



MORPHOMETRIC STUDY OF EXTERNAL EAR OF MEDICAL STUDENTS IN JAMMU AND KASHMIR.

Anatomy

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ABSTRACT

Introduction: The auricle or auricular is the visible part of the ear that resides outside the head. It is also called as pinna from a latin word wing/ fin. The auricle is trumpet like undulating projection on the side of head. The entire pinna except its lobule is made up of a single piece of crumpled yellow elastic cartilage covered with skin. The auricular cartilage is continuous with the cartilage of external auditory meatus.

Material and method: the study was carried out on 50 first year medical students in the Department of Anatomy, SKIMS Medical College, Srinagar. The study consists of 25 male and 25 female students between the age group of 18 to 22 years. Following parameters of external ear were taken:

Ear height, Ear width, Ear index in cm.

Result : the measurements of right and left ear among male students, reveals that mean height of right ear is more than the mean height of left ear, whereas mean of ear width is almost similar, but mean of right ear index is more than the left ear, it concludes that dimensions of the right ear is more than the left ear but the difference is insignificant. Similarly the measurements of right and left ear among the female students, reveals that mean height, mean width and mean index of left ear is more than the right ear, but the difference is insignificant. Nevertheless when we compared it between males and females the mean height of ear in males was more than the females and the difference is significant ($p < 0.05$).

Conclusion: the study provides mean values of different parameters of right and left ear among males and females. This data may act as baseline to guide plastic surgeons to reconstruct malformed ear and can also help the forensic experts in identification of body.

KEYWORDS

Ear height, Ear width, Ear Index.

INTRODUCTION: The auricle is the visible part of the ear that resides outside the head. It is also called as pinna from a latin word wing/ fin. The auricle is trumpet like undulating projection on the side of head. The entire pinna except its lobule is made up of a single piece of crumpled yellow elastic cartilage covered with skin. The auricular cartilage is continuous with the cartilage of external auditory meatus¹. In humans, ear is the most defining feature of the face and its structure shows the signs of age and sex². Next to fingerprints, the external ear constitutes the most unique design, characteristic features and peculiarities for the purpose of identification³. Morphological features of humans are used as biometric traits for identifying individuals. It is accepted and known fact that external ear is a potential candidature even among monozygotic twin⁴. The statistical data on anthropometric measurements of body dimensions are beneficial in forensics, apparel sizing, prosthesis, and in optimizing products⁵.

MATERIAL AND METHOD: the study was carried out on 50 first year medical students in the Department of Anatomy, SKIMS Medical College, Srinagar with no evidence of congenital ear anomalies or previous ear surgeries and heavy earring wearers were also excluded. The study consists of 25 male and 25 female students between the age group of 18 to 22 years. The purpose of study was explained to them and written informed consent was taken.

Anthropometric measurements: Each subject was made to sit in a natural head position on a chair with a backrest and positioned the head such that the subject looks straight forward with lower border of the eye sockets in the same plane as the external auditory meatuses-Frankfurt horizontal plane. Bilateral measurements of auricle were taken in centimeters. All the parameters were taken by using standard vernier caliper.

Following parameters of external ear were taken:

Ear height: Uppermost point of pinna to the lower most point of lobule.

Ear width: From root of the ear to maximum convexity of the helix.

Ear index: ear width/ear height $\times 100$

RESULT:

Table 1: Mean and Standard deviation of Ear morphometry of all students

	Right Ear	Left Ear	P value
Dimensions			
Ear Height	5.886 +/- 0.61346	5.882 +/- 0.59271	1.0
Ear Width	2.95 +/- 0.30723	2.95 +/- 0.3677	1.0
Ear Index	50.458 +/- 5.46529	50.44 +/- 6.68162	0.99

Table 1 show the measurements of right and left ear of all the students, which reveals that the mean height of right ear is more than the left ear, whereas mean of ear width and ear index is almost similar in both ears, it concludes that morphology of both years is bilaterally symmetrical.

Table 2: Mean and Standard deviation of Ear morphometry of male students

	Right Ear	Left Ear	P value
Dimensions			
Ear Height	6.312 +/- 0.4746	6.284 +/- 0.4741	0.82
Ear Width	3.04 +/- 0.2466	3 +/- 0.4082	0.67
Ear Index	48.276 +/- 4.0214	47.78 +/- 5.7359	0.72

Table 2 show the measurements of right and left ear among male students, which reveals that mean height of right ear is more than the mean height of left ear, whereas mean of ear width is almost similar, but mean of right ear index is more than the left ear, it concludes that dimensions of the right ear is more than the left ear but the difference is insignificant.

Table 3: Mean and Standard deviation of Ear morphometry of female students

	Right Ear	Left Ear	P value
Dimensions			
Ear Height	5.46 +/- 0.4062	5.48 +/- 0.3948	0.85
Ear Width	2.86 +/- 0.3391	2.9 +/- 0.3227	0.66
Ear Index	52.46 +/- 5.9165	53.1 +/- 6.596	0.71

Table 3 show the measurements of right and left ear among the female

students, which reveals that mean height, mean width and mean index of left ear is more than the right ear, but the difference is insignificant.

Table 4: Comparison of the measurements according to gender.

Dimensions	Right male	Right female	P value	Left male	Left female	P value
Ear height	6.31 +/- 0.47	5.46 +/- 0.47	<0.0001*	6.28 +/- 0.47	5.48 +/-0.39	<0.0001*
Ear width	3.04 +/- 0.2	2.86 +/- 0.33	0.02*	3 +/- 0.40	2.91 +/-0.32	0.33
Ear index	48.27 +/-4.0	52.46 +/-5.9	0.0050*	47.78 +/-5.73	53.1 +/-6.59	0.003*

Table 4 shows that the mean of ear height in male are more as compared to females and the difference is significant, similarly mean of ear width among males is more than females which is significant on right side but insignificant on left side. Above table also show the mean ear index is more among females as compared to males in both ears and is significant.

DISCUSSION:

The malformation of pinna is esthetically unpleasing and imposes social rejection and solitude, adversely affecting the physical and mental growth of a person. Moreover, malformation of an external ear may be an outcome of genetic disease or injuries due to environmental factors such as trauma, infection, radiation, etc⁶.

Ear height: our result showed the mean height of right ear is more than left ear in all students but the difference is insignificant(table 1). Nevertheless when we compared it between males and females the mean height of ear in males was more than the females and the difference is significant($p < 0.05$). So our study is very close to the study conducted by **Deopa et al.**⁵ which concluded that mean height of ear in males is higher than the females on both sides. In another study done by **Pandit et al.**⁷ on 168 medical students, concluded that there were significant differences in linear Measurements of ear between males and females ($p < 0.05$), the ear height, ear width being higher in males than females, so their study also supports our study.

Ear width: from the above tables it is clear that mean ear width is more on right side than the left among males, but in females ear width is more on left side(table 3), although it is insignificant. In regards with the gender the ear width is more in males than females (table 4). So our study is supported by the study done by **Laxmi et al.**⁸ which also concluded that males have greater values than females.

Ear index: from the table 2 it is clear that ear index is more on right side among males, but in females ear index is more on left side shown in table 3, although difference is insignificant. In regards with the gender ear index is more in females than males (table 4). So our study is similar to the study done by **Laxmi et al.**⁸, which also concluded that left ear indices were greater than the right ones in female subjects.

CONCLUSION: the study provides mean values of different parameters of right and left ear among males and females. This data may act as baseline to guide plastic surgeons to reconstruct malformed ear and can also help the forensic experts in identification of body.

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