

## Study of Prosopic (Facial) Index of Indian and Malaysian Students

Estudio del Índice Prosopo (Facial) de Estudiantes de la India y Malasia

Vaishali R. Shetti; Shakunthala R. Pai; Sneha, G. K.; Chandni Gupta; Chethan, P. & Soumya

---

SHETTI, R. V.; PAI, S. R.; SNEHA, G. K.; GUPTA, C.; CHETHAN, P. & SOUMYA. Study of prosopic (facial) index of Indian and Malaysian students. *Int. J. Morphol.*, 29(3):1018-1021, 2011.

**SUMMARY:** For several generations physical anthropologists measured skulls in the belief that thereby they were likely to obtain results, this would enable them to trace the relationships between the races of mankind. It was believed that the form of the skull in particular remained constant in each race, and that different races typically showed different facial indices. Form of the head and face is now known to be subject to change through environmental influences. Measurement is necessary in order to obtain this kind of knowledge, and in order to be able to give as accurate a description of an individual or group of individuals as possible. The present study aimed at measuring facial index of both sex in Malaysian and Indian students. 300 students of both nations were measured for face length and face width and facial index was calculated. Malaysian males had a mean facial index of 85.72 and females had marginally higher value 87.71. Both belonged to Mesoprosopic face type and were statistically significant. Indian males had a mean facial index of 87.19 where as 86.75 in females. Both belonged to Mesoprosopic face type, and comparison of facial index was statistically not significant. Comparison between Indian and Malaysian subjects indicates that Indians (both sexes together) had a higher (87.04) mean facial index than Malaysians (86.76). However, this difference was statistically not significant.

**KEY WORDS:** Facial index; Face length; Face width; Anthropometry.

---

### INTRODUCTION

In view of the fact that no two persons are ever alike in all their measurable characters, that the latter tend to undergo change in varying degrees from birth to death, in health and in disease, and since persons living under different conditions, and members of different ethnic groups and the crosses between them, frequently present differences in bodily form and proportions. Anthropometry constitutes that it is the technique of expressing quantitatively the form of the body. It is a measurement of man, living or dead, and consists primarily in the measurement of the dimensions of the body (Ashley Montagu, 1951). Comparison of changes in facial index between parents, offspring and siblings can give a clue to genetic transmission of inherited characters. The Indian populations belong to the Mesoprosopic facial index, which varies from Hypereuriprosopic to Hyperleptoprosopic index (Bhasin, 2006). The facial index is the ratio of the maximum length of the face to its maximum width and multiplied by 100 for convenience.

### MATERIAL AND METHOD

In this study 300 medical students of Manipal University were taken as subjects which included students of Kasturba Medical College and Melaka Manipal Medical College, Manipal. Of the total 300 students 200 students were from Melaka Manipal medical college and 100 students were from Kasturba Medical College. Among 200 Malaysian students of Melaka Manipal Medical College, 96 were male students and 104 were female students. Similarly in 100 Indian students 66 were male students and 34 were female students of Kasturba Medical College Manipal. The study included both Malaysians and Indian students of all religions, with age group between 18–22 years in a normal healthy state. Study was carried out with protocol presentation and followed by ethical committee clearance.

Instruments used in the study were manual spreading calipers and pencil. Calipers was manufactured in India by UNA and CO, scale reading up to 60cm. Students were

informed about the study design, its benefits and privacy of the data collected. Consent form was given to each student and consent was taken. Students were asked to sit in a relaxed state, straight and looking forward. Face length was measured from nasion to gnathion. Then face width was measured as Bizygomatic breadth. Facial index were calculated using the following formula.

$$\text{Prosopic index (Facial index)} = \frac{\text{Face length}}{\text{Face width}} \times 100$$

Index was determined on the basis of international descriptions (Table I) (Williams *et al.*, 1995).

Landmarks of measurements were (Fig. 1).

Nasion: The intersection of the nasofrontal suture with the midsagittal plane. Nasion is the uppermost landmark for the measure of facial height.

Gnathion: The most anterior and lowest median point on the border of mandible.

Bizygomatic breadth: Farthest points on zygomatic arches.

Photographs were taken with Sony digital camera of 7.2 megapixels, Model no. DSC – S650 made in China.

Table I. Classification of facial index determined on the basis of international descriptions (Williams *et al.*, 1995).

Face shape	Range of Prosopic index
Hypereuriprosopic	< 79.9
Euriprosopic	80 – 84.9
Mesoprosopic	85 – 89.9
Leptoprosopic	90 – 94.9
Hyperleptoprosopic	>95



Fig. 1. Landmarks showing measurement of face length and face width.

## RESULTS

The findings of our study are depicted in Tables II and III. In general females showed minimum measurements as compared to males in both nations. Among Malaysians minimum facial index of 75.75 was observed in both sexes. However, males had a maximum facial index of 96.66 while it was 100 in female group. The difference that was observed between these two groups in above parameter was statistically significant (0.018). The face length ranged from 10cm to 12.5cm in males and females showed minimum of 9.6cm to maximum of 12 cm. The face width ranged from 12cm to 14.7cm in males and 10.4cm to 14.3cm in females.

Table II. Measurements and facial index in Malaysian population.

	Face length (mean)	Face width (mean)	Facial index (mean)
Males	11.14±0.54	13.02±0.63	85.72±5.4
Females	10.48±0.5	11.97±0.68	87.71±5.1

Table III. Measurements and facial index in Indian population.

	Face length (mean)	Face width (mean)	Facial index (mean)
Males	11.08±0.62	12.73±0.68	87.19±5.2
Females	10.48±0.5	12.12±0.72	86.75±6.3

Among Indians minimum facial index was 74.82 and 71.22 in males and females respectively. Maximum facial index in males was 96.85 while in females it was 100. There was no significant difference between males and females in these parameters (0.647). The face length in males ranged from 10.1cm to 12.4cm (almost similar to Malaysian males) and females showed a range of 9.4cm to 11.5cm (similar to Malaysian females). The face width ranged from 10.9cm to 13.9cm in males (higher in Malaysian males) and females showed 10.9cm to 13.9cm (slightly higher in Malaysian females). This difference showed that Malaysians had slightly broader face as compared to Indians.

Comparison of facial index between Malaysian and Indian subjects indicates that Indians (both sexes together) had a higher (87.04±5.62) mean facial index than Malaysians (86.76±5.4).

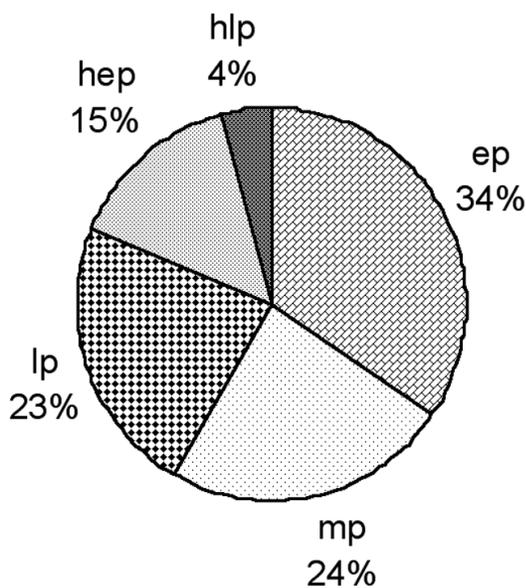


Fig. 2. Face shape of Malaysian males (n = 96), Ep=euriprosopic, mp=mesoprosopic, lp=leptoprosopic, hep=hypereuriprosopic, hlp=hyperleptoprosopic.

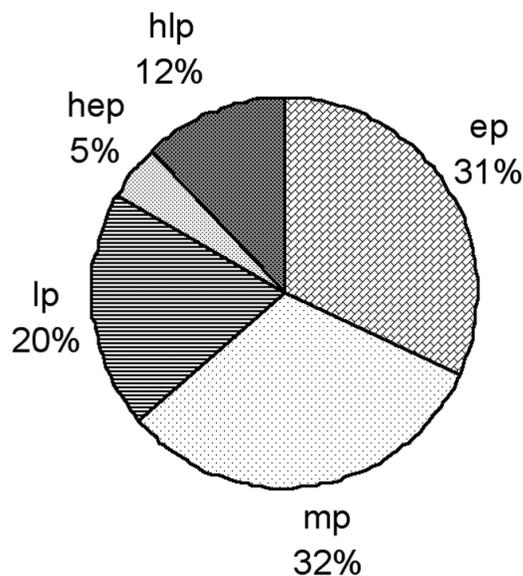


Fig. 3. Face shapes of Indian males (n=66), Ep=euriprosopic, mp=mesoprosopic, lp=leptoprosopic, hep=hypereuriprosopic, hlp=hyperleptoprosopic.

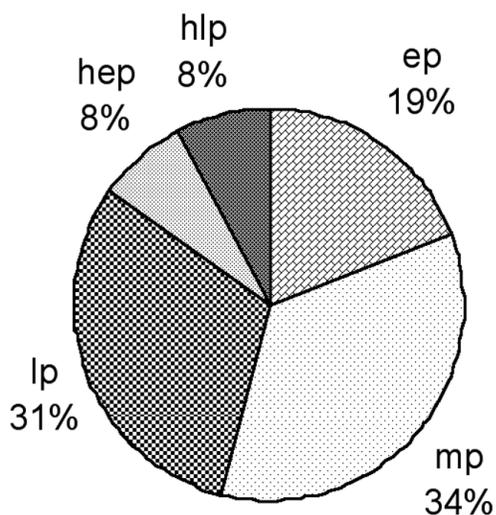


Fig. 4. Face shapes of Malaysian females (n=104), Ep=euriprosopic, mp=mesoprosopic, lp=leptoprosopic, hep=hypereuriprosopic, hlp=hyperleptoprosopic.

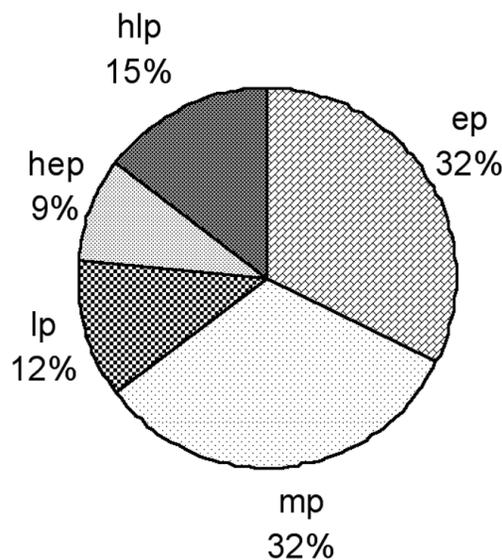


Fig. 5. Face shapes of Indian females (n=34), Ep=euriprosopic, mp=mesoprosopic, lp=leptoprosopic, hep=hypereuriprosopic, hlp=hyperleptoprosopic.

## DISCUSSION

The present study reports the anthropometrical variations in facial index in Malaysian and Indian medical students taking face length, face width, facial index as parameters. All measurements were expressed in centimeters.

Our results showed that dominant type of face shape

in Malaysian males was euriprosopic whereas females showed mesoprosopic with 34% each respectively. Least common type was hyperleptoprosopic (4%) in males and females hyperleptoprosopic and hypereuriprosopic (8%) face shape each. Among Indian males dominant type of face shape was mesoprosopic with 32% and females had dominant type of

mesoprosopic and euriprosopic with 32% each respectively. Hypereuriprosopic type was least common type in both males and females with 5% and 9% respectively.

In a study of native Fars and Turkman ethnic groups (Jahanshahi *et al.*, 2008) the dominant type of face shape in both native Fars and Turkman females was euriprosopic (37.7% and 51.7%, respectively). The dominant type of face shape in both native Fars and Turkman males was mesoprosopic (44% and 38.4%, respectively). The mean facial index in Turkman males and females were 87.25% and 81.48% respectively. The mean facial index in Fars males and females were 88.22% and 84.48% respectively. It showed that Iranian males had globular face as that of Indians (present study) and Iranian females showed slight broader face as compared to Indian females globular face (present study).

In a study by Bhasin, Indians showed dominant type face shape of mesoprosopic. The mean value of facial index among Indians as 86.34 which varied from 75 among Naga Sندان of Nagaland to 122.80 in Bhil Khandesh of Maharashtra region. The study was in correlation with present study indicating Indians had mesoprosopic face type.

When our study was compared with Malaysian Indians a study by Ngeow & Aljunid (2009) showed that facial index of males was 85.5 and in females it was 85.4 which showed to be Mesoprosopic. Present study showed slight higher value of facial index (87.19 & 86.75 males and females) in comparison to above study.

In a study of craniofacial measurements by Nagle *et al.* (2005) among Latvian and non Latvian residents showed face length and face width of both males and females. There was no significance in comparison between Latvian and non Latvian residents. But Latvian males showed mean face length of  $12.48 \pm 0.5$  cm which was higher compared to our study (Table II). Latvian females also showed higher value of face length  $11.88 \pm 0.65$  as compared to present study (Table III). This showed that Latvian residents had longer face as compared to Indians and Malaysians. The difference seen was due to regional difference of population.

With the help of above statistics, the sex as well as race of the deceased can be determined accurately and this knowledge can be of immense importance to anthropologists as well as forensic science experts.

SHETTI, R. V.; PAI, S. R.; SNEHA, G. K.; GUPTA, C.; CHETHAN, P. & SOUMYA. Estudio del índice prosopo (facial) de estudiantes de la India y Malasia. *Int. J. Morphol.*, 29(3):1018-1021, 2011.

**RESUMEN:** Por muchas generaciones los antropólogos físicos han medido cráneos con la finalidad de obtener resultados permitiéndoles trazar relaciones entre diferentes razas de la humanidad. Se creía que la forma del cráneo se mantenía constante en cada raza, y que las diferentes razas mostraban diferentes índices faciales. En la actualidad se sabe que la forma de la cabeza y la cara están sujetas a cambios debido a las influencias ambientales. Las mediciones son necesarias para obtener este tipo de conocimiento, con el fin de poder dar la descripción más exacta de un individuo o grupo de personas. El presente estudio tuvo como objetivo medir el índice facial en estudiantes de ambos sexos de Malasia e India. 300 estudiantes de ambas naciones fueron medidos para determinar la longitud de la cara, el ancho de la cara y determinar el índice facial. Los hombres de Malasia tuvieron un promedio de índice facial de 85,72 y las mujeres tuvieron un valor ligeramente superior (87,71). Ambos pertenecieron al tipo de cara mesoprosópicas y las diferencias fueron estadísticamente significativas. Los hombres indios tuvieron un índice facial medio de 87,19, y las mujeres 86,75. Ambos pertenecieron al tipo de cara mesoprosópicas y la comparación del índice de la cara no fue estadísticamente significativa. La comparación entre sujetos de la India y Malasia indicó que los indios (de ambos sexos en conjunto) tuvieron mayor índice facial (87,04) que los malasios (86,76). Sin embargo, esta diferencia no fue estadísticamente significativa.

**PALABRAS CLAVE:** Índice facial; Longitud de la cara; Ancho de la cara; Antropometría.

## REFERENCES

- Ashley Montagu, M. F. *An Introduction to Physical Anthropology*. 2<sup>nd</sup> Ed. Springfield, Charles C. Thomas, 1951.
- Bhasin, M. K. Genetics of Castes and Tribes of India: Somatometry. *Int. J. Hum. Genet.*, 6(4):323-56, 2006.
- Jahanshahi, M.; Golalipour, M. J. & Heidari, K. The effect of ethnicity on facial anthropometry in Northern Iran. *Singapore Med. J.*, 49(11):940-3, 2008.
- Nagle, E.; Teibe, U.; Kapoka D. Craniofacial anthropometry in a group of healthy Latvian residents. *Acta Med. Lituanica*, 12(1):47-53, 2005.
- Ngeow, W. C. & Aljunid, S. T. Craniofacial anthropometric norms of Malaysian Indians. *Indian J. Dent. Res.*, 20(3):313-9, 2009.
- Williams, P.; Dyson, M.; Dussak, J. E.; Bannister, L. H.; Berry, M. M.; Collins, P. & Ferguson, M. W. J. *Gray's Anatomy*. 38<sup>th</sup> Ed. London, Churchill Livingstone, 1995. pp.607-12.

Correspondence to:

Dr. Vaishali R Shetti

Assistant professor

Department of Anatomy

KMC Manipal 576104

INDIA

Email: vaishalikiran31@gmail.com

Received: 10-12-2010

Accepted: 25-03-2011