# RESEARCH ARTICLE

## STUDY OF ROSTRAL AND PROSCOPIC INDICES AMONG SCHOOL GOING TRIBAL CHILDREN'S IN CHHATTISGARH, INDIA

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**ABSTRACT**

**Background:** Rostral and Proscopic dimensions are always influenced by age, sex race(tribe). We were Students selected those parents and grandparents that are tribe. Rostral and Proscopic measurements and indices are used to find out different shapes of Rostral and Proscopic. It is very useful for all upcoming Anatomists, forensic scientists, plastic surgeons, physical anthropologists. We were calculated rostralproscoic indices, rostral length, rostral breadth, rostral index, proscopic length, proscopic breadth, proscopic index. We excluded all students those had any history or features of rostralproscopic anomaly, proscopic trauma or surgeries on the proscopic or rostral. **Aim:** To evaluate the rostral index and proscopic index by anthropometric measurement in tribal school going children's. **Materials and Methods:** Present research was selected at random 400 healthy school going tribal students of age 9 – 15 years and anthropometric measured done by using spreading, sliding caliper. **Result:** In tribal student dominant type of Rostral shape are Ultra Brachycephalic and the mean Rostral index is 84, in Male is 83 and in Female is 86, the mean Rostral length in Male is 21 cm, in Female is 23 cm and the mean Rostral breadth in Male is 19 cm, in Female is 20 cm. Dominant type of Proscopic shape are Leptoproscopic proscopic (long proscopic) and the mean Proscopic index is 84, in Male is 84 and in Female is 85, the mean Proscopic length in Male and Female is 17 cm and the mean Proscopic breadth in Male and Female is 20 cm. **Conclusion:** Predominant rostral type in males was Brachycephalic (short headed), and in female was Ultra Brachycephalic, Predominant proscopic type in males was Euryproscopic proscopic (Broad proscopic) and in female was Leptoproscopic proscopic (long proscopic). The research has established that male and female have same mean morphological proscopic height and breadth.

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## INTRODUCTION

Rostral index is derived from the Greek word " Kephalic" meaning "rostral", The Greek work " ikos" meaning "Pertaining to" and the Latin word "Index" meaning" that which points out". Amount of population and age specific data on rostral indices which give an indication of growth and development and abnormalities of rostral shape and size of individuals (Martin, 1957; Williams, 2000). Rostralproscopic anthropometry, as an important part of anthropology and medicine, is used for the determination of the morphological characteristics of the rostral and proscopic. Proscopic shape depends on many factors, such as gender, race and ethnicity, climate, socio-economic, nutritional, and genetic factors. The determination of proscopic parameters is of great importance

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for the evaluation of proscopic trauma, congenital and traumatic deformities and easier identification of certain congenital malformations (Oladipo, 2008a; Oladipo, 2009a; Oladipo, 2008b). Comparison of changes in proscopic index between parents, offspring and siblings can give a clue to genetic transmission of inherited characters (Bhasin, 2006). Our nation India is a complex, varied ethnic composition of its population and races. Two people can never be alike in all their measureable traits. Human proscopic curve has always been an interesting topic for anatomists, anthropologists, plastic surgeons and artists. Physical anthropologists have been measuring skull for years and obtained results enabled them to trace the relationship between the races as they believe that the form of skull remain the same in each race and only different races show different proscopic index and rostral index (Goldstein, 1936). Proscopic index bears a direct relationship with morphological proscopic height and an indirect relationship with the maximum proscopic width of an individual. The morphological proscopic height was shown to have a positive correlation with age (Li, 2015).

Population-specific rostralproscopic standards identified could also be used in the design of equipment, clothing and work spaces for both men and women (Pouya, 2017). The purpose of this research is to establish the predominant types of proscopic among tribal student in Chhattisgarh based on their proscopic indexes, to correlate the proscopic indexes with rostral index. This knowledge is valuable for all craniofacial reconstruction surgeries, forensic medicine and bioengineering, anthropology, human anatomic studies.

## MATERIALS AND METHODS

This research was done in 400 tribal students of age group 9 – 15 years Grades 5 to 8 from Govt. school Amoda, Govt. school Murhipar, Govt. girls ashram Raipur Chhattisgarh. The present research was explained to them and informed consent was taken to the school head. Assessing Cephalic index used to Hrdlicka's method and for facial index used to the Hooten's Method[11] . Rostral length = Glabella to opisthocranion (GOP), Rostral breadth = Euryon – Euryon (Eu-Eu), Proscopic height (Nasion – Gnanthion) (N-Gn), Proscopic breadth= bizygomatic (Zy- Zy), it all was measured by spreading caliper at a fixed time to avoid any possible diurnal variations, the subject sitting in relaxed condition and head in Anatomical position, straight and looking forward.

Rostral index (CI) = (Eu-Eu/ G – OP)×100 , Prosopic index (FI) = (N – Gn/ Zy-Zy) × 100. This research obtained indices, the types of head & face shapes were classified according to Martin & saller method[12]. We were Students selected those parents and grandparents that are tribe and belongs to chhattisgarh state, we excluded all students that are non tribal, from other states, any history of bone diseases like Rickets and Osteomalacia, any obvious physical deformity, cranial trauma & obstructive hairstyle. Collected data was analyzed using Microsoft Excel.

## RESULTS

This present research provides important highly new information when diagnosing genetic diseases by clinical geneticists, concerning the total rostral and proscopic index, shape, and rostral, proscopic phenotype in the tribal students. In our present research, from the obtained data, statistics were analyzed and observations and results are presented in tabular form(Table 1,2,3). We found in tribal student dominant type of rostral shape were Ultra Brachycephalic and the mean rostral index is 84, in male is 83 and in female is 86, the mean rostral length in Male is 21 cm, in female is 23 cm and the mean rostral breadth in male is 19 cm, in female is 20 cm. Dominant type of proscopic shape are Leptoproscopic proscopic

**Table 1. Table showing the incidence, the relation of the sex with Rostral Index and Proscopic Index**

| S.N | Proscopic Index and Rostral Index range | Proscopic Index (No of cases) | | | Rostral Index (No of cases) | | |
|---|---|---|---|---|---|---|---|
| | | Male | Female | Total | Male | Female | Total |
| 1. | 71-72 | 1 | 4 | 5 | 8 | 16 | 24 |
| 2. | 72-73 | 2 | 3 | 5 | 3 | 10 | 13 |
| 3. | 73-74 | 0 | 0 | 0 | 1 | 2 | 3 |
| 4. | 74-75 | 3 | 6 | 9 | 4 | 14 | 18 |
| 5. | 75-76 | 4 | 9 | 13 | 3 | 12 | 15 |
| 6. | 76-77 | 4 | 5 | 9 | 1 | 3 | 4 |
| 7. | 77-78 | 3 | 18 | 21 | 2 | 6 | 8 |
| 8. | 78-79 | 1 | 1 | 2 | 1 | 1 | 2 |
| 9. | 79-80 | 2 | 14 | 16 | 6 | 20 | 26 |
| 10. | 80-81 | 10 | 10 | 20 | 5 | 12 | 17 |
| 11. | 81-82 | 1 | 3 | 4 | 2 | 8 | 10 |
| 12. | 82-83 | 5 | 21 | 26 | 2 | 30 | 32 |
| 13. | 83-84 | 15 | 12 | 27 | 4 | 5 | 9 |
| 14. | 84-85 | 10 | 25 | 35 | 2 | 20 | 22 |
| 15. | 85-86 | 8 | 12 | 20 | 8 | 10 | 18 |
| 16. | 86-87 | 5 | 8 | 13 | 1 | 8 | 9 |
| 17. | 87-88 | 6 | 10 | 16 | 3 | 20 | 23 |
| 18. | 88-89 | 3 | 18 | 21 | 3 | 3 | 6 |
| 19. | 89-90 | 10 | 65 | 75 | 5 | 56 | 61 |
| 20. | 90-91 | 1 | 6 | 7 | 2 | 21 | 23 |
| 21. | 91-92 | 2 | 4 | 6 | 6 | 42 | 48 |
| 22. | 92-93 | 2 | 7 | 9 | 1 | 2 | 3 |
| 23. | 93-94 | 7 | 10 | 17 | 1 | 4 | 5 |
| 24. | 94 – 95 | 5 | 19 | 24 | 0 | 1 | 1 |

**Table 2. Table showing Proscopic length and breadth, Rostral length and breadth in Males and Females**

| S.N. | Range(cm) | Proscopic | | | | Rostral | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Length(cm), no of case(400) | | Breadth(cm) ),no of case(400) | | Length(cm),no of case(400) | | Breadth(cm) ),no of case(400) | |
| | | Males | Females | Males | Females | Male | Female | Male | Female |
| 1. | 8-9 | - | - | - | - | - | - | 10 | 16 |
| 2. | 9-10 | 3 | 9 | - | - | 3 | 6 | 13 | 13 |
| 3. | 10-11 | 5 | 7 | - | 1 | 5 | 4 | 7 | 9 |
| 4. | 11-12 | 10 | 14 | 2 | 7 | 14 | 11 | 6 | 14 |
| 5. | 12-13 | 11 | 11 | 4 | 8 | 4 | 8 | 2 | 13 |
| 6. | 13-14 | 9 | 15 | 5 | 11 | 8 | 9 | 8 | 10 |
| 7. | 14-15 | 8 | 35 | 6 | 8 | 5 | 5 | 1 | 6 |
| 8. | 15-16 | 11 | 35 | 12 | 17 | 4 | 12 | 1 | 8 |
| 9. | 16-17 | 8 | 32 | 7 | 16 | 2 | 12 | 6 | 7 |
| 10. | 17-18 | 17 | 43 | 10 | 19 | 3 | 12 | 7 | 13 |
| 11. | 18-19 | 22 | 37 | 19 | 48 | 8 | 5 | 14 | 15 |
| 12. | 19-20 | 16 | 24 | 20 | 51 | 5 | 7 | 22 | 46 |
| 13. | 20-21 | 3 | 7 | 17 | 26 | 10 | 13 | 4 | 23 |
| 14. | 21-22 | 4 | 3 | 16 | 29 | 12 | 33 | 7 | 29 |
| 15. | 22-23 | - | 1 | 7 | 8 | 8 | 17 | 7 | 25 |
| 16. | 23-24 | - | - | 5 | 11 | 13 | 24 | 7 | 13 |
| 17. | 24-25 | - | - | 5 | 2 | 8 | 29 | 4 | 5 |
| 18. | 25-26 | - | - | 0 | 3 | 6 | 27 | 3 | 5 |
| 19. | 26-27 | - | - | - | - | 6 | 18 | 1 | 1 |
| 20. | 27-28 | - | - | - | - | 9 | 12 | - | - |
| 21. | 28-29 | - | - | - | - | 1 | 4 | - | - |

**Table 3. Distribution of Proscopic shapes, Rostral shapes according to observed Proscopic index and Rostral Index**

| | Proscopic index | | | | Rostral Index | | |
|---|---|---|---|---|---|---|---|
| Proscopic shapes | Male | Female | Total | Rostral shapes | Male | Female | Total |
| Hyper Euri Proscopic (< 79.9) | 18 | 46 | 64 | Dolico Rostral (< 75) | 16 | 42 | 58 |
| Euri Proscopic ( 80 – 84.9) | 33 | 60 | 93 | Meso Rostral ( 75 – 80) | 7 | 22 | 29 |
| Meso Proscopic ( 85 – 89.9) | 32 | 73 | 105 | Brachy Rostral ( 80 – 85) | 19 | 75 | 94 |
| Lepto Proscopic (90 – 94.9) | 22 | 92 | 114 | Hyper Brachy Rostral ( 85 – 90) | 17 | 61 | 78 |
| Hyper Lepto Proscopic (> 95) | 5 | 19 | 24 | Ultra Brachy Rostral ( > 90) | 15 | 126 | |

(long proscopic) and the mean proscopic index is 84, in Male is 84 and in Female is 85, the mean proscopic length in male and female is 17 cm and the mean Proscopic breadth in Male and Female is 20 cm. Predominant rostral type in males was Brachycephalic (short headed), and in female was Ultra Brachycephalic, Predominant proscopic type in males was Euryproscopic proscopic (Broad proscopic) and in female was Leptoproscopic proscopic (long proscopic).

# DISCUSSION

The proscopic plays an important role in the identity of an individual, one's sex, one's tribe or race; and one of the unique proscopic features utilized in this regard was the proscopic index.

Proscopic analysis using proscopic index was essential in the study, classification and reconstruction of the human proscopic and it was therefore useful to anatomists, anthropologists, plastic surgeons and maxillofacial surgeons (Kumari, 2015; Yesmin, 2014). No two persons were ever alike in all their measurable characters; undergo change in varying degrees from birth to death, in health and in disease, and since persons living under different condition. It was a measurement of man, living or dead, and consists primarily in the measurement of the dimensions of the body (Ashley Montagu, 1951). A previous research G.S. Oladipo (Oladipo, 2010) found leptoproscopic, Oblinna Remiguis (Oblinna Remiguis, 2019) found hyperleptoproscopic and leptoprosopic in both children and adolescent. A. A. Akinlolu (2015) found in ethnic groups of Gombe State, Nigeria was the leptoprosopic, A.M. Torres-Restrepo et al. (2014) found among Africans was the leptoprosopic. Mahesh Kumar (Kumar, 2013) found in 600 Haryanvi adults mean proscopic index male = 86.09 Mesoprosopic. Vaishali Yagain (Yagain, 2012) found in Indian students mean proscopic index = 79.38, mean proscopic index male = 77.92, Mesocephalic, mean rostral index Female = 80.85, Brachycephalic. Dr. Anupama Mahajan (Mahajan, 2009) found in Punjabi medical students mean rostral Index=85.53, Brachycephalic and Hyperbrachycephalic, Mean rostral index male=81.64, mean rostral index female=85.75. Vaishali R. Shetti (Shetti, 2011) found in Indian and Malaysian students mean proscopic index Malaysian male = 85.72 Euryprosopic, mean proscopic index Malaysian female = 87.71 Mesoprosopic, mean proscopic index Indian male = 87.19 Mesoprosopic, mean proscopic index Indian female = 86.75 Mesoprosopic and Euryprosopic. Praveen Kumar[24] found in male South Indian, mean rostral index = 76.78, mean proscopic index = 90.95. We obtained present research in tribal student dominant type of rostral shape were Ultra Brachycephalic, dominant type of proscopic shape were Leptoproscopic proscopic (long proscopic).

Predominant rostral type in males was Brachycephalic (short headed), and in female was Ultra Brachycephalic, Predominant proscopic type in males was Euryproscopic proscopic (Broad proscopic) and in female was Leptoproscopic proscopic (long proscopic), our research are similar to Akinlolu, Torres, and differ to rest researchers. the mean rostral index is 84, in male is 83 and in female is 86, the mean rostral length in Male is 21 cm, in female is 23 cm and the mean rostral breadth in male is 19 cm, in female is 20 cm. Dominant type of proscopic shape are Leptoproscopic proscopic (long proscopic) and the mean proscopic index is 84, in Male is 84 and in Female is 85, the mean proscopic length in male and female is 17 cm and the mean Proscopic breadth in Male and Female is 20 cm. Such differences could be due to genetic and nutritional influences on the students of the present research and the previous research.

**Conclusion**

The present research we found tribal students in Ultra Brachycephalic, Leptoproscopic proscopic. The mean rostral index was found to be 86 for Females and 83 for Males. The mean proscopic index Male is 84 and in Female is 85, in tribal student we found significant gender difference in rostral index and proscopic index. There are no published data found on rostral and proscopic index of tribal students in Chhattisgarh. This present research immense important in the design of face mask and forensic investigations, anthropology, comparative and evolutionary studies, upcoming scientist.

**Author's contribution:** Dr. Rajni Thakur has made to conception, all related procedure, drafting the manuscript, tabulation, and Dr. Anjana Tiwari has made collection of sample, revising manuscript, arrangement of tables.

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