Original Research Article

A study of orbital index in south Indian west coast population

Sanjaykumar B Revankar[1], Shishirkumar[2*], Shivarama CH[3], Chethana YK[4]

[1]Assistant Professor, Department of Anatomy, Father Muller Medical College, Mangalore.
[2,3]Associate Professor, [4]Tutor, Department of Anatomy, Kanachur Institute of Medical Sciences, Mangalore.
Email: dr.shishirkumar091010@gmail.com

Abstract

Orbit is a bony socket which contains one of the most important if not the important sense organ. In the ancient world the eyes were considered to be the windows to the soul. In modern Medicine it is considered as a window to observe the brain. Such highly developed sense organ is actually surrounded by a secured orbit. The orbit is the bony cavity in which the eye ball rests. The orbit also contains the other neuro - vascular structures and the muscles that is needed to move the eyeball so as to directly allow the parallel rays of light inside. The shape of the orbit can be roughly considered as a four sided pyramid with a somewhat square base. The shape and the size of the socket differ from race to race. It is highly studied and is important in forensic sciences in the field of identification. Orbital Index is one of the most commonly studied and one of the easiest ways to find the race of the individual. India being a country where diversity is seen at every step this study puts in an effort to find if there are any and also this study along with some other studies in this region tries to put a baseline measurement for this population.

Key Words: Orbital Index, South Indian population, Forensic, Cross Sectional, Identification.

[*]**Address for Correspondence:**
Dr. Shishirkumar, Department of Anatomy, Kanachur institute of Medical Sciences, Natekal, Mangalore – 575018
Email: dr.shishirkumar091010@gmail.com
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INTRODUCTION

The orbits are situated on each side of the median plane of the face[1]. Orbit is a bony socket which contains one of the most important if not the important sense organ. In the ancient world the eyes were considered to be the windows to the soul. In modern Medicine it is considered as a window to observe the brain[4]. Such highly developed sense organ is actually surrounded by a secured orbit. The orbit is the bony cavity in which the eye ball rests. The orbit also contains the other neuro - vascular structures and the muscles that is needed to move the eyeball so as to directly allow the parallel rays of light inside[2]. The shape of the orbit can be roughly considered as a four sided pyramid with a somewhat square base. The shape and the size of the socket differ from race to race[8]. The humans have a binocular vision and to do so there are specialized muscles called as the extra-ocular muscles as mentioned earlier. This helps to focus the parallel rays of light and conveys a single image to the brain[3]. The physical anthropologists are one more set of people that have worked tremendously in this field[5,6]. Also the measurements of the orbit are important in reconstruction surgeries. Congenital anomalies have been studied and have been reported across the globe. There are many syndromes where the measurements of the orbit and the eyeball are studied.[11] The shape and the size of the socket differ from race to race. It is highly studied and is important in forensic sciences in the field of identification. Orbital Index is one of the most commonly studied and one of the easiest ways to find the race of the individual[7,9,10]. India being a country where diversity is seen at every step this study puts in an effort to find if there are any and also this study along with some other studies in this region tries to put a baseline measurement for this population.

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AIMS AND OBJECTIVES

The study aims to understand the orbital index and also other measurements of the orbit in the South Indian West coast population.

MATERIALS AND METHODS

This study was done in the Department of Anatomy, Kanachur Institute of Medical sciences from December 2014 to June 2015 and then more cases were added in the month of December 2018. The study was first done in Department of Anatomy Kanachur Institute of Medical sciences. All together there are 232 dry bones were studied for the study. The length and the breadth of the orbit were measured and also the orbital Index was calculated. Different studies and literature that was available was studied and a comparison was drawn.

Inclusion Criteria:

All skulls that was fully developed (Fetal skulls were not studied)

Exclusion Criteria:

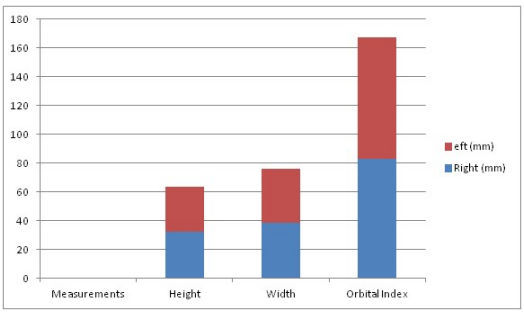
Disfigured skulls were not studied.

RESULTS

Table 1: Measurements and the Orbital Index

Measurements	Right (mm)	Left (mm)
Height	32.11 ± 2.16	31.45 ± 3.24
Width	38.65 ± 3.64	37.34 ± 3.34
Orbital Index	83.07	84.22

The mean height of the orbit on the right side was found to be 32.11mm with a standard deviation of 2.16mm. The mean height of the orbit on the left side was found to be 31.45mm with a standard deviation of 3.24mm. The mean width of the orbit on the right side was found to be 38.65 with a standard deviation of 3.64mm. The mean width of the orbit on the left side was found to be 37.34 with a standard deviation of 3.34mm. The Orbital Index was calculated to be 83.07 on the right side and 84.22 on the left side.



Graph 1: Measurements and the Orbital Index.

DISCUSSION

The orbital index is calculated taking the orbital length and the breadth. The preliminary requirements are the orbital length which is measured using the points so as to measure the maximum length of the orbit. Then the points that represent the maximum breadth or width is measured. Then the orbital index is calculated using the formula length (Height) divided by the breadth and this is multiplied by 100. This gives us the orbital index. Based on index orbits are Megaseme (large) when Orbital Index is 89 are more. These type is seen in yellow races.[9] Mesoseme (Intermediate between the yellow and the black races) the Orbital Index ranges between 83 to 89, these type is seen in the white races10. Microseme (small) Orbital Index is 83 or less is characteristics of black races where the orbital opening is rectangular9,10. According to Ukoha U, Egwu OA, Okafor IJ, Oguagu PC, Onwudingo O,Udemezue OO in their study Orbital dimensions of adult male Nigerians: a direct measurement study using dry skulls the orbital index was found to be more than 89. Kaur J, Ydav S, Singh Z. Orbital dimensions in their study A direct measurement study using dry skulls reported the mean orbital index of 81.6513. Deepak S. Howale, Jain L. K, Kanaklata Iyer, *et al* in their study Orbital and Nasal indices of Maharastra region: A direct measurement study using dry skulls reported the orbital index to be 86.414. Munguti J, Mandela P, Butt F. Referencing orbital measures for surgical and cosmetic procedures reported orbital index to be 83.0315. Gosavi SN, Jadhav SD, Zambre BR in their study Orbital morphology with reference to bony landmarks reported the orbital index to be 81.8816. Patil GV, T Shishirkumar, D Apoorva, Sharif J, Sheshgiri C, Sushanth NK in their Study of orbital index in human dry skulls of South Indian origin reported the mean orbital index to be 81.23.

In our study the mean height of the orbit on the right side was found to be 32.11mm with a standard deviation of 2.16mm. The mean height of the orbit on the left side was found to be 31.45mm with a standard deviation of 3.24mm. The mean width of the orbit on the right side was found to be 38.65 with a standard deviation of 3.64mm. The mean width of the orbit on the left side was found to be 37.34 with a standard deviation of 3.34mm. The Orbital Index was calculated to be 83.07 on the right side and 84.22 on the left side. Our study stands in agreement with the other studies. Still subpopulations of this country have to be studied. So this study forms a base line from which the further studies can be compared.

CONCLUSION

The study is successful in finding the orbital index in this population. This study puts in a strong statistic baseline

which can be compared and used by other authors in and around this population and also other parts of the country.

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