

Research Article

A STUDY OF ORBITAL INDEX IN DRY SKULLS OF NORTH COASTAL ANDHRA PRADESH

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ABSTRACT

This study is aimed to assess the orbital index which varies with race, regions, within the same race and periods in evolution. Anthropology helps us to understand the anatomic structures of the orbit, and constitutes the technique of expressing makeover of human body and skeleton, for these reasons knowing the orbital index of different races by doing the regional studies is must for the better treatment. Orbital dimensions of hundred (70) adult skulls were measured by digital Vernier Calipers with 0.01mm accuracy. The mean orbital height for the right and left sides were 32.62 ± 2.03 and 32.89 ± 2.2 mm while, their orbital width were 36.5 ± 1.92 and 36.41 ± 1.78 mm respectively. The mean orbital index was 86.13 on right and 90.69 on left side. The knowledge of this index is therefore important in various aspects such as in craniofacial database, interpretation of fossil records, classification in forensic medicine.

Keywords: *Anthropology, Cosmetic, Orbit, Skull, Vernier Calipers*

INTRODUCTION

Orbital cavities are of immense clinical and surgical interest in ophthalmology, oral and maxillofacial surgery and neurosurgery. In particular the orbital index is important as it varies in the different races of mankind and determines the shape of the face in different population groups.

The index varies with race, regions, within the same race and periods in evolution (Anil *et al.*, 2014). Weiss *et al.*, (1987) described the CT as the best way of assessing the orbital cavity because of the complexity in the anatomy of ocular and ethmoidal regions.

But considering the expensiveness of CT and its inaccessibility, it is far beyond the reach of most people in the developing world. To treat congenital or post-traumatic facial disfigurements successfully, surgeons require access to craniofacial database based on accurate anthropological measurements (Ghosh *et al.*, 2013). Anthropology helps us to understand the anatomic structures of the orbit, and constitutes the technique of expressing makeover of human body and skeleton (Ukoha *et al.*, 2011) for these reasons knowing the orbital index of different races by doing the regional studies is must for the better treatment. Patniak *et al.*, (2001) stated that in each orbital cavity, the width is usually greater than the height, the relation between the two is given by the orbital index, which varies in different races.

MATERIALS AND METHODS

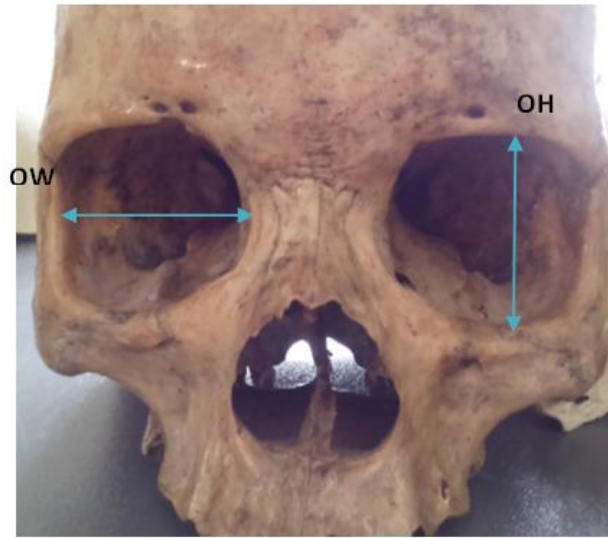
Adult skulls of unknown sex collected from Department of Anatomy were examined. Fifty skulls i.e. 140 orbits were measured using digital Vernier caliper with 0.01mm accuracy. Orbital Height (OH) was measured as the distance between the superior and inferior orbital margins. Orbital Width (OW) was the distance between the medial and lateral walls of the orbits. The orbital index was calculated as $OH/OW \times 100$.

RESULTS AND DISCUSSION

Results

In the present study of , the mean orbital height for the right and left sides were 32.62 ± 2.03 and 32.89 ± 2.2 mm while, their orbital width were 36.5 ± 1.92 and 36.41 ± 1.78 mm respectively. The mean orbital index was 86.13 on right and 90.69 on left side. There was no statistical significance between the right and left orbits. The p value is more than 0.05.

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Discussion

In a study by Gosavi *et al.*, (2014) from central India, the mean height of the orbit was observed as 32.31 ± 2.52 mm. Kaur *et al.*, observed it as 32.05 ± 2.0 mm in North Indian skulls. The orbital width was observed as 36.5 ± 1.92 and 36.41 ± 1.78 mm on right and left sides in the present study and it was 39.25 ± 2.3 mm by Kaur *et al.*, (2001). Weaver *et al.*, in their CT scan based study in Caucasian subjects observed mean orbital height as 32.09 ± 2.2 mm and orbital width as 37.01 ± 2.0 mm. Ebete and Otikpo in Nigeria subjects observed mean OH as 32.46 mm and mean OW as 41.43 mm. Ebeye and Otikpo in their study observed orbital index as 78.15. The Orbital index which determines the shape of the face differs in different population groups. This means that the orbit with larger width than height will have smaller orbital indices while those with larger orbital index will have narrow faces. Kaur *et al.*, observed OI as 81.65 which has low orbital index to the observations in the present study (86.13 and 90.69 on right and left side). The skulls can be classified as below: (Table 1)

Table 1: Showing the classification of Orbital index

Type	Orbital index	Commonly seen in
Megaseme (large)	89 or more	Yellow races (Patrick, 1913)
Mesoseme (intermediate)	89 to 83	White races (European 87, English 88.4) ("mesoconch" Mcgraw)
Microseme (small)	83 or less	Black races (Patrick, 1913)

Conclusion

Thus based on the present study, Indian skulls of north coastal Andhra Pradesh can be placed between mesoseme and megaseme. The study is useful in surgical aspects of oromaxillary surgery, orbital surgeries, and cosmetic surgeries and in medico-legal aspects of forensic medicine.

REFERENCES

Anil Kumar (2014). Morphometry of the orbital region: Beauty is bought by judgment of the eyes. *International Journal of Anatomy and Research* 2(3) 566-70, Issn 2321-4287.
Ebeye OA and Otikpo O (2013). Orbital Index in Urhobos of Nigeria. *IOSR Journal of Dental and Medical Sciences* 8(2) 51-53.
Ghosh A, Manjiri C and Mahaptra S (2013). The craniofacial anthropometric measurements in a population of normal newborns of Kolkata. *Nepal Journal of Medical Sciences* 2(2) 12-9.

Research Article

- Gosavi SN, Jadhav SD and Zambre BR (2014).** A study of orbital morphometry in Indian dry skulls. *Asian Journal of Biomedical and Pharmaceutical Sciences* **04**(29) 23-25.
- Kaur J, Yadav S and Sing Z (2012).** Orbital dimentions – A direct measurement study using dry skulls. *Journal of Academia and Industrial Research* **1**(6) 293-5.
- "Mesoconch" McGraw Hill (2003).** *Dictionary of Scientific and Technical Terms* (Mcgraw hill company inc) answers.com (homepage on the internet). Available: <http://www.answers.com/topic/mesoconch>.
- Patniak VVG, Bala Sanju and Singla Rajan K (2001).** Anatomy of the bony orbits- some applied aspects. *Journal of the Anatomical Society of India* **50**(1) 59-67.
- Patrick J (1913).** Megaseme webster dictionary. Cassidy 1913 answers.com (homepage on the internet). Available: <http://www.answers.com/topic/megaseme>.
- Patrick J Cassidy (1913).** Microseme webster dictionary. answers.com (homepage on the internet). Available: <http://www.answers.com/topic/microseme>.
- Ukoha U, Egwu OA, Okafor IJ, Ogugua PC, Onwudinjo O and Udemezue OO (2011).** Orbital dimensions of adult male Nigerias: a direct measurement study using dry skulls. *International Journal of Biological and Medical Research*.
- Weaver AA, Loftis KI, Tan JC, Duma SM and Stitzel JD (2010).** CT scan based three-dimensional measurement of orbit and eye anthropometry. *Investigative Ophthalmology & Visual Science* **51**(10) 4892-7.
- Weiss RA, Haik BG, Saint-Louis LA and Ellsworth RM (1987).** Advanced Diagnostic Imaging Techniques in Ophthalmology. *Ad Ophthalmic Plastic & Reconstructive Surgery* **6** 207-263.