Original Article

ANTHROPOMETRIC STUDY OF FACIAL INDEX AND ITS CLINICAL IMPLICATIONS AMONG MEDICAL STUDENTS IN DEVDAHA MEDICAL COLLEGE AND RESEARCH INSTITUTE, RUPANDEHI, NEPAL

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ABSTRACT

Background
The human facial contour has always been an interesting subject for anatomists, anthropologists, plastic surgeons and artists. The purpose of study was to create and evaluate data on face anthropometry.

Methods
A descriptive cross-sectional study was conducted in 200 medical students studying at a tertiary care hospital during the period of 5th September 2022 to 5th February 2023 after ethical clearance from the institutional review committee (Ref. No: 194/079/080). Simple random sampling was done. Data were collected, entered in Statistical Package for Social Sciences version 20.

Results
We observed that mean indices of the facial height was10.43± 0.84, facial width was 12.40±0.68,range of facial height was 9.31-13.01 and range of facial width was11.10-15.13 cm. Mesoprosopic face was predominant among female whereas leptoprosopic face type was more common among male population of the study. The most common face type was mesoprosopic and the uncommon was hyperleptoprosopic. The least common face among men was Europrosopic while among women was hyperleptoprosopic type. There was significant difference in the male and the female facial index.

Conclusions
A higher index for all the parameters was seen among males than females. The data obtained may be useful in anthropological research, forensic, genetic research, as well as in medical clinical practice.

Keywords: Anatomy, Facial Index, Gnathion, Nasion, Zygion

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INTRODUCTION

Face plays a main role for the individual identity. The facial characters are important for recognition of the race, nationality, and their ethnicity.[1] These facial features may be calculated using the various invasive and noninvasive tools. The noninvasive tool that helps in the calibration of the various human body parts is the anthropometric analysis. It can be employed in both the dead and alive subjects.[2-5] The values obtained from this method are applied in the forensic cases, for the sex determination in the medico legal cases, and other evolutionary scientists. Various other dimensional values are also present that can help in the identification and the treatment planning for various medical professionals. The changes in the dimension of the face occur over a period of time from birth till death. Almost over one third of the face's development completed by the time of the birth. The growth occurs slowly and increases approaching the growth spurts. The facial growth depends on the various factors like ethnicity, sex, nutritional levels, genes etc.[4-6] The facial index was calculated from the facial height and the facial breadth, and it was classified as leptoprosopic, mesoprosopic, and europrosopic.[7] Various populations have different indices. In the present study our aim was to conduct anthropometric study of facial index and its clinical implications among medical students in Devdaha Medical College and Research Institute, Rupandehi District, Nepal.

METHOD

In our study we conducted a cross-sectional study among medical students of Devdaha Medical College and Research Institute, Rupandehi District, Nepal. The study was conducted from 5th of September 2022 to 5th of February 2023. A total of 200 participants were included in the study. Participants with history of oculofacial trauma, craniofacial deformities (congenital or acquired) and abnormal neurological findings affecting the craniofacial dimensions (such as facial palsy, ptosis, and squint) were excluded from the study. Students were asked to sit in a relaxed state, straight and looking forward. Ethical clearance was taken from the Institutional Review Committee of Devdaha Medical College and Research Institute on 4th September 2022 (Ref. No: 194/079/080). The study was done after the consent was taken from the participants. We distributed both male and female participants equally (N=100). Vernier caliper was used to scale the facial width and height. The facial height was taken from the nasion (midline bony depression between the eyes where the frontal and two nasal bones meet) to gnathion (midline anatomical point at the base of the mandible). The point from right zygion (the most lateral point on each zygomatic arch) to left zygion was considered as facial width. Both these values are calculated in centimeters. We calculated the facial index as percentage of facial width divided by facial height. We followed the facial index classification as leptoprosopic, mesoprosopic, and europrosopic. The data was collected, entered and analyzed by software package for social sciences 20 (SPSS 20). Data were represented, frequency, mean and standard deviation and considered significant at $P<0.05$

RESULTS

Table 1: Comparison of the facial height and width.

Gender	N(200)	Facial height Mean± SD(cm)	Facial width Mean± SD(cm)	Range of facial height (cm)	Range of facial width (cm)
Men	100	11.21± 0.37	12.70±0.63	10.9-13.01	11.21-15.11
women	100	10.21± 0.58	12.15±0.61	9.31-12.61	11.10-13.72
Total	200	10.43± 0.84	12.40±0.68	9.31-13.01	11.10-15.13

Table 1: The facial height and width was seen difference in between male and female subjects. The men subjects showed greater facial width and height than their counterparts.

Table 2: Comparison of the facial index

Gender	Range of the Facial index	Mean ± SD of the Facial index	P
Men	74.16-100.01	89.32±5.01	<0.001
women	76.70-92.67	85.81±4.01	<0.001
Total	76.19-100.01	87.43±4.83	<0.001

Table 2: The range of the facial index showed higher in male subjects than in the female. This variation of facial index had significant difference between the males and females.

Table 3: Comparison of the face type

Face types	Facial index	Male	Female
Leptoprosopic	90-95	45.81	12.04
Mesoprosopic	85-90	29.16	45.80
Europrosopic	80-85	6.95	34.95
Hypereuroprosopic	<80	8.32	7.25
Hyperleptoprosopic	>95	9.71	1
Total		46.45	53.54

Table 3: According to the facial index, the face was categorized into leptoprosopic, mesoprosopic, europrosopic, hyperleptoprosopic, and hypereuroprosopic. In our study subjects that the females mesoprosopic face

was more then the men but leptoprosopic face type was more in the males.. The most common face types was mesoprosopic and the uncommon was hyperleptoprosopic. The least common face among males was Europrosopic while infemales hyperleptoprosopic face type was least common. There was significant difference in the males and the females facial index.

DISCUSSION

The facial features are dependent of the ethnicity, gender and age. The facial measurements of our subjects were similar to those of the participants in the study among the Malaysian populations.[8]The mean facial height was found less than those in the study of the Srilankan subjects.[9] However in the same study the facial width was lower than our study subjects. Our study has shown lower facial index than the Serbian andSrilankans.[9,10]In our study the uncommon face type was Europrosopic which is in contrast to the Srilankans and the Serbian's where hypereuroprosopic type of the face was the least common.[9,10] Previous studies have shown that there are some standards set for the perception of the beauty. Narrow face is considered attractive in the fashion industry.[11]Several stud-

ies state that those with the male with much bony features i.e., Europrosopic faces were more violent.[12-15] The facial index is associated with the behavior again proportionally. The greater the facial index the violent the person.[16-19] The facial index is also important in the treatment planning and also for the educational purposes to show the probable treatment outcomes. The facial index may be impacted by the hormones like the testosterone. In the forensics the values of the facial measurement are important to identify the ethnicity of the specimen or the skeletal remains.[19]

CONCLUSIONS

A higher index for all the parameters was seen among men than women. The study was conducted by taking the standard values from the western countries. Further studies with are advised to formulate a quantification tool for the local population of the Nepalese populations.

REFERENCES

1. Ngeow WC, Aljunid ST. Craniofacial anthropometric norms of Malays. Singapore Med J. 2009;50(5):525-8.
2. FarkasLG, DeutschCK. Anthropometric determination of craniofacial morphology. Am J Med Genet. 1996;65(1):1-4.
3. Kamal R,Yadav PK. Estimation of stature from different anthropometric measurements in Kori population of North India. Egypt J Forensic Sci. 2016;6(4):468-77.
4. Scott JH. The Growth of the Human Face. Proc R Soc Med.1954;47(2):91-100.
5. Franciscus RG, Long JC. Variation in human nasal height and breadth. Am J PhysAnthropol. 1991;85(4):419-27.
6. Porter JP, Olson KL. Analysis of the African American female nose. PlastReconstr Surg. 2003;111(2):620-6.
7. Zhang XT, Wang SK, Zhang W, Wang XF. Measurement and study of the nose and face and their correlations in the young adult of Han nationality. PlastReconstr Surg. 1990;85(4):532-6.
8. Yesmin T, Thwin SS, Urmi SA, Wai MM, Zaini PF, Azwan K. A study of facial index among Malay population. J Anthropol. 2014;1-5.
9. Chandimal K, Yasawardene S, Adikari G. Assessment of Prosopic Phenotypes in Purana (old) Inhabitants at Sigiriya Suburbs, Sri Lanka. Int J AdvSci Tech. 2015;3:93-96.
10. Jeremić D, Kocić S, Vulović M, Sazdanović M, Sazdanović P, Jovanović B, et al. Anthropometric study of the facial index in the population of central Serbia. Arch Biol Sci. 2013;65(3):1163-8.
11. Puts DA. Beauty and the beast: mechanisms of sexual selec-

tion in humans. Evol Hum Behav. 2010;31(3):157–75.
12. Geniole SN, Denson TF, Dixson BJ, Carré JM, McCormick CM.Evidence from Meta-Analyses of the Facial Width-to-Height Ratio as an Evolved Cue of Threat. PLoS One. 2015;10(7):e0132726.
13. Dixson BJW. Is Male Facial Width-to-Height Ratio the Target of Sexual Selection? Arch Sex Behav.2018 March 5.
14. Wang Y, Geigel J, Herbert A. Reading personality: Avatar vs. human faces. Proc-2013 Hum AssocConf Affect ComputIntell Interact ACII. 2013; 479–484.
15. Geniole SN, Molnar DS, Carré JM, McCormick CM. The facial width-to-height ratio shares stronger links with judgments of aggression than with judgments of trustworthiness. J ExpPsychol Hum Percept Perform. 2014;40(4):1526-41.
16. Archer J. Does sexual selection explain human sex differences in aggression? Behav Brain Sci. 2009;32:249-66.
17. Torres-Restrepo AM, Quintero-Monsalve AM, Giraldo-Mira JF, Rueda ZV, Vélez-Trujillo N, Botero-Mariaca P. Agreement between cranial and facial classification through clinical observation and anthropometric measurement among Envigado school children. BMC Oral Health. 2014;14:50.
18. Lefevre CE, Lewis GJ, Perrett DI, Penke L. Telling facial metrics: Facial width is associated with testosterone levels in men. Evol Hum Behav. 2013;34(4):273-9.
19. Vanezis M, Vanezis P. Cranio-facial reconstruction in forensic identification--historical development and a review of current practice. Med Sci Law. 2000;40(3):197-205.