Alexandr I. Mamykin, Andrew I. Demyanov, Omari V. Kanadashvili. LEFT HEMICOLECTOMY IN PATIENTS WITH COLORECTAL CANCER: SURGICAL VIEW ON INFERIOR MESENTERIC ARTERY ANATOMYVARIABILITY.....	234-242
Pere Sanz-Gallen, Inmaculada Herrera-Mozo, Beatriz Calvo-Cerrada, Albert Sanz-Ribas, Gabriel Martí-Amengual. OCCUPATIONAL ALLERGIC DERMATITIS IN METALWORKERS.....	243-249
Erkin Pekmezci, Songül Kılıç, Hakan Sevinç, Murat Türkoğlu. THE EFFECTS OF <i>ROSMARINUS OFFICINALIS</i> ON VEGF AND IL-1 $\alpha$ GENE EXPRESSIONS IN HACAT CELLS: UNRAVELING ITS MECHANISM OF ACTION IN WOUND HEALING AND HAIR LOSS.....	250-254

## ANATOMICAL FEATURES OF THE CAROTID ARTERIES, OPHTHALMIC NERVES, MANDIBULAR NERVE AND EXTRAOCULAR ARTERY BASED ON MULTISLICE COMPUTED TOMOGRAPHY (MSCT) DATA

Kalashnik-Vakulenko Yu<sup>1</sup>, Kostrovskiy O<sup>2</sup>, Aleksandruk N<sup>3</sup>, Makaruk O<sup>4</sup>, Kudriavtseva T.O<sup>5</sup>, Lytovska O<sup>1</sup>, Leliuk O<sup>1</sup>, Alekseeva V<sup>1,5</sup>.

<sup>1</sup>Kharkiv National Medical University, Kharkiv, Ukraine.

<sup>2</sup>Department of Otorhinolaryngology Zaporizhzhia State Medical and Pharmaceutical University Zaporizhzhya, Ukraine.

<sup>3</sup>Department of Otorhinolaryngology, Head and Neck Surgery, Ivano-Frankivsk National Medical University, Ukraine.

<sup>4</sup>Department of Oncology and Surgery, Otolaryngology SO «Grigoriev Institute for Medical Radiology and Oncology of the National Academy of Medical Sciences of Ukraine».

<sup>5</sup>Kharkiv International Medical University, Kharkiv, Ukraine.

### Abstract.

**Introduction:** Anatomical variability of cranial neurovascular structures presents significant challenges in surgical planning and diagnostic interpretation. Multislice Computed Tomography (MSCT) offers detailed imaging of these structures, facilitating accurate morphometric analysis and spatial understanding critical to clinical interventions.

**Objective:** To analyze the anatomical features and variations of the internal carotid arteries, optic and ophthalmic nerves, mandibular nerve, and extraocular (ophthalmic) artery based on high-resolution MSCT imaging data.

**Materials and Methods:** This retrospective study evaluated 400 MSCT scans performed using a Toshiba Aquilion 64-slice scanner. Image analysis included multiplanar reconstructions and 3D modeling using RadiAnt DICOM Viewer. Measurements focused on ICA diameter and proximity to the sphenoid sinus, optic canal integrity, mandibular canal course and size, and traceability of the ophthalmic artery. Statistical analysis was performed using SPSS v26 with significance set at  $p < 0.05$ .

### Results:

1. ICA was adjacent to the sphenoid sinus in 97% of cases; dehiscence occurred in 11%.
2. Optic canal dehiscence was found in 13.5%, with average diameter of  $3.7 \pm 0.5$  mm.
3. Mandibular canal showed 9% asymmetry; mean diameter was  $2.9 \pm 0.4$  mm.
4. Ophthalmic artery was visualized in 78% of scans; mean diameter  $1.5 \pm 0.2$  mm.

Significant interindividual variability was noted across all structures.

**Conclusion:** MSCT is an effective tool for evaluating cranial neurovascular anatomy. Frequent anatomical variations such as ICA dehiscence and mandibular canal asymmetry underscore the need for individualized imaging assessment in preoperative planning. The high resolution of MSCT allows reliable visualization of fine neurovascular details, enhancing safety in head and neck surgery.

**Key words.** MSCT, internal carotid artery, optic nerve, ophthalmic artery, mandibular nerve, anatomical variation.

### Introduction.

The advancement of diagnostic imaging techniques, particularly Multislice Computed Tomography (MSCT), has

revolutionized the anatomical study of cranial structures [1]. The ability to visualize and evaluate the individual anatomical variability of complex neurovascular formations such as the carotid arteries, ophthalmic and optic nerves, mandibular nerve, and extraocular arteries has deepened our understanding of normal and pathological anatomy [2]. These structures, located in regions of high surgical risk, require precise imaging for planning interventions and avoiding iatrogenic complications [3].

The internal carotid artery (ICA) plays a crucial role in cerebral perfusion and is intimately related to the sphenoid sinus and optic canal with ophthalmic artery inside, making it highly susceptible to surgical trauma during transnasal endoscopic procedures. Similarly, the optic nerve and its associated ophthalmic vasculature pass through narrow bony canals, often dehiscent or thinned, which may not be apparent without high-resolution imaging [4,5]. The mandibular nerve, a branch of the trigeminal nerve (CN V3), passes through the foramen ovale and mandibular canal, and is significant in both maxillofacial surgery and dental procedures. Variations in its course or canal morphology, Variations in canal morphology, such as bifid or trifid canals, can lead to complications in anaesthesia or nerve injury during interventions [6].

In addition, the ophthalmic artery [5] branching from the ICA and supplying the orbit is a vital structure in orbital and skull base surgery. Its traceability and relation to adjacent structures can be accurately visualized on MSCT. Traditional anatomical studies often relied on cadaveric dissection, which, despite its value, is limited by specimen variability, postmortem changes, and inability to represent dynamic or living tissue density. MSCT, however, offers a reproducible, non-invasive, and quantitative modality capable of evaluating bone and vascular relationships in high detail [8].

The original MSCT-based morphometric dataset used in this study originates from a comprehensive anatomical evaluation of the paranasal sinuses and adjacent neurovascular structures [9]. This dataset was acquired under controlled imaging protocols and serves as a reliable foundation for in-depth analysis of key cranial structures, including the carotid arteries, optic and ophthalmic nerves, mandibular nerve, and extraocular artery [10,11]. Its application in this study supports the broader goal of correlating radiological findings with clinically significant anatomical variations, thereby enhancing surgical planning in

fields such as neurosurgery, otolaryngology, ophthalmology, and oral and maxillofacial surgery [12-14].

According to everything was mentioned above the aim of our work was to analyze and describe the anatomical features of the carotid arteries, ophthalmic and optic nerves, mandibular nerve, and extraocular arteries using original MSCT data obtained from a morphometric study of paranasal sinuses.

## Materials and Methods.

The study was approved by the Bioethics Committee of Kharkiv National Medical University (Protocol No. 5, November 11, 2018). Written informed consent was obtained from all participants prior to inclusion in the study.

A total of 400 spiral computed tomography (SCT or MSCT) scans were examined in this retrospective morphometric study. The cohort included both male and female individuals of various age groups, without known craniofacial pathology. All examinations were performed without intravenous contrast administration. Visualization of the ophthalmic artery was assessed on high-resolution non-contrast MSCT using thin-slice reconstructions (0.5–0.75 mm) and optimized bone and soft tissue window settings.

The imaging studies were performed using a Toshiba Aquilion 64-slice MSCT scanner. Scanning parameters included axial thickness of 0.5–0.75 mm, with multiplanar reconstruction (MPR), maximum intensity projection (MIP), and volume rendering performed using RadiAnt DICOM Viewer. All measurements were made in DICOM format in standard bone and soft tissue windows. Three-dimensional reconstructions and image post-processing were conducted to assess topographic relationships and canal integrity.

Representative MSCT images were selected to illustrate key anatomical variations, including internal carotid artery dehiscence, optic canal bone defects, mandibular canal asymmetry, and ophthalmic artery course. Axial, coronal, and sagittal reconstructions were used to demonstrate these findings with corresponding measurement landmarks.

Data were evaluated using descriptive and comparative statistical methods. Mean values, standard deviations, frequency distributions, and cross-tabulations were calculated using SPSS v26 (IBM Corp., USA). Intergroup differences were analyzed using Student's t-test or Mann-Whitney U test for non-parametric data. Chi-square tests were used for categorical variables. A p-value of <0.05 was considered statistically significant.

Specific anatomical features measured included:

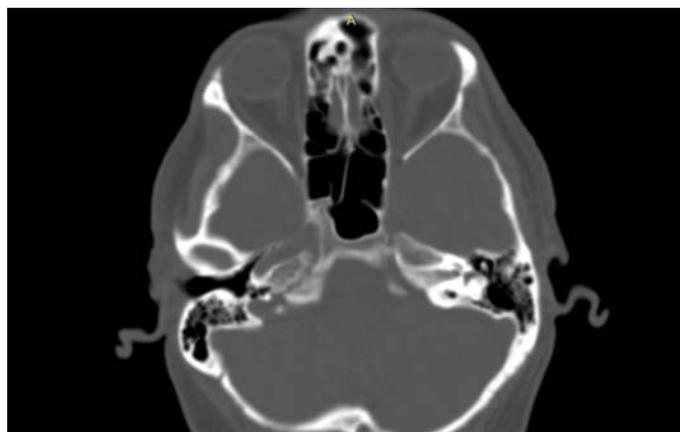
1. **Internal carotid artery (ICA):** visualization of cavernous and petrous segments, diameter measurements, and positional relation to sphenoid sinus. Bony dehiscence was defined as complete absence of visible bone coverage (0 mm thickness) between the neurovascular structure and adjacent sinus cavity on at least two consecutive MSCT slices (see Figure 1).

2. **Ophthalmic nerve and optic nerve:** analysis of canal diameter, bony coverage, and proximity to ethmoid and sphenoid sinuses.

3. **Mandibular nerve (V3):** course through the foramen ovale and mandibular canal, including positional variants and symmetry (see Figure 2).



**Figure 1.** Representative coronal multislice computed tomography (MSCT) image (bone window) illustrating the anatomical relationship between the sphenoid sinus and the internal carotid artery at the skull base. The image demonstrates the approach used for evaluating bony coverage and spatial proximity between the artery and the sinus cavity.



**Figure 2.** Axial multislice computed tomography image at the level of the skull base demonstrating the cavernous segment of the internal carotid artery (ICA) in close proximity to the sphenoid sinus wall.

4. **Extraocular artery (ophthalmic artery):** traceability through the optic canal and ethmoidal foramina.

Subgroup analysis was performed to evaluate potential sex-related and age-related differences in morphometric parameters. Patients were stratified by sex and into age groups (<40 years, 40–60 years, >60 years). Intergroup comparisons were conducted using Student's t-test or Mann-Whitney U test depending on data distribution.

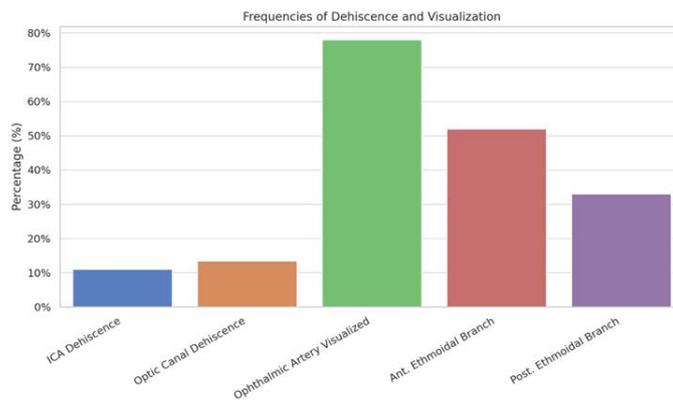
## Results.

**Internal Carotid Arteries (ICAs):** In 97% of cases, the petrous segment of the ICA was visible through the bony coverage of the sphenoid sinus. Bony dehiscence was observed in 11% of scans, increasing the surgical risk during endoscopic sinus procedures. Representative MSCT images illustrating ICA dehiscence and variations in neurovascular anatomy are provided in Figures 1-3 to demonstrate the radiological criteria used for assessment.

**Optic and Ophthalmic Nerves:** The optic nerve canal showed thinning or partial dehiscence in 13.5% of cases, with bilateral presentation in 6.2%. The optic canal's average diameter was



**Figure 3.** Representative coronal multislice computed tomography (MSCT) image (bone window) demonstrating the anatomical region used for assessment of the mandibular nerve (V3) and mandibular canal morphology. The image illustrates the methodological approach applied for evaluating canal course, symmetry, and bony boundaries.



**Figure 4.** Frequencies of Dehiscence and Visualization.

**Table 1.** Anatomical Features of ICA based on MSCT Data.

Parameter	Mean ± SD (mm)
ICA Diameter (petrous)	4.8 ± 0.6
ICA Proximity to Sphenoid Sinus Wall	1.4 ± 0.3
ICA Diameter (cavernous segment)	4.3 ± 0.4
Distance ICA to Optic Canal	2.1 ± 0.5

**Table 2.** Anatomical Features of Optic and Ophthalmic Nerves based on MSCT Data.

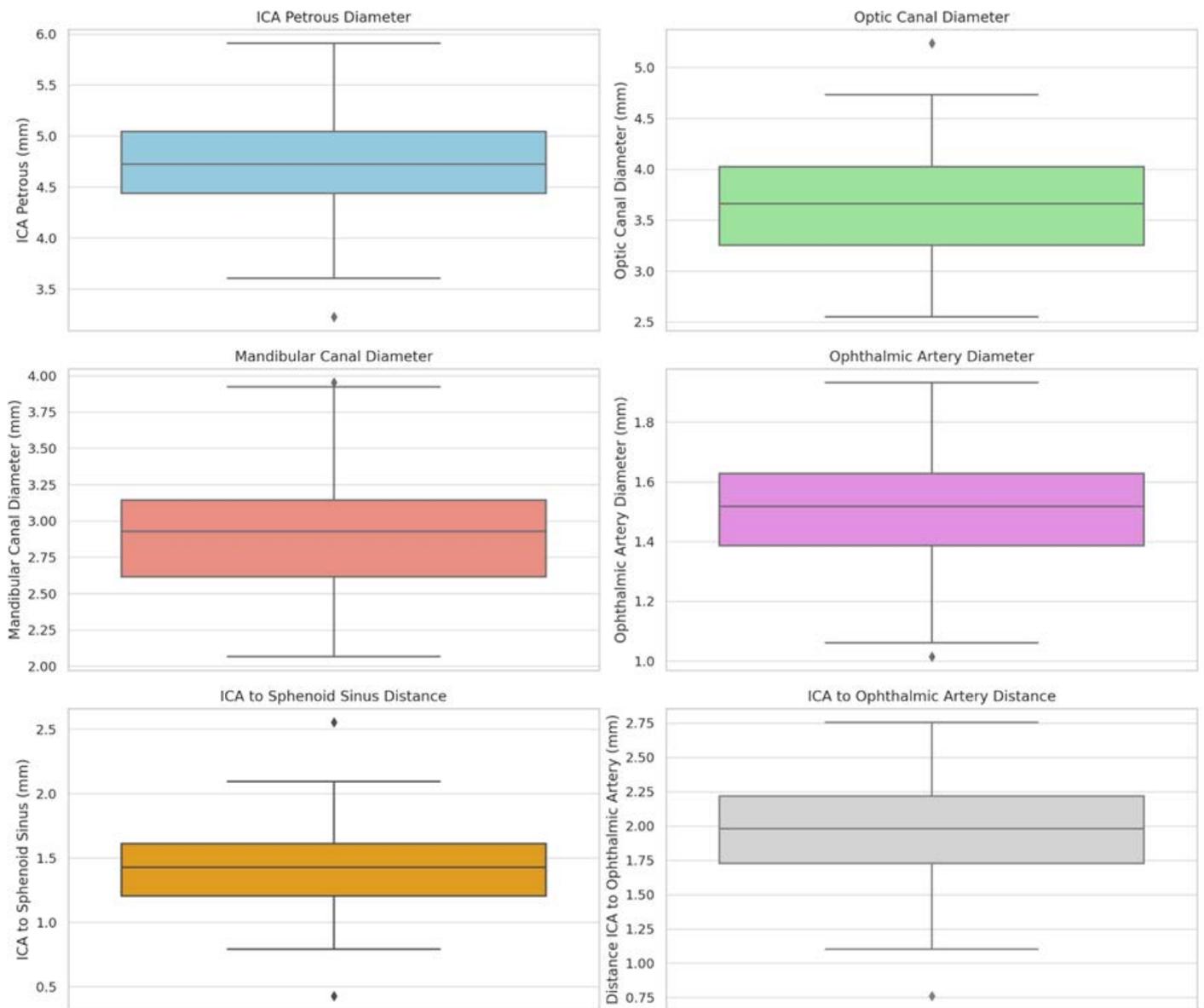
Parameter	Mean ± SD (mm)
Optic Canal Diameter	3.7 ± 0.5
Length of Optic Canal	9.2 ± 1.3
Bony Thickness Over Optic Nerve	1.1 ± 0.4
Dehiscence of Optic Canal	13.5%

**Table 3.** Anatomical Features of Mandibular Nerve based on MSCT Data.

Parameter	Mean ± SD (mm)
Foramen Ovale Diameter	5.1 ± 0.8
Mandibular Canal Diameter (midshaft)	2.9 ± 0.4
Distance Mandibular to Mental Foramen	30.2 ± 4.7
Cortical Bone Thickness (mandibular canal)	1.8 ± 0.5

**Table 4.** Anatomical Features of Extraocular Artery (Ophthalmic Artery) based on MSCT Data.

Parameter	Mean ± SD (mm)
Ophthalmic Artery Diameter (proximal)	1.5 ± 0.2
Distance from ICA to Artery Entry in Optic Canal	1.9 ± 0.4
Visualization of Anterior Ethmoidal Branch	52%
Visualization of Posterior Ethmoidal Branch	33%



**Figure 5.** Features of Neurovascular Parameters.

$3.7 \pm 0.5$  mm. The bony separation between the optic nerve and adjacent ethmoid/sphenoid sinuses varied significantly.

The ophthalmic nerve was traced indirectly using anatomical corridors. Its emergence at the superior orbital fissure was identifiable in reconstructed views in 88% of scans.

**Mandibular Nerve (V3):** V3 passed through the foramen ovale in all cases. Asymmetry in mandibular canal course was present in 9% of scans. Variability in canal diameter was significant in relation to cranial index. The distance between the mandibular foramen and mental foramen was measured as an additional landmark.

**Extraocular Artery (Ophthalmic Artery):** The ophthalmic artery could be reliably traced in 78% of scans. It was most visible in younger patients with higher bone transparency. In 65% of cases, it could be visualized entering the orbit via the optic canal. Anterior and posterior ethmoidal branches were identifiable in 52% and 33% of cases, respectively.

Comparative analysis revealed no statistically significant sex-

related differences in ICA diameter, optic canal diameter, or mandibular canal dimensions ( $p > 0.05$ ). Age-related analysis demonstrated a trend toward reduced bony thickness over the optic canal and decreased visualization rate of the ophthalmic artery in patients older than 60 years; however, these differences did not reach statistical significance.

These findings further confirm that patient-specific anatomical variations are common, especially in relation to skull base vascular and nerve structures. These parameters offer a reliable anatomical reference for surgical planning.

### Discussion.

The variability observed in ICA proximity to the sphenoid sinus and the optic nerve's exposure has significant clinical relevance, especially in the context of endoscopic sinus surgery and skull base approaches [15,16]. Dehiscence of the optic canal poses a high risk of visual complications [17,18]. Similarly, understanding the mandibular nerve's variation is essential

for planning dental implants or nerve blocks [19,20], and its relationships with paranasal sinuses [21].

Although sex- and age-related trends were observed, the absence of statistically significant differences suggests that individual anatomical variability outweighs demographic factors, reinforcing the necessity of patient-specific preoperative imaging.

Our findings are consistent with the results of Koç et al. [1], who also reported a high frequency of ICA protrusion into the sphenoid sinus wall and emphasized the surgical implications of such proximity. Similar rates of bony dehiscence (10–13%) of the optic canal were described by Mahmut Öksüzler, Fatma Yasemin Öksüzler, Sema Ozandaç Polat, Ayşe Gül Uygur et al. [21], highlighting the risk of visual injury during orbital and sinus surgeries. Our observed 13.5% incidence of optic canal dehiscence aligns closely with their data, reinforcing the importance of preoperative imaging.

In terms of mandibular nerve morphology, our results correspond with the CBCT-based study by Kim and Lee [3], which emphasized the significance of mandibular canal variations in clinical dentistry. Their mean canal diameter was comparable to our results (approximately 2.8–2.9 mm), supporting the reproducibility of these measurements across imaging modalities. Furthermore, our measurement of the distance from the mandibular foramen to the mental foramen ( $30.2 \pm 4.7$  mm) reflects values similar to those found in South Asian populations by Singh et al. [6], confirming ethnic and individual variation.

Ophthalmic artery imaging is relatively underrepresented in existing CT studies. However, our ability to visualize the artery in 78% of cases echoes findings by Cheng et al. [4], who reported a visibility rate of approximately 75% using CTA. The dimensions of the artery (mean  $1.5 \pm 0.2$  mm) were also consistent with those described in anatomical reviews by Michalinos et al. [5]. The relatively high visualization rate of the ophthalmic artery on non-contrast MSCT may be attributed to thin-slice acquisition and high spatial resolution; nevertheless, contrast-enhanced CT angiography remains superior for detailed vascular assessment.

A distinguishing feature of our study is the use of a large, demographically diverse MSCT dataset, to provide detailed anatomical correlations. Compared to traditional cadaveric studies, such as those summarized by Hoving et al. [7], MSCT offers non-invasive insights with real-world spatial relevance. This strengthens the clinical applicability of our findings in surgical planning, especially for procedures involving the skull base, orbit, and mandibular regions [22–26].

Taken together, our results confirm and extend existing knowledge of cranial neurovascular anatomy [27,28]. They emphasize the necessity of personalized anatomical analysis, particularly in populations with high variability [29–31]. Our findings are also consistent with previous morphometric studies of maxillary sinus relationships and applied anatomical modeling approaches [32–33], further supporting the relevance of MSCT-based anatomical assessment in clinical and interdisciplinary contexts. The integration of morphometric datasets into structured analytical systems may further enhance

clinical decision-making, as demonstrated in decision support modeling approaches [34]. Future research should focus on expanding MSCT-based morphometric databases with stratification by age and sex, as well as on the integration of advanced 3D reconstruction techniques to further improve preoperative risk assessment. Comparative studies using CT angiography and cone-beam CT may additionally clarify the limits of non-contrast MSCT in visualizing small-caliber neurovascular structures [35].

### Conclusion.

1. MSCT is a highly effective modality for evaluating the anatomical variability of cranial neurovascular structures.
2. Dehiscence of the optic nerve and ICA were observed in over 10% of cases, necessitating caution in surgical interventions.
3. Significant interindividual variability exists in the course and diameter of the mandibular canal.
4. The ophthalmic artery can be visualized with sufficient clarity in most MSCT scans, aiding surgical navigation.
5. Incorporating 3D reconstruction and statistical morphometry improves diagnostic and anatomical accuracy.

### Funding.

This research received no external funding

### Conflict of interest statement.

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

### REFERENCES

1. Koç A. Are Maxillary and Sphenoid Sinus Volumes Deterministic for Gender and Age Estimation? A Cone Beam Computed Tomography Study. *Cumhur. Dent. J.* 2020;23:348-355.
2. Akçakaya MO, Aras Y, İzgi N, et al. Fully endoscopic supraorbital keyhole approach to the anterior cranial base: A cadaveric study. *J Neurosci Rural Pract.* 2015;6:361-8.
3. Kim ST, Hu KS, Song WC, et al. Location of the mandibular canal and the topography of its neurovascular structures. *J Craniofac Surg.* 2009;20:936-9.
4. Cheng XR, Zhao L, Huang YX, et al. Comparison of Ophthalmic Artery Morphological Characteristics and Retinal Vessel Diameter for Identifying Ocular Ischemic Syndrome. *Invest Ophthalmol Vis Sci.* 2023;64:20.
5. Michalinos A, Zogana S, Kotsiomitris E, et al. Anatomy of the ophthalmic artery: a review concerning its modern surgical and clinical applications. *Anat Res Int.* 2015;2015:591961.
6. Singh A, Halli R, Khandelwal S, et al. Trifid mandibular nerve canal: an enigma – a rare case report. *Arch Med Health Sci.* 2025;13:289-292.
7. Hoving AM, Kraeima J, Schepers RH, et al. Optimisation of three-dimensional lower jaw resection margin planning using a novel Black Bone magnetic resonance imaging protocol. *PLoS One.* 2018;13:e0196059.
8. Pillai A, Kalra MK, Samei E. Multidetector CT in anatomical studies. In: Diederich S, Zollikofer CL, editors. *MDCT:*

- Multidetector Computed Tomography – Principles, Advances, and Clinical Applications. Chapter 4. 2018.
9. Kassam AB, Gardner P, Snyderman C, et al. Expanded endonasal approach: fully endoscopic, completely transnasal approach to the middle third of the clivus, petrous bone, middle cranial fossa, and infratemporal fossa. *Neurosurg Focus*. 2005;19:E8.
  10. Yeung AWK. A systematic review of optic canal measurements. *J Craniofac Surg*. 2020;31:1287-93.
  11. Reiser MF, Becker CR, Nikolaou K, et al. *Multislice CT*. 3rd ed. Berlin: Chapter: Head and Neck Imaging. Springer; 2008.
  12. Hatipoglu HG, Cetin MA, Selvi A, et al. Role of magnetic resonance imaging in evaluating sphenoid sinus and internal carotid artery. *J Laryngol Otol*. 2009;123:1331-7.
  13. Li S, Liao C, Qian M, et al. Narrow ovale foramina may be involved in the development of primary trigeminal neuralgia. *Front Neurol*. 2022;13:1013216.
  14. Arya S, Rane P, D’Cruz A. Infratemporal fossa, masticator space and parapharyngeal space: can the radiologist and surgeon speak the same language? *Am Int J Otorhinolaryngol Clin*. 2013;6:1-8.
  15. Eguchi T, Tamaki N, Kurata H, et al. Combined transpetrosal and fronto-orbito-zygomatic approach to a giant skull-based meningioma: a case report. *Surg Neurol*. 1998;50:272-6.
  16. Tanriover N, Sanus GZ, Ulu MO, et al. Middle fossa approach: microsurgical anatomy and surgical technique from the neurosurgical perspective. *Surg Neurol*. 2009;71:586-596.
  17. Fontolliet M, Bornstein M.M, von Arx T. Characteristics and dimensions of the infraorbital canal: A radiographic analysis using cone beam computed tomography (CBCT) *Surg. Radiol. Anat*. 2019;41:169-179.
  18. Lang J. *Clinical Anatomy of the Head*. Berlin: Springer; 1983.
  19. Ngeow WC, Chai WL. The clinical anatomy of accessory mandibular canal in dentistry. *Clin Anat*. 2020;33:1214-1227.
  20. Menditti D, Menditti VS, Amodio M, et al. The Real Anatomy of Mandibular Canal: "New Features and Prospectives in Oral and Maxillofacial Surgery". *In Vivo*. 2025;39:2883-2892.
  21. Öksüzler FY, Polat S, Öksüzler M, et al. The determination of sphenoid sinus dimensions in Turkish healthy adult subjects: an MRI study. *International Journal of Morphology*. 2019;37:22-27.
  22. Özdemir A, Bayar Muluk N, Asal N, et al. Is there a relationship between Onodi cell and optic canal? *Eur Arch Otorhinolaryngol*. 2019;276:1057-1064.
  23. Sinanoglu A, Orhan K, Kursun S, et al. Evaluation of Optic Canal and Surrounding Structures Using Cone Beam Computed Tomography: Considerations for Maxillofacial Surgery. *J Craniofac Surg*. 2016;27:1327-30.
  24. Kaygısız Yiğit M, Pınarbaşı A, Etöz M, et al. Artificial intelligence-based fully automatic 3D paranasal sinus segmentation. *Dentomaxillofac Radiol*. 2026;55:61-72.
  25. Lo Giudice G, Cicchiello S, Calvo A, et al. Internal carotid artery anatomical variants and their association with increased thromboembolic risk in vascular Eagle syndrome. *Appl Sci*. 2025;15:13085.
  26. Dal Secchi MM, Lutaif Dolci RL, Teixeira R, et al. An analysis of anatomic variations of the sphenoid sinus and its relationship to the internal carotid artery. *Int Arch Otorhinolaryngol*. 2018;22:161-166.
  27. Dahal P, Parajuli S, Maharjan S, et al. Critical anatomical variants in preoperative computed tomography of paranasal sinuses in a tertiary care center: a cross-sectional study. *Ann Med Surg (Lond)*. 2025;87:1909-1917.
  28. Zdilla MJ, Cusick AM, Cowher AE, et al. Optic Canal Size is an Indicator for the Accessory Optic Canal: Applications for Anterior Clinoidectomy. *World Neurosurg*. 2024;181:e826-e832.
  29. Pirinc B, Fazliogullari Z, Koplay M, et al. Morphometric and morphological evaluation of the optic canal in three different parts in MDCT images. *Int Ophthalmol*. 2023;43:2703-2720.
  30. Teshome MK, Najib K, Nwagbara CC, et al. Patent Foramen Ovale: A Comprehensive Review. *Curr Probl Cardiol*. 2020;45:100392.
  31. Kwiecińska M, Bonczar M, Plutecki D, et al. The complete anatomy of the ophthalmic artery: a meta-analysis with clinical implications. *Neurosurg Rev*. 2025;48:572.
  32. Burian OV, Kudriavtseva TO, Harbar KB, et al. Anatomical characteristics and biological significance of the relationships between posterior maxillary teeth and the maxillary sinus. *Kharkiv Dental J*. 2025;2:643-656.
  33. Kalashnyk-Vakulenko YuM, Poberezhnik GA, Sukhina IS, et al. Morphometric features of the relationships between tooth roots and the maxillary sinus. *Kharkiv Dental J*. 2025;2:390-401.
  34. Yakovlev S, Bazilevych K, Chumachenko D, et al. The Concept of Developing a Decision Support System for the Epidemic Morbidity Control. *CEUR Workshop Proceedings*. 2020;2753:265-274.
  35. Tanaka T, Arai Y, Inaba Y, et al. Current role of hybrid CT/angiography system compared with C-arm cone beam CT for interventional oncology. *Br J Radiol*. 2014;87:20140126.