

Age-Related Features of the Size of the Auricle: Comparative Study of Vertical and Horizontal Parameters in Children

Abdulxakimov Arsen Renatovich^{1,*}, Fattaxov Nusratullo Xamidullayevich¹,
Xomidchonova Shaxzoda Xasanzoda², Xolikov Bekzod Murtazo Ugli¹

¹Department of Faculty and Hospital Surgery, Fergana Medical Institute of Public Health, Fergana, Uzbekistan

²Department of Histology and Biology, Fergana Medical Institute of Public Health, Fergana, Uzbekistan

Abstract The article examines the age-related features of the vertical and horizontal dimensions of the auricle in children. The study was conducted on a sample of 244 schoolchildren, which revealed minor differences between the right and left ears in both boys and girls. The data obtained indicate minimal sexual differences in the size of the auricle, where the differences between the right and left sides are 0.1–0.15% [1,2,3].

Keywords Auricle, Size, Gender, Children, Morphometric, Age characteristics

1. Introduction

The relevance of the study of the vertical and horizontal dimensions of the auricle in children is due to the importance of studying the age and anatomical features of the development of the hearing organ [4,5]. The formation of the auricle is closely related to the function of hearing, and any deviations in its size can affect the auditory perception and overall development of the child. In the context of modern methods of diagnosis and prevention of ear diseases, the study of the morphometric parameters of the auricle can contribute to the early detection of pathologies, as well as help determine the normative indicators of development in different age groups. Studying the vertical and horizontal dimensions of the auricle in children is also important for the development of adapted medical devices such as hearing aids and ear prostheses [6]. Considering that the proper functioning of the auditory system is crucial for the social adaptation and education of a child, this study has not only scientific, but also practical significance for pediatrics, otorhinolaryngology and audiology [7,8,9].

The materials and methods of the study were the results of measurements of the vertical and horizontal dimensions of the auricle in 244 healthy children of schoolchildren of different sexes and age groups.

2. Result and Discussion

Examination of the auricles and measurement of vertical and horizontal dimensions, the direction of the measurement lines is shown in Figure 1 [10].

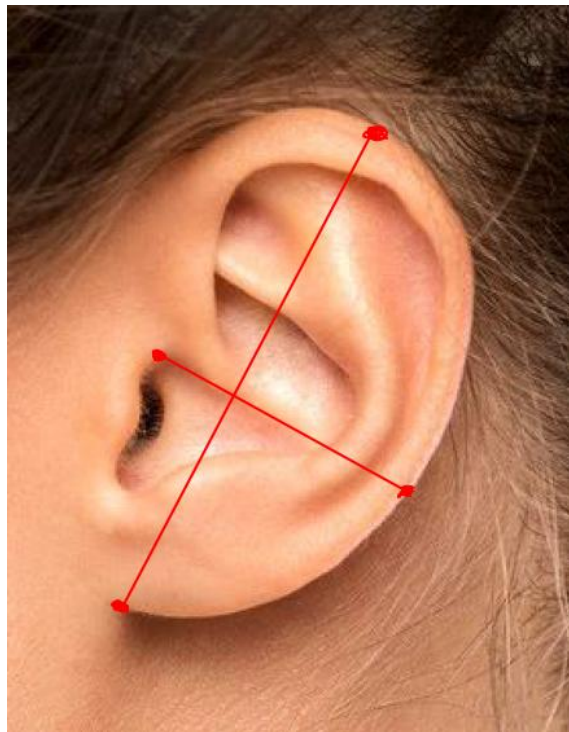


Figure 1. Points and directions of measurements of the auricle

* Corresponding author:

abdulhakimovarsen@gmail.com (Abdulxakimov Arsen Renatovich)

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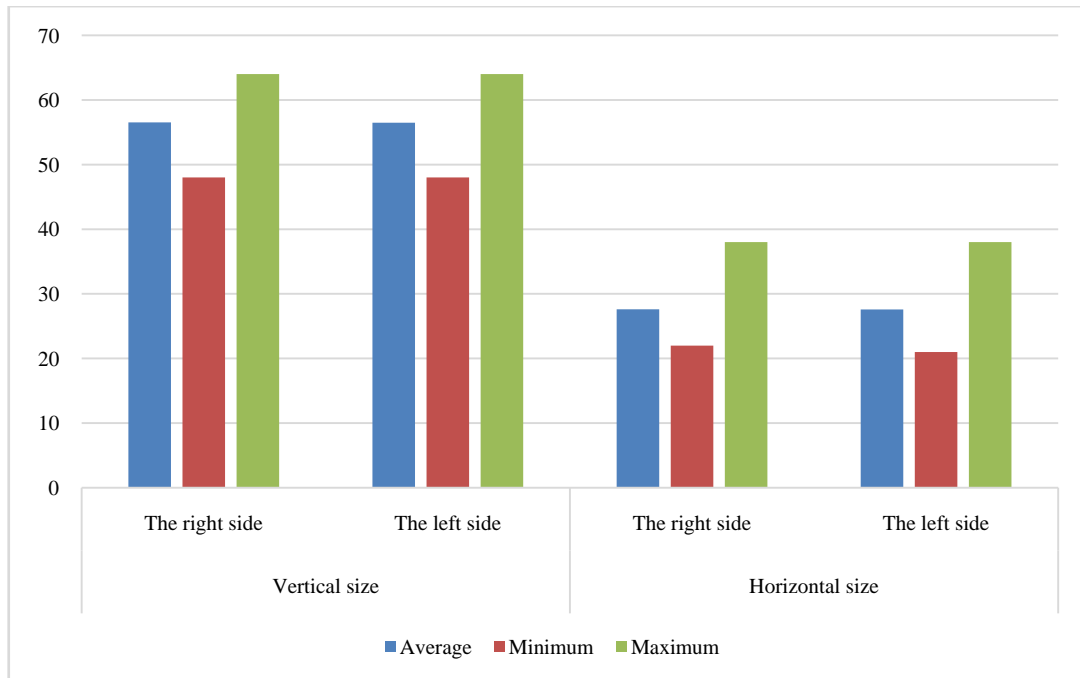


Figure 2. The sizes of the auricles of children-boys of the studied sample

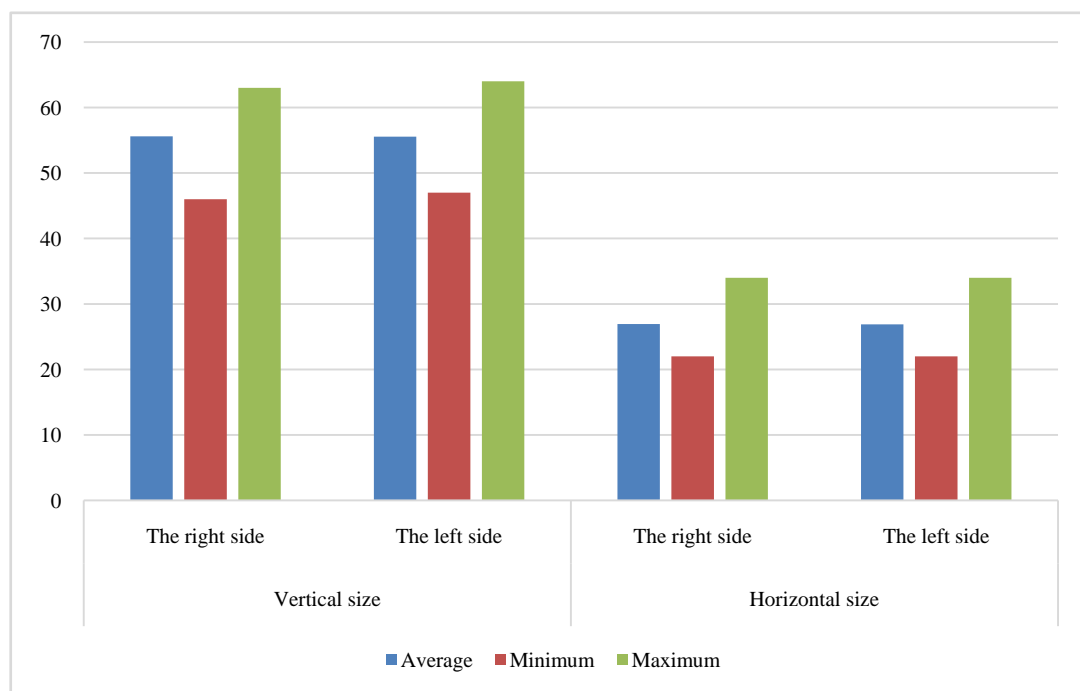


Figure 3. The sizes of the auricles of children-girls of the studied sample

Vertical ear size: The minimum value of the vertical ear size in boys was 48 mm on both sides, and the maximum was 64 mm. Thus, the minimum and maximum values turned out to be the same for both sides. The average height of the right ear was 56.54 mm, and the left ear was 56.47 mm, which is 0.1% less than the right one.

Horizontal ear size: The minimum ear width for boys was 21 mm on the left and 22 mm on the right, that is, the width of the left ear was 4.5% smaller than the right. The maximum width was 38 mm on both sides. The average width of the

right ear was 27.62 mm, and the left one was 27.58 mm, which is 0.1% less than the right one. Based on these data, it can be concluded that the average values of the height and width of the ears of boys in our sample differ between the right and left sides by 0.1% Figure 2.

In the girls in the study sample, the vertical size of the auricle varies in a relatively narrow range: from 46 to 63 mm for the right ear and from 47 to 64 mm for the left. The average is 55.61 mm for the right side and 55.55 mm for the left. The horizontal dimensions of the auricle also vary in a

narrow range: from 22 to 34 mm for both sides. The average width of the auricle is 26.93 mm for the right ear and 26.89 mm for the left.

The data indicate that the differences in the vertical size and width of the auricle between the right and left sides in girls are minimal. The difference between the average height values is only 0.06 mm (0.1%), and between the average width values is 0.04 mm (0.15%) Figure 3.

The findings highlight the remarkable consistency in auricle size among children, suggesting that anatomical development is largely uniform across genders. The minimal differences observed (0.1% to 0.15%) between the right and left auricles imply that individual variations are negligible and may not significantly impact auditory function. This consistency is particularly relevant for clinical applications, including the design and fitting of hearing aids and ear prosthetics, where precise measurements are crucial for ensuring comfort and effectiveness.

Moreover, understanding these normative data is essential for pediatric healthcare providers. Given the critical role that the auricle plays in hearing, any deviations from these average measurements could indicate potential developmental issues or pathologies. Early identification of such anomalies could lead to timely interventions, thus improving auditory health outcomes for children.

The study's results align with previous research indicating that sexual dimorphism in auricle size is minimal, reinforcing the notion that anatomical variations in this context are not substantial. This suggests that, in clinical practice, practitioners can adopt a generalized approach to auricle measurements in pediatric populations, reducing the need for individualized assessments based solely on gender.

Furthermore, these findings contribute to a deeper understanding of the morphometric parameters of the auricle, which could aid in future studies exploring the relationship between auricle size and auditory performance. Such research could further elucidate how anatomical features correlate with functional outcomes in hearing, leading to enhanced strategies for diagnosis and treatment in audiology and otorhinolaryngology.

3. Conclusions

The study showed that the vertical and horizontal dimensions of the auricle in children vary depending on

gender, but the differences between the right and left auricles are minimal. In boys, the average height of the right ear is 56.54 mm, and the left ear is 56.47 mm, which differs by only 0.1%. The average width of the right ear is 27.62 mm, and the left one is 27.58 mm, also with a difference of 0.1%. In girls, the average height of the right ear is 55.61 mm, and the left ear is 55.55 mm, with a difference of 0.1%, and the width of the right ear is 26.93 mm, while the left ear is 26.89 mm, which is a difference of 0.15%. These data indicate differences between the ears of children, which are about 0.1–0.15%.

REFERENCES

- [1] Fijałkowska M., Kasielska A., Antoszewski B. (2014), Variety of complications after auricle piercing, *International journal of dermatology*, Vol. 53 (8), 952-955.
- [2] Hénoux M. et al. (2017), Vascular supply of the auricle: anatomical study and applications to external ear reconstruction, *Dermatologic Surgery*, Vol. 43 (1), 87-97.
- [3] Peuker E.T., Filler T.J. (2002), The nerve supply of the human auricle, *Clinical Anatomy*, Vol. 15 (1), 35-37.
- [4] Storck K. et al. (2014), Total reconstruction of the auricle: our experiences on indications and recent techniques, *BioMed research international*, Vol. 2014 (1), 373-286.
- [5] TANZER R.C. (1971), Total reconstruction of the auricle: The evolution of a plan of treatment, *Plastic and reconstructive surgery*, Vol. 47 (6), 523-533.
- [6] Veugen C.C., Dijkers F.G., de Bakker B.S. (2020), The developmental origin of the auricula revisited, *The Laryngoscope*, Vol. 130 (10), 2467-2474.
- [7] CONVERSE J.M. (1958), Reconstruction of the auricle—part 1, *Plastic and Reconstructive Surgery*, Vol. 22 (2), 150-163.
- [8] Farhan S.S. et al. (2019), Morphological assessment of Ear auricle in a group of Iraqi subjects and its possible role in personal identification, *Italian Journal of Anatomy and Embryology*, Vol. 124 (3), 432-442.
- [9] Singhal J. et al. (2016), A study of auricle morphology for identification in Indians, *Annals of International Medical and Dental Research*, Vol. 2 (4) 217-247.
- [10] Britto J. et al. (2018), Photogrammetric morphometric analysis of auricle, *Int J Med Sci Public Heal*, Vol. 7 (6), 1-2.