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Original article

Anthropometric characteristics of the orbit assessed by multislice computed tomography in individuals without orbital pathology

Radmila Balaban-Djurević[1], Marija Drakul[1], Vanja Mališ[1], Tamara Šolaja[1], Ljiljana Kozić[1], Milena Dubravac Tanasković[1], Nikolina Elez-Burnjaković[1], Branislava Ćurčić[1], Ivana Heleta[1], Željko Maraš[3], Bojan Joksimović[1,2]

[1]University of East Sarajevo, Faculty of Medicine Foča, Foča, Republic of Srpska, Bosnia and Herzegovina

[2]University Hospital Foča, Foča, Republic of Srpska, Bosnia and Herzegovina

[3]Clinical Center of Montenegro, Institute for Children's Diseases, Podgorica, Montenegro

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Corresponding author:
Radmila Balaban-Djurević, MD, PhD
Studentska 5, 73300 Foča
radmilabalaban@yahoo.com

Summary

Introduction. Knowledge of orbital anthropometry is essential for reconstructive surgery, ophthalmology and forensic identification, yet normative multislice computed tomography (MSCT) data for this region are scarce. The study aimed to determine the principal orbital parameters in adults without orbital pathology and to examine sex, age and side differences.

Method. In this retrospective study, 154 orbits in 77 adults (51 men, 26 women; aged 24–86 years) were measured on three-dimensional reconstructions from a 64-slice MSCT scanner. Orbital height, width, volume, orbital index and the interorbital and biorbital distances were recorded and compared by sex, age group and side.

Results. Men had significantly greater orbital width, volume and biorbital and interorbital distances than women bilaterally ($p \leq 0.009$), whereas orbital height did not differ by sex. The right orbital index was higher in women (90.02 ± 6.45 versus 86.36 ± 7.26; $p = 0.034$). In the older group the right orbit showed greater height, volume and orbital index ($p \leq 0.031$), with no significant age effect on the left. The right orbit was significantly wider and had a higher orbital index than the left ($p \leq 0.011$), while orbital volume was symmetrical ($p = 0.099$).

Conclusion. Orbital morphometry is sex-, age- and side-dependent, and the MSCT-derived values reported here provide population-specific reference data for clinical and forensic use.

Key words: orbit, anthropometry, multidetector computed tomography, sex characteristics, imaging, three-dimensional

Introduction

The orbit is a structurally demanding cavity of the human skull, shaped as a four-sided pyramid with its base opening anteriorly and its apex directed posteromedially towards the optic canal. It houses the globe, extraocular muscles, neurovascular structures and orbital fat [1]. Because the orbit lies at the intersection of the cranium, the paranasal sinuses and the midface, its dimensions are relevant to ophthalmology, maxillofacial and plastic surgery, neurosurgery, radiology and forensic anthropology.

The orbit is described quantitatively through a handful of standard measurements — orbital height, orbital width, orbital volume, and the interorbital and biorbital distances. Broca defined the orbital index as the ratio of orbital height to orbital width multiplied by one hundred, so that the shape of the orbital aperture could be expressed independently of its size. By convention, the index sorts orbits into three groups: microseme (below 83), mesoseme (83 to 89) and megaseme (above 89). These categories were tied originally to broad population groupings, and they are still used in anthropological and forensic practice [2]. What makes such data valuable is also what makes them difficult: the orbital index and the linear dimensions vary not only from one population to another, but within a single population they differ between the sexes and shift with age — which is exactly why normative values cannot simply be borrowed from elsewhere [3].

How these measurements are obtained has changed considerably. For most of the last century they came from dry skulls or from plain radiographs — the former restricted to skeletal collections, the latter distorted by superimposition and magnification. Multislice computed tomography (MSCT), coupled with three-dimensional reconstruction, has transformed the field. The bony orbit can now be measured in the living patient, non-invasively and to within a fraction of a millimeter, and volume rendering allows the cavity to be quantified reliably and reproducibly [4]. This is not merely a technical convenience. Accurate orbital dimensions guide the repair of the orbit after trauma, the correction of congenital deformity, and the management of conditions in which the volume of the orbit is itself disturbed — blow-out fractures and dysthyroid orbitopathy among them [5, 6].

Yet for all their clinical relevance, MSCT-based normative values are spread unevenly across populations, and for the Western Balkan region — specifically Serbia and neighboring countries — they are largely missing. We set out, therefore, to determine the main anthropometric parameters of the orbit — height, width, volume, orbital index, and the interorbital and biorbital distances — in adults free of orbital pathology, using multislice computed tomography, and to ask how these parameters differ between the sexes, between age groups, and between the two orbits of the same person.

Methods

This was a retrospective study of facial computed-tomography scans from 77 adults, amounting to 154 orbits. Both sexes were represented; ages ranged from 24 to 86 years, with a mean of 56, and no participant had pathological changes within the orbit. The material was gathered at the Clinical Centre in Kragujevac and comprised examinations performed between January 2010 and November 2015 in patients referred to facial-region scanning for various clinical reasons unrelated to this analysis. We excluded anyone who had undergone previous facial surgery, anyone with severe facial trauma, and those younger than 20 years. The institutional Ethics Committee approved the study.

Imaging used a 64-slice MSCT scanner (Aquilion 64, Toshiba Medical Systems, Otawara, Japan). Participants lay supine, arms resting along the body, the head supported by a headrest. Acquisitions were made in the axial plane and then reformatted by multiplanar reconstruction, with the scan range set on the lateral topogram according to the region of interest. The parameters were as follows: tube voltage 120 kVp, tube current 500 mAs, section thickness 0.5 mm, tube rotation time 0.75 s, and reconstruction thickness 0.4–0.6 mm. All datasets were analyzed on a Vitrea 2 workstation (version 4.1.14.0; Vital Images, Minnetonka, MN, USA). The orbital index, orbital volumetry and the biorbital and interorbital distances were measured on the same workstation and software, on three-dimensional reconstructions of the bony structures, and a single radiologist performed every measurement.

Measurements followed standard anatomical landmarks. Orbital width was the distance from the dacryon — where the frontal, lacrimal and maxillary bones meet to form the medial orbital margin — to a point on the lateral orbital margin. Orbital height was the maximum distance between the superior and inferior orbital margins, taken perpendicular to the width. The orbital index was orbital height divided by orbital width, multiplied by one hundred. The biorbital distance was measured between the right and left ectoconchion (the lateral orbital margin points), and the interorbital distance between the right and left dacryon. Linear measurements were given in millimeters and volumes in cubic centimeters. For every participant we compared the right and left orbit, and we tested for differences between the sexes and between age groups; for the latter, the sample was split into a younger group (24–55 years) and an older group (56–86 years).

Orbital volume was measured by delineating the bony orbital cavity on sequential axial slices. The anterior boundary was defined as a plane connecting the orbital rim, and the posterior boundary at the orbital apex, excluding the optic canal and the superior and inferior orbital fissures. The software then calculated the volume of the segmented region of interest in cubic centimeters.

Statistical analysis was performed using SPSS version 15.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics included measures of central tendency and dispersion — arithmetic mean, standard deviation, and minimum and maximum values — for all continuous variables, and absolute and relative frequencies for categorical variables. Differences between groups for continuous variables were assessed with the Student t-test: the independent-samples t-test was used for comparisons by sex and by age group, and the paired-samples t-test for comparisons between the right and left orbit of the same participant. For each significant comparison, the effect size was reported as Cohen's d (for independent-samples tests) or Cohen's dz (for paired-samples tests), together with the 95% confidence interval for the mean difference. A p-value below 0.05 was considered statistically significant. The a priori power analysis indicated that 88 participants would be required to achieve a power of 0.90 at $\alpha = 0.05$ for detecting a medium effect size (Cohen's d = 0.5); with the 77 participants included, the achieved statistical power was approximately 0.83. Results are presented in tables and graphs.

Results

Table 1 summarizes the sample. Of the 77 participants, 51 (66.2%) were men and 26 (33.8%) women, with a mean age of 56.11 ± 17.13 years. Split by age, 32 (41.6%) fell into the younger group (24–55 years) and 45 (58.4%) into the older group (56–86 years).

Table 1. Sociodemographic characteristics of the participants (n = 77)

Characteristic	n (%) or mean ± SD
Sex - male	51 (66.2)
Sex - female	26 (33.8)
Age (years)	56.11 ± 17.13
Age group - 24–55 years	32 (41.6)
Age group - 56–86 years	45 (58.4)

SD - standard deviation

Sex differences were pronounced for the size-dependent parameters, and they are set out for both orbits in Table 2 and Figure 1. On the right side, orbital width was greater in men than in women (44.40 ± 2.21 mm versus 42.39 ± 2.34 mm; t(75) = 3.790, p = 0.001, Cohen's d = 0.89, 95% CI for the difference: 0.95 to 3.07 mm), and so was orbital volume (23.43 ± 3.71 cm^3 versus 20.71 ± 2.37 cm^3; t(75) = 3.387, p = 0.001, Cohen's d = 0.84, 95% CI for the difference: 1.12 to 4.32 cm^3). Orbital height, by contrast, was essentially identical in the two sexes (38.31 ± 3.30 mm versus 38.16 ± 3.43 mm; p = 0.851). The orbital index ran the other way: it was higher in women than in men (90.02 ± 6.45 versus 86.36 ± 7.26; t(75) = −2.162, p = 0.034, Cohen's d = 0.53, 95% CI for the difference: 0.29 to 7.03), a reflection of the comparatively narrower female orbit (Table 2, Figure 1).

Table 2. Orbital height, width, volume and orbital index by sex for the right and left orbit

Parameter	Side	Male (mean ± SD)	Female (mean ± SD)	t(df)	p	Cohen's d	95% CI for difference
Height (mm)	Right	38.31 ± 3.30	38.16 ± 3.43	0.189 (75)	0.851	0.04	−1.43 to 1.73
Height (mm)	Left	38.43 ± 2.91	37.25 ± 2.88	1.689 (75)	0.095	0.41	−0.21 to 2.57
Width (mm)	Right	44.40 ± 2.21	42.39 ± 2.34	3.790 (75)	0.001	0.89	0.95 to 3.07
Width (mm)	Left	42.69 ± 2.04	40.39 ± 2.26	3.447 (75)	0.002	1.08	1.30 to 3.30
Volume (cm^3)	Right	23.43 ± 3.71	20.71 ± 2.37	3.387 (75)	0.001	0.84	1.12 to 4.32
Volume (cm^3)	Left	22.50 ± 3.29	19.88 ± 1.74	3.783 (75)	0.001	0.94	1.24 to 4.00
Orbital index	Right	86.36 ± 7.26	90.02 ± 6.45	−2.162 (75)	0.034	0.53	0.29 to 7.03
Orbital index	Left	90.19 ± 7.10	91.08 ± 6.11	−0.545 (75)	0.587	0.13	−4.12 to 2.34

SD - standard deviation; t(df) - independent-samples Student t-test statistic with degrees of freedom; p - probability value; Cohen's d - standardized effect size; CI - confidence interval. Statistically significant differences ($p < 0.05$) are observed for width and volume bilaterally and for the right orbital index.

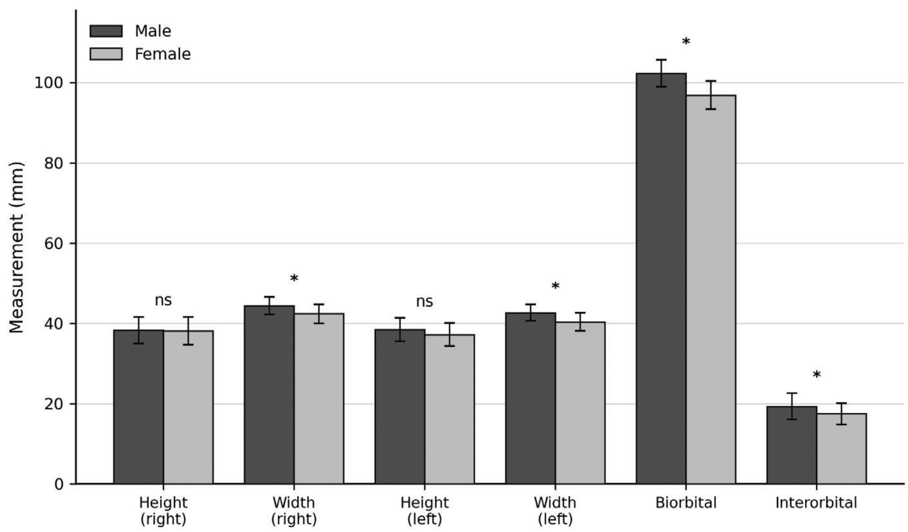

Figure 1. Orbital linear dimensions and the interorbital and biorbital distances in men and women (mean ± SD). Group comparisons by independent-samples Student t-test. Asterisks denote a statistically significant sex difference ($p < 0.05$); ns = not significant

The left orbit told much the same story. Width was again greater in men (42.69 ± 2.04 mm versus 40.39 ± 2.26 mm; t(75) = 3.447, p = 0.002, Cohen's d = 1.08, 95% CI for the difference: 1.30 to 3.30 mm), as was volume (22.50 ± 3.29 cm^3 versus 19.88 ± 1.74 cm^3; t(75) = 3.783, p = 0.001, Cohen's d = 0.94, 95% CI for the difference: 1.24 to 4.00 cm^3). On this side, however, neither orbital height (38.43 ± 2.91 mm versus 37.25 ± 2.88 mm; p = 0.095) nor the orbital index (90.19 ± 7.10 versus 91.08 ± 6.11; p = 0.587) differed significantly between men and women.

The interorbital and biorbital distances showed unambiguous sexual dimorphism. The biorbital distance was much greater in men (102.30 ± 3.36 mm versus 96.91 ± 3.51 mm; t(75) = 6.549, p = 0.001, Cohen's d = 1.58, 95% CI for the difference: 3.75 to 7.03 mm), and the interorbital distance followed suit (19.35 ± 3.33 mm versus 17.48 ± 2.66 mm; t(75) = 2.685, p = 0.009, Cohen's d = 0.60, 95% CI for the difference: 0.48 to 3.26 mm) (Table 3).

Age-related differences were almost entirely a right-sided phenomenon. The older participants had a greater right orbital height than the younger ones (39.27 ± 3.46 mm versus 36.85 ± 2.55 mm; t(75) = −3.357, p = 0.001, Cohen's d = 0.78, 95% CI for the difference: 0.98 to 3.86 mm), a greater right orbital volume (23.24 ± 4.08 cm^3 versus 21.48 ± 2.33 cm^3; t(75) = −2.194, p = 0.031, Cohen's d = 0.51, 95%

Table 3. Biorbital and interorbital distances by sex

Parameter	Male (mean ± SD)	Female (mean ± SD)	t(df)	p	Cohen's d	95% CI for difference
Biorbital distance (mm)	102.30 ± 3.36	96.91 ± 3.51	6.549 (75)	0.001	1.58	3.75 to 7.03
Interorbital distance (mm)	19.35 ± 3.33	17.48 ± 2.66	2.685 (75)	0.009	0.60	0.48 to 3.26

SD - standard deviation; t(df) - independent-samples Student t-test statistic with degrees of freedom; p - probability value; Cohen's d - standardized effect size; CI - confidence interval

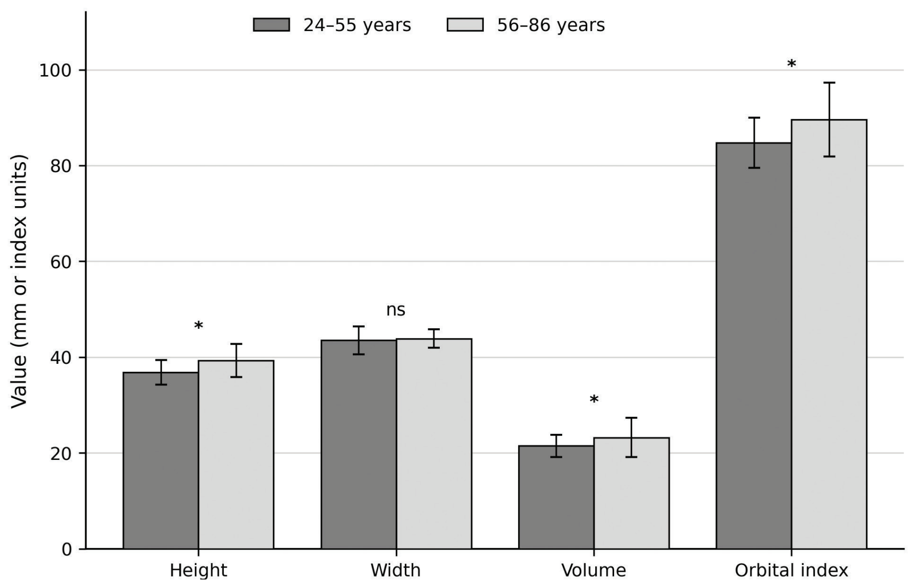

Figure 2. Right-orbit parameters in the younger (24–55 years) and older (56–86 years) age groups (mean ± SD). Group comparisons by independent-samples Student t-test. Asterisks denote a statistically significant difference (p < 0.05); ns = not significant

CI for the difference: 0.16 to 3.36 cm^3), and a higher right orbital index (89.61 ± 7.72 versus 84.77 ± 5.22; t(75) = −3.072, p = 0.003, Cohen's d = 0.71, 95% CI for the difference: 1.70 to 7.98). Right orbital width was unaffected by age (p = 0.536). On the left, not one of the four parameters — height, width, volume or index — differed between the age groups (all p > 0.05) (Table 4 and Figure 2).

Age told on the biorbital distance as well: it was greater in the older group (101.56 ± 3.91 mm versus 98.96 ± 4.31 mm; t(75) = −2.750, p = 0.007, Cohen's d = 0.64, 95% CI for the difference: 0.72 to 4.48 mm). The interorbital distance, on the other hand, was unchanged across age groups (p = 0.162).

A final comparison set the two sides against each other, irrespective of sex or age, and a consistent right-sided predominance emerged in two parameters. The right orbit was wider than the left (43.72 ± 2.38 mm versus 42.09 ± 2.26 mm; t(76) = 4.338, p = 0.002, paired, Cohen's dz = 0.49, 95% CI for the mean difference: 0.88 to 2.38 mm), and its orbital index was lower (87.60 ± 7.17 versus 90.49 ± 6.76; t(76) = −2.575, p = 0.011, paired, Cohen's dz = 0.29, 95% CI for the mean difference: −5.11 to −0.67). Height (p = 0.652) and volume (p = 0.099) were statistically the same on both sides (Table 5 and Figure 3).

Table 4. Right-orbit parameters by age group

Parameter	24–55 years (n=32)	56–86 years (n=45)	t(df)	p	Cohen's d	95% CI for difference
Height (mm)	36.85 ± 2.55	39.27 ± 3.46	−3.357 (75)	0.001	0.78	0.98 to 3.86
Width (mm)	43.52 ± 2.92	43.86 ± 1.93	−0.621 (75)	0.536	0.14	−1.43 to 0.75
Volume (cm^3)	21.48 ± 2.33	23.24 ± 4.08	−2.194 (75)	0.031	0.51	0.16 to 3.36
Orbital index	84.77 ± 5.22	89.61 ± 7.72	−3.072 (75)	0.003	0.71	1.70 to 7.98

Right orbit by age group. SD - standard deviation; t(df) - independent-samples Student t-test statistic with degrees of freedom; p - probability value; Cohen's d - standardized effect size; CI - confidence interval

Table 5. Side-to-side comparison of orbital parameters (all participants)

Parameter	Right orbit	Left orbit	t(df)	p	Cohen's dz	95% CI for mean difference
Height (mm)	38.26 ± 3.32	38.04 ± 2.94	0.452 (76)	0.652	0.05	−0.74 to 1.18
Width (mm)	43.72 ± 2.38	42.09 ± 2.26	4.338 (76)	0.002	0.49	0.88 to 2.38
Volume (cm^3)	22.51 ± 3.55	21.61 ± 3.11	1.660 (76)	0.099	0.19	−0.17 to 1.97
Orbital index	87.60 ± 7.17	90.49 ± 6.76	−2.575 (76)	0.011	0.29	−5.11 to −0.67

SD - standard deviation; t(df) - paired-samples Student t-test statistic with degrees of freedom; p - probability value; Cohen's dz - standardized effect size for paired comparisons; CI - confidence interval. The right orbit is significantly wider than the left and has a significantly lower orbital index.

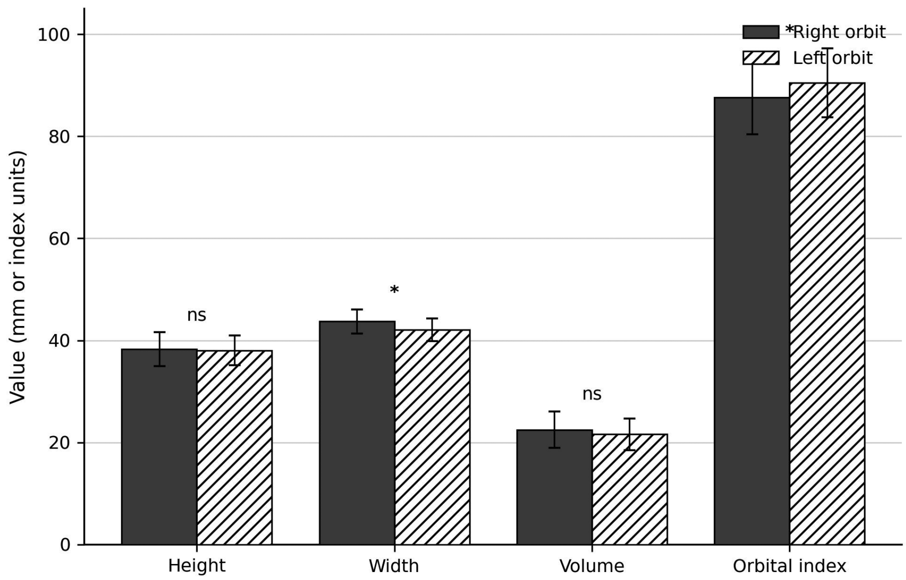

Figure 3. Comparison of the right and left orbit for height, width, volume and orbital index (mean ± SD). Side comparisons by paired-samples Student t-test. Asterisks denote a statistically significant side difference ($p < 0.05$); ns = not significant

Discussion

This study offers MSCT-based reference values for the bony orbit in adults without orbital disease, and three patterns stand out from it: a clear sexual dimorphism in the size-dependent dimensions, an age-related enlargement that is largely confined to the right orbit, and a right-sided predominance in width and orbital index. All three patterns are consistent with the international literature — and where they diverge from it, the divergence itself merits closer examination.

The most straightforward finding is that men have larger orbits than women. Width, volume, and both the biorbital and interorbital distances were greater in men on both sides; height alone showed no sex difference. This combination — strong dimorphism in most linear and volumetric measurements, but little or none in height — turns up repeatedly in CT-based work. A Saudi study using three-dimensional CT found every orbital measurement larger in men, yet the orbital index showed no dimorphism at all [3]. Orbital volume, in particular, tends to be greater in men: among healthy Koreans, orbital tissue volume was larger in men throughout adult life [7], and a recent three-dimensional Turkish study likewise reported a larger bony orbital volume in men in every age band [8]. The size of the volume difference we observed — somewhere around 2.5 cm^3 — is in line with these series, and it carries an obvious practical lesson: orbital implants and reconstruction targets ought to be chosen with the patient's sex in mind [9].

The orbital index calls for a more careful word. In our material it was higher in women than in men on the right side — the female orbit being relatively narrower while the heights were much the same — but on the left the difference vanished. Whether the index is sexually dimorphic at all is a question on which literature simply does not agree. In Ghanaians it was significantly higher in women, though both sexes still fell within the microseme range [2]; in the Saudi series and several others it did not separate the sexes despite obvious dimorphism in the underlying measurements [3].

This apparent discrepancy arises from the nature of a ratio: when height and width scales differ in the two sexes, the ratio can either preserve or cancel the underlying size difference. The index, then, is best read as a descriptor of orbital shape and population affinity — not as a reliable indicator of sex [10].

Our age analysis showed the orbit growing larger with age, but in a curiously one-sided way: on the right, height, volume and orbital index were all greater in the older group, whereas the left orbit showed no age effect whatsoever. That orbital volume increases with age, it is well established, and it is usually attributed to bony remodeling and resorption around the rim over time. Ugradar and Lambros, working from CT volumetry, found that the female orbit expanded with age while the male orbit barely changed [11]; the Turkish three-dimensional study came to a similar conclusion, the age effect on bony orbital volume reached significance only in women [8]. A larger Jordanian craniofacial series, too, picked out orbital height and orbital index among the parameters that shifted with age [12]. The fact that our age effect appeared on one side only was unusual, and we were inclined to read it cautiously — it may owe more to the uneven age distribution and the modest sample than to any genuine biological lateralization, and it would need a larger, age-balanced cohort to confirm.

It should be noted that sex and age effects were analyzed separately in this study using univariate tests. The possibility of a sex–age interaction — for instance, a more pronounced age-related orbital expansion in women than in men, as suggested by Ugradar and Lambros [11] — was not formally tested across all parameters owing to limited subgroup sizes. This remains an open question for future research with larger, sex-balanced samples.

Setting the two sides against each other, the right orbit proved wider but carried a lower orbital index than the left, while height and volume were no different. A degree of orbital asymmetry is normal in the human skull and has been reported many times over. One recent three-dimensional CT study found bony orbital volume symmetrical between the sides while height and width differed significantly — a pattern that mirrors our own, in which the volumes were statistically indistinguishable ($p = 0.099$) but the width was not [8]. Orbital and periorbital asymmetry has also been tied to wider craniofacial asymmetry in patients being assessed for orthognathic surgery [13]. The clinical point is a simple one: the opposite orbit, useful as it is as a template for reconstruction, is not a flawless mirror of the injured side, and small native asymmetries should be expected whenever the intact orbit is used to plan a repair.

These measurements are more than descriptive. Orbital volume is the parameter that matters most in managing orbital fractures: an increase in bony orbital volume after a blowout fracture invites enophthalmos, and the aim of reconstruction is to bring the volume back as close to its original value as possible [5]. Intraoperative CT and three-dimensional volumetry are increasingly relied upon to confirm that this has been done [6], and the methods for measuring herniated orbital volume continue to be refined [5]. Population-specific normative values like ours, together with mean-shape orbital models built from CT data, supply the yardstick against which an individual orbit can be judged and against which implants can be designed [9]. The interorbital and biorbital distances, for their part, bear on the assessment of hypertelorism and hypotelorism and on craniofacial surgical planning [14].

The study has several limitations. First, it was retrospective and single-center, and with 77 participants the achieved statistical power was approximately 0.83, meaning that small effects may have gone undetected — which could partly explain some of the side-specific and age-specific findings. Second, the sexes were unevenly represented (66.2% male), which may have affected sex-specific estimates and reduced the precision of subgroup analyses. Third, because participants were drawn from patients referred for clinical CT scanning, they did not constitute a strictly random sample of the general population, even though orbital pathology was excluded. Fourth, all measurements were performed by a single radiologist; while that ensured internal consistency, both intraobserver and interobserver reliability remained untested. Fifth, correction for multiple comparisons was not applied, and borderline significant results (e.g., right orbital index by sex, p = 0.034; right orbital volume by age, p = 0.031) should therefore be interpreted with caution. Finally, although a sex × age interaction was explored, the limited subgroup sizes did not permit a robust analysis of such interaction effects across all parameters. Future studies should recruit a larger, prospective sample balanced for age and sex, employ multiple independent observers with formal reliability testing, and assess potential sex-age interaction effects using multivariable models.

Conclusion

Multislice computed tomography with three-dimensional reconstruction measures the bony orbit reliably in the living patient, and here it has produced normative anthropometric data for a population that had none. In adults without orbital pathology, the male orbit was larger than the female orbit in width, in volume, and in the biorbital and interorbital distances, while height was much the same in both sexes; the orbital index, a descriptor of shape, was higher in women on the right side. Orbital dimensions tended to grow with age — in this sample, mostly on the right — and the right orbit was, on average, wider but had a lower orbital index than the left. Together these findings confirm that orbital morphometry depends on sex, age and side, and that population-specific reference values are worth having. The values reported here can serve as a baseline for diagnosing orbital disease and for planning reconstructive and decompressive surgery in this region. The documented physiological asymmetry between the right and left orbit (significant for width and orbital index) indicates that the contralateral orbit, while useful as a surgical template, is not a perfect mirror, and a degree of native asymmetry should be anticipated during preoperative planning. These findings also lay the groundwork for larger studies aimed at refining the classification of the orbit by sex and age and for the development of population-specific orbital models for implant design.

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Ethical approval. The Ethics Committee of the Clinical Centre in Kragujevac, Serbia, where the imaging data were collected, approved the study and informed consent was obtained from all individual respondents. The research was conducted according to the Declaration of Helsinki.

Conflicts of interest. The authors declare no conflict of interest.

References:

1. Zhou P, Chambers CB. Orbital fractures. Semin Plast Surg 2021;35(4):269–73.
2. Botwe BO, Sule DS, Ismael AM. Radiologic evaluation of orbital index among Ghanaians using CT scan. J Physiol Anthropol 2017;36(1):29.
3. Packirisamy V, Aljarrah K, Nayak SB. Morphometric evaluation of the orbital region for sex determination in a Saudi Arabian population using 3DCT images. Anat Sci Int 2024;99(1):118–26.

4. Shyu VB, Hsu CE, Chen CH, Chen CT. 3D-assisted quantitative assessment of orbital volume using an open-source software platform in Taiwanese population. PLoS One 2015;10(3):e0119589.

5. Kawabata E, Nuri T, Ichida T, Ueda K. Computed tomography-based measurement of herniated orbital volume following acute orbital fractures. Plast Reconstr Surg Glob Open 2025;13(4):e6689.

6. Shyu VB, Chen HH, Chen CH, Chen CT. Clinical outcome following intraoperative computed tomography-assisted secondary orbital reconstruction. J Plast Reconstr Aesthet Surg 2021;74(2):341–9.

7. Yoo JH, Lee YH, Lee H, Kim JW, Chang M, Park M, et al. Correlation between orbital volume, body mass index, and eyeball position in healthy East Asians. J Craniofac Surg 2013;24(3):822–5.

8. Otu E, Nalçacı Bozkurt N, Örmeci T, Yüzbaşıoğlu N. 3D evaluation of bony orbit characteristics in relation to age, sex, and symmetry: a quantitative CT study. Acta Radiol 2025;66(7):748–56.

9. Kim MJ, Lee MJ, Jeong WS, Hong H, Choi JW. Three-dimensional computer modeling of standard orbital mean shape in Asians. J Plast Reconstr Aesthet Surg 2020;73(3):548–55.

10. Scendoni R, Kelmendi J, Arrais Ribeiro IL, Cingolani M, De Micco F, Cameriere R. Anthropometric analysis of orbital and nasal parameters for sexual dimorphism: new anatomical evidence in the field of personal identification through a retrospective observational study. PLoS One 2023;18(5):e0284219.

11. Ugradar S, Lambros V. Orbital volume increases with age: a computed tomography-based volumetric study. Ann Plast Surg 2019;83(6):693–6.

12. Mustafa A, Abusamra H, Kanaan N, Alsalem M, Allouh M, Kalbouneh H. Morphometric study of the facial skeleton in Jordanians: a computed tomography scan-based study. Forensic Sci Int 2019;302:109916.

13. Sun W, Tang Y, Zhao T, Li X, Gao S, Zheng G. The relationship between eye canting and vertical craniofacial skeletal asymmetry in adult patients with dento-maxillofacial deformities. J Stomatol Oral Maxillofac Surg 2024;125(6):101803.

14. Pala HG, Artunç-Ülkümen B, Koyuncu FM, Uyar Y, Bülbül-Baytur Y. Normal ranges of biorbital and interorbital distances in healthy Turkish pregnancies at 19–23 weeks of gestation and correlation with craniofacial structures. J Turk Ger Gynecol Assoc 2015;16(3):170–3.

Antropometrijske karakteristike orbite procijenjene multislajsnom kompjuterizovanom tomografijom kod ispitanika bez patoloških promjena u orbiti

Radmila Balaban-Đurević[1], Marija Drakul[1], Vanja Mališ[1], Tamara Šolaja[1], Ljiljana Kozić[1], Milena Dubravac Tanasković[1], Nikolina Elez-Burnjaković[1], Branislava Ćurčić[1], Ivana Heleta[1], Željko Maraš[3], Bojan Joksimović[1,2]

[1]Univerzitet u Istočnom Sarajevu, Medicinski fakultet Foča, Foča, Republika Srpska, Bosna i Hercegovina

[2]Univerzitetska bolnica Foča, Foča, Republika Srpska, Bosna i Hercegovina

[3]Klinički centar Crne Gore, Institut za bolesti djece, Podgorica, Crna Gora

Uvod. Poznavanje antropometrije orbite je značajno za rekonstruktivnu hirurgiju, oftalmologiju i forenzičku identifikaciju, ali su normativni podaci dobijeni multislajsnom kompjuterizovanom tomografijom (MSCT) oskudni. Cilj rada je bio da se odrede osnovni parametri orbite kod odraslih ispitanika bez patoloških promjena u orbiti i ispitati razlike u odnosu na pol, starost i stranu.

Metod. U ovoj retrospektivnoj studiji izmjereno je 154 orbita kod 77 odraslih ispitanika (51 muškarac, 26 žena; starosti 24–86 godina) na trodimenzionalnim rekonstrukcijama dobijenim 64-slajsnim MSCT aparatom. Mjereni su visina, širina, volumen i orbitalni indeks orbite, kao i interorbitalni i biorbitalni razmak, te upoređivani prema polu, starosnoj grupi i strani.

Rezultati. Muškarci su imali statistički značajno veće vrijednosti širine, volumena te biorbitalnog i interorbitalnog razmaka u odnosu na žene, obostrano ($p \le 0{,}009$), dok se visina orbite nije razlikovala prema polu. Orbitalni indeks desne orbite bio je veći kod žena (90,02 ± 6,45 naspram 86,36 ± 7,26; $p = 0{,}034$). Kod starije grupe desna orbita je imala veću visinu, volumen i orbitalni indeks ($p \le 0{,}031$), bez značajnog uticaja starosti na lijevoj strani. Desna orbita bila je značajno šira i imala viši orbitalni indeks od lijeve ($p \le 0{,}011$), dok je volumen bio simetričan ($p = 0{,}099$).

Zaključak. Morfometrija orbite zavisi od pola, starosti i strane, a prikazane MSCT vrijednosti predstavljaju referentne podatke specifične za populaciju.

Ključne riječi: orbita, antropometrija, multidetektorska kompjuterizovana tomografija, polne karakteristike, trodimenzionalni prikaz