Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page:www.jamdsr.com doi:10.21276/jamdsr Index Copernicus value [ICV] =82.06

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Evaluation of Anthropometric Measurements of External Ear in a Recognized Population

[1]Agnijeet Palit, [2]Mohammad Asif Khan

[1]Assistant Professor, Department of Microbiology, Gouri Devi Institute of Medical Sciences & Hospital, Durgapur, West Bengal, India;
[2]Assistant Professor, Department of Anatomy, Gouri Devi Institute of Medical Sciences & Hospital, Durgapur, West Bengal, India

ABSTRACT:
Aim: Evaluation of Anthropometric Measurements of External Ear in a Recognized Population. **Material and Methods:** The current investigation was carried out on a sample of 120 individuals of both sexes at the Department of Anatomy. Everyone was informed about the research and their signed permission was acquired. Information such as name, age, gender, and other relevant details were documented. Photographs were taken with a camera on a white piece of paper. Several distinctive features of the outer ear were recognized. A linear mark was made to indicate the point where the auricle is connected to the facial skin. A line was drawn perpendicular to the first line in a way that it touched the highest point on the helix. A second line was drawn perpendicular to the first line in a way that it touched the lowest point on the lobule. A second line is drawn parallel to the first line and touching the outermost point on thespiral shape of the outer ear. **Results:** Out of 120 subjects, males were 72 and females were 48. The mean length was 65.01mm in males and 63.67 mm in females. Width was 33.11 mm and 31.03 mm in males and females, length above tragus was 30.03 mm and 28.89 mm in males and females respectively,length below tragus was 20.98 mm and 20.76 mm, tragus length was 15.07 mm and 14.75 mm, concha length was 23.87 mm and 23.06 mm, concha width was 17.56 mm and 16.99 mm in males and females, lobule height was 12.63 mm and 11.59 mm, lobule width was 20.43mm and 19.87 mm respectively. **Conclusion:** We have discovered that evaluating the characteristics of the ear is beneficial foridentifying different types of ear disorders.
Keywords: Anthropometric, Tragus, Concha, Lobule

Received: 16 March, 2018 Accepted: 19 April, 2018

Corresponding Author: Mohammad Asif Khan, Assistant Professor, Department of Anatomy, Gouri Devi Institute of Medical Sciences & Hospital, Durgapur, West Bengal, India

This article may be cited as: Palit A, Khan MA. Evaluation of Anthropometric Measurements of External Ear in a Recognized Population. J Adv Med Dent Scie Res 2018;6(5):159-162.

INTRODUCTION

The ear is a significant anatomical feature that enhances the visual appeal of the human face. The look of a person is influenced by the size, shape, location, and projection of their ear[1]. The external ear comprises the external auditory meatus and the auricle or pinna[2]. Congenital abnormalities, such as microtia, macrotia, malposed ear, auxiliary auricle, lop ear, and projecting ear, are most typically linked to the latter condition. These abnormalities may be seen in individuals with Down's syndrome, Potter's syndrome, and Turner syndrome. Acquired abnormalities arise from severe accidents and pathological illnesses, including cancer[3]. Approximately 5-8% of all skin malignancies occur in the auricle due to its protrusion and exposure, which increases its susceptibility to actinic damage. To correct these irregularities, it is necessary to have knowledge about the typical size of the ear, the location of the ear on both sides of the face, and the overall shape of the ear. Several research have been published on the ear, focusing on syndromes and abnormalities. However, there is a scarcity of studies that have examined the ear in the general population[4]. The measurement of human individual is known as Anthropometry (anthrops-human and metron-measure)[5]. Anthropometric measurements have uses in epidemiology and medical anthropology, in helping to determine the relationship between various body measurements such as the height, weight, percentage, body fat and medical outcomes. Anthropometry involves the systematic measurement

of the physical properties of the human body, primarily dimensional descriptors of body size and shape[6]. The current research aimed to evaluate the anthropometric measures of the external ear in a specific group.

MATERIAL AND METHODS

The current investigation was carried out on a sample of 120 individuals of both sexes at the Department of Anatomy. Everyone was informed about the research and their signed permission was acquired. Information such as name, age, gender, and other relevant details were documented. Photographs were taken with a camera on a white piece of paper. Several distinctive features of the outer ear were recognized. A linear mark was made to indicate the point where the auricle is connected to the facial skin. A line was drawn perpendicular to the first line in a way that it touched the highest point on the helix. A second line was drawn perpendicular to the first line in a way that it touched the lowest point on the lobule. A second line is drawn parallel to the first line and touching the outermost point on the spiral shape of the outer ear. A rectangle was made in such a way that it touched all four edges of the auricle.This rectangle delineated the limits of the auricle. The received results were analyzed using statistical methods. A significance level of 0.05 or below was used to determine statistical significance.

RESULTS

Table 1 shows that out of 120 subjects, males were 72 and females were 48. Table 4, shows that mean length was 65.01 mm in males and 63.67 mm in females. Width was 33.11 mm and
31.03 mm in males and females, length above tragus was 30.03 mm and 28.89 mm in males and females respectively, length below tragus was 20.98 mm and 20.76 mm, tragus length was 15.07 mm and 14.75 mm, concha length was 23.87 mm and 23.06 mm, concha width was 17.56 mm and 16.99 mm in males and females, lobule height was 12.63 mm and 11.59 mm, lobule width was 20.43 mm and 19.87 mm respectively.

Table 1: Distribution of subjects

Gender	Number	Percentage
Males	72	60
Females	48	40
Mean Age	28.98±2.36	

Table 2: Assessment of ear measurements in male

Parameters (mm)	Mean	Sd
Length	65.01	4.36
Width	33.11	4.24
Length above tragus	30.03	3.36
Length below tragus	20.98	3.65
Tragus length	15.07	3.12
Concha length	23.87	3.98
Concha width	17.56	2.47
Lobule height	12.63	1.39
Lobule width	20.43	2.72

Table 3: Assessment of ear measurements in Female

Parameters (mm)	Mean	Sd
Length	63.67	4.28
Width	31.03	4.82
Length above tragus	28.89	3.72
Length below tragus	20.76	2.93
Tragus length	14.75	1.26
Concha length	23.06	2.27
Concha width	16.99	1.87
Lobule height	11.59	1.68
Lobule width	19.87	2.75

Table 4: Assessment of ear measurements in male and Female

Parameters (mm)	Male	Female	P value
Length	65.01	63.67	0.1
Width	33.11	31.03	0.23
Length above tragus	30.03	28.89	0.16
Length below tragus	20.98	20.76	0.35

Tragus length	15.07	14.75	0.21
Concha length	23.87	23.06	0.08
Concha width	17.56	16.99	0.17
Lobule height	12.63	11.59	0.28
Lobule width	20.43	19.87	0.43

DISCUSSION

The ear is a significant and often overlooked characteristic of the face that provides valuable information about a person's age and gender[7]. The main purpose of the pinna is to gather sound waves and send them to the eardrum via the external auditory meatus. However, the earis also considered a cosmetic organ and its significance is more closely tied to the aesthetics and appearance of the face. Individuals with atypical ear structure due to congenital deformities or ear loss caused by injury may experience feelings of depression and discomfort. Surgical intervention is used to repair any abnormalities in the size, elongation, or absence of the auricular lobe[8,9]. For rectifying such abnormalities plastic surgeons require information about normal auricular dimension, the auricles bilateral position on the face, the general conformations, and its variation. But these auricular data vary in different ethnic groups[10]. Recent anthropometric studies of the external ear from different parts of the world prove that much variability exists depending on the age, sex and ethnic group, and even in the same person between the right and left ears. In spite of this, the available literature suggests that males have larger ears than females, the length and width of the ear keep on increasing with age, and the general size of the ear varies in populations of different ethnicities[11].The present study was conducted to assess anthropometric measurements of external ear among known population. In present study, out of 120 subjects, males were 72 and females were 48. Sangeetha S et al[12] found that evaluation of 156 participants, 49 males and 107 females (mean age = 24.72 years), was done. It was observed that males had slightly larger dimensionsfor left ear length, right ear length, left ear breadth, right ear breadth, left ear length above tragus, right ear length above tragus, left ear length below tragus, right ear length below tragus, left ear concha length, right ear concha length, left ear concha breadth, right ear concha breadth, left ear lobule height, right ear lobule height, left ear lobule width and right ear lobulewidth as compared to females. On the other hand, females had slightly higher values for left ear tragus length and right ear tragus length as compared to the males. The *P* values for left ear length, right ear length, left ear breadth, right ear breadth, left ear length above tragus, right ear length above tragus and left ear lobule width were <0.05 and hence statistically significant. All other variables of the ear between males and females in this age group had a *P* >0.05 and hence were not significant. The Spearman's correlation coefficient (*r*) was calculated, and the highest strength of correlation was seen for left ear length–right ear length(r^2 = 86.23%), while the least was observed for left ear breadth–right ear breadth (r^2 = 70.43%).The *P* value for all the correlations was found to be <0.05. We found that mean length was 65.01 mm in males and 63.67 mm in females. Width was 33.11 mm and 31.03 mm in males and females, length above tragus was 30.03 mm and 28.89 mm in males and females respectively, length below tragus was 20.98 mm and 20.76 mm, tragus length was 15.07 mm and 14.75 mm, concha length was 23.87 mm and 23.06 mm, concha width was 17.56 mm and 16.99 mm in males and females, lobule height was 12.63 mm and 11.59 mm, lobule width was 20.43 mm and 19.87 mm respectively. Similar study was done by the others authors. In the study of Bozkir *et al*., the ear width in males was 33.3 mm on the left side and 33.1 mm on the right side, whereas in females, it was 31.3 mm in the left ear and 31.2 mm in the right ear[13]. According to Bozkir MG, the ear width in males was 32.4 mm in the left ear and 33 mm in the right ear, whereas in females, it was 31.9 mm in the left ear and 32.4 mm in the right ear[14] In the study of Singhal J *et al*., the ear width in males for the right ear was 3.07 cm, and for theleft ear, it was 3.06 cm. In females, the ear width for the right ear was 2.89 cm, and for the left ear, it was 2.87 cm[15].

CONCLUSION

We have discovered that evaluating the characteristics of the ear is beneficial for identifying different types of ear disorders.

REFERENCES

1. Taura MG, Adamu LH, Gudaji A, Modibbo MH. Height prediction from external ear morphometry; a pilot study. Int J Res Heal Sci. 2016;4(1):15-19.
2. Kordi R,Mansournia MA,Nourian RA,Wallace WA. Cauli- flower ear and skin infections among wrestlers in Tehran. J Sports Sci Med. 2007;6:39–44.
3. Sforza C, Grandi G, Binelli M, Tommasi DG, Rosati R, Ferrario VF et al. Age- and sex-related changes in the normal human ear. Forensic Sci Int. 2009;187:110e1–7.
4. Abdelaleem S, Abdelbaky FF. Estimation of stature in Upper Egypt population from external ear morphometry. Int J Forensic Sci Pathol. 2016;4(10):276-84
5. Kalra D, Kalra A, Goel S. Anthropometric measurements of external ear: An in vivo study. International Journal of Enhanced Research in Medicines & Dental Care. 2015;2(3):10-16.
6. Niemitz C, Nibbrig M, Zacher V. Human ears grow throughout the entire lifetime according to complicated and sexually dimorphic patterns–Conclusions from a cross-sectional analysis. Anthropol Anz. 2007;65:391–413.

7. Gualdi-Russo E. Longitudinal study of anthropometric changes with aging in an urban Italian population. Homo. 1998;49:241– 59.
8. Ekanem AU, Garba SH, Musa TS, Dare ND. Anthropometric study of the pinna (Auricle) among
10. Kalcioglu MT, Miman MC, Toplu Y, Yakinci C, Ozturan O. Anthropometric growth study of normal human auricle. Int J Pediatr Otorhinolaryngol. 2003;67:1169–77.
11. Barut C, Aktunc E. Anthropometric measurements of the external ear in a group of Turkish primary school students. Aesthetic Plast Surg. 2006;30:255–9.
12. Sangeetha S and Anisha B Anthropometric measurements of human ear lobule in adult student population. Int J Anat Res 2017;5(2.2):3748-87
13. Bozkir MG, Karakaş P, Yavuz M, Dere F. Morphometry of the external ear in our adult population. *Aesthetic Plast Surg.* 2006;30:81–5.
14. Balogh B, Millesi H. Are growth alterations a consequence of surgery for prominent ears? *Plast Reconstr Surg*. 1992;89:623–30.
15. Singhal J, Sharma N, Jain SK, Budhiraja V, Rastogi R, Garg R, et al. A study of auricle morphology for identification in Indians. Annals of International Medical and Dental Research.2016;2(4):217.

adult Nigerians resident in Maiduguri metropolis. J Med Sci. 2010;10:176–80.
9. Shireen S, Karadkhelkar VP. Anthropometric measurements of human external ear. J Evol Med Dent Sci. 2015;4:10333–8.