



Original Research Article

Study of Orbital Index in Human Dry Skulls of South Indian Origin

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ABSTRACT

The orbits are conical or four sided pyramidal cavities, which open on either side of nose in the face. The main function of the orbital bony socket is to give protection to the eye. Orbital measurements vary in different races of mankind. Its measurements are better understood by knowing orbital index. 200 hundred human dry skulls (130 skulls belongs to male gender and 70 skulls belongs to female gender) of south Indian origin were studied. Orbital index: Orbital height/Orbital width X 100. The mean orbital index of south Indian adult human male was found to be 81.13 and in adult south Indian human females it was 82.32. Regional studies on the orbital index will provide useful data for clinical and surgical treatment for needy patients in ophthalmology, oral and maxillofacial surgery and neurosurgery.

Key words: Dry skulls, Measurements, Orbital index, South Indian.

INTRODUCTION

The orbit is the bony socket in the skull where the eye and its appendages are situated. [1] In the adult human, the volume of the orbit is 30 to 32 ml, of which the eye occupies only 1/5th of the space. [2] The orbits are conical or four sided pyramidal cavities, which open on either side of nose in the face. Each consists of a base, an apex and four walls. The main function of the orbital bony socket is to give protection to the eye. Orbital measurements vary in different races of mankind. Its measurements are better understood by knowing orbital index. Orbital index of the person is must to do any operations related to orbit for the specialists like ophthalmologists, oral maxillofacial

surgeons and neurosurgeons. Anthropology helps us to understand the anatomic structures of the orbit, and constitutes the technique of expressing makeover of human body and skeleton [3] for these reasons knowing the orbital index of different races by doing the regional studies is must for the better treatment. Orbital indices have been studied by several authors. Suzuki 1969 [4] reported microsome type of eye in East Asia, Adebisi 2003, [5] evaluated sexual dimorphic characteristics in Hausa and Fulani he observed low dimensions in males than females. Oladipo G.S et al., 2009 [6] studied The Circumference Interorbital Index of Ijaw and Igbo Ethnic Groups in Nigeria. Igbigbi and Ebite in 2010 [7] calculated orbital index in Malawians. Ukoha et al.,

2011 [8] studied Orbital dimensions of adult male Nigerians: a direct measurement study using dry Skulls, These studies indicate racial and ethnic differences occur in orbital index amongst different population. The present study was aimed at documenting standard values of orbital indices in a south Indian group and comparing it with available data from other populations of the world. These would be very useful in anthropological studies, craniofacial surgery and diagnosis of craniofacial anomalies.

MATERIALS AND METHODS

200 hundred human dry skulls (130 skulls belongs to male gender and 70 skulls belongs to female gender) of south Indian origin were studied with age ranged from 35 -80 years. Only normal skulls were selected for the study. Skulls with craniofacial malformations or any skulls with healed fractures or operated previously for some or the other reason were excluded from the study. All the skulls for the study were taken from the department of Anatomy DM-WIMS, Wayanad, Kerala.

Standard methods were used for all measurements. All measurements were taken twice and average reading recorded by using digital Vernier caliper.

Orbital height: the distance between the superior and inferior margin of the orbital fossa.

Orbital width: the distance between the medial and lateral walls of the orbital fossa (from the frontal process of the zygomatic arch to the frontal process of the maxilla).

Orbital index: Orbital height/Orbital width X 100

Table 1: Showing the classification of Orbital index.

Type	Orbital index	Commonly seen in
Megaseme (large)	89 or more	Yellow races [9]
Mesoseme (intermediate)	89 to 83	White races (European 87, English 88.4) [10]
Microseme (small)	83 or less	Black races [11]

RESULTS

Table 2: showing the orbital index in the present study

Sample size	Male		Female	
	Mean	SD	Mean	SD
Orbital height	34.04 mm	3.12	32.12 mm	2.89
Orbital width	41.89 mm	2.34	39.02 mm	3.08
Orbital index	81.13	0.72	82.32	0.68

Table 2 shows the mean orbital height in males is 34.04mm while in females its 32.12mm, orbital width in males was found to be 41.89 and 39.02 in females, also orbital index was found to be 81.13 in males and 82.32 in females. All the measurements are found to be higher in males than females. The difference between males and females indices were statistically significant (p<0.05).

DISCUSSION

The mean orbital index of south Indian adult human male was found to be 81.13 and in adult south Indian human females it was 82.32. This value places the orbital index of south Indian males and females in Microseme category (Table 1). This coincides with the previous study (Kaur et al and Gosavi S.N et al) which demonstrated that the Indian races have microseme orbital index.

Table 3: comparison with the previous studies

Parameter (mm)	Kaur et al. [12]	Weaver et al. [13]	Ebeye and Otikpo [14]	Gosavi S. N et al [15]	Present study	
					Male	Female
Orbital height	32.05	32.09	32.46	32.31	34.04 mm	32.12 mm
Orbital width	39.25	37.01	41.53	39.46	41.89 mm	39.02 mm
Orbital index	81.65		78.36	81.88	81.13	82.32

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. [12] Anthropometric studies are an integral part of biological variability, [16,17] forensic investigation, [18-20] craniofacial surgery and syndromology. [21] Orbital indices are also one of the vital measurements in the evaluation, and diagnosis of craniofacial syndromes and post traumatic deformities. The knowledge of the orbital index of a particular region can be used as guidelines for the further studies and for the treatment of craniofacial deformed patients. [22] Variations in the orbital index in different races and regions prove that craniofacial growth depends on races, ethnic, social and dietary background.

CONCLUSION

Regional studies on the orbital index will provide useful data for clinical and surgical treatment for needy patients in ophthalmology, oral and maxillofacial surgery and neurosurgery. This study done on south Indian adult dry skull may be useful for the forensic medicine experts. More regional studies should be done for the standardisation of the values for the particular races in the world. It helps the physical anthropologists to know the migration pattern of the early civilization.

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