

Anatomy of middle ear ossicles in boar (*sus scrofa* Atilla)

Morovatisharifabad, M.¹; Salehi, E.¹ and Morovvati, H.²

Received: 21.01.2018

Accepted: 23.07.2018

Abstract

The middle ear is an irregular cavity composed of three ossicles, malleus, incus, stape, which transmit sound waves to the inner ear and converted into mechanical energy. Due to the importance of the middle ear in voice transmissions this study was established. In this research, in order to investigate morphologically, the details of *sus scrofa* Atilla middle ear ossicles, 5 matured male animals skulls were used. After anatomical examination of different parts of the temporal bone and removing the bones, the middle ear bones were exposed, in addition to examine the shape, dimensions and details of each bone were measured using an ocular micrometer. Finally, data were evaluated and analyzed using the Sigma Statt statistics software. In *sus scrofa* Atilla, temporal bone, similar to other animals, consisted of three parts: squamous, tympanic and petrous part. The length of the outer ear canal to the tympanic membrane is 37 ± 0.14 mm. The tympanic membrane is circular in animal and the diameter of the tympanic membrane is about 12.5 ± 0.21 mm. The tympanic membrane has also Beige color. In the boar, the number of middle ear ossicles was three, including Malleus, Incus and Stapes. Morphometric results showed that the Malleus ossicle had a head, neck, handle and three distinct process including anterior, muscular and lateral process. Incus ossicle consists of a body, two long and short crura and has two articular surfaces. A short or posterior crura attaches to the posterior wall of the body and the long crura are connected to the stape ossicle. The Stape ossicle has a footplate and three anterior, posterior, and muscular process which anterior process is shorter than posterior. In the present study, the components of the middle ear in the boar was investigated. It was determined that the number of middle ear ossicles in the boar was similar to pigs, and the only difference was the size of the ossicles processes.

Key words: Anatomy, Ossicle, Middle ear, *Sus scrofa* Atilla

1- Assistant Professor, Department of Veterinary, School of Veterinary Medicine, Ardakan University, Ardakan, Iran

2- Professor, Department of Basic Science, Faculty of Veterinary, Tehran University, Tehran, Iran

Corresponding Author: Morovatisharifabad, M., E-mail: mmorevati@ardakan.ac.ir

References

- Ashrafzadeh, M.R. and Bordkhani, M. (2013). Age estimation of wild boar (*Sus scrofa*) using different methods (Case study: Minoo Island and Khabr National Park, Iran) *Taxonomy and Biosystematics*. 5th ed. Directory of Open Access Journals. Pp: 1-14.
- Aspinall, V. and O'Reilly, M. (2004). *Introduction to veterinary anatomy and physiology*. 1st ed. Butterworth-Heinemann, An imprint of Elsevier. Pp: 110-111.
- Cunningham, J.G. and Klein, B.G. (2012). *Text book of veterinary physiology*. 5th ed. Saunders W.B. Elsevier Health Sciences. Pp: 119-126.
- Dinsmore, C.E.; Daugherty, S. and Zeitz, H.J. (1999). Teaching and learning gross anatomy: dissection, prosection, or "both of the above?". *Clinical Anatomy*, 12(2): 110-114.
- Frandsen, R.D.; Wilke, W.L. and Fails, A.D. (2009). *Anatomy and physiology of farm Animals*. 4th ed. Wiley – Blackwell. Pp: 192-198.
- Gratton, M.A.; Bateman, K.; Cannuscio, J.F. and Saunders, J.C. (2008). Outer- and middle-ear contributions to presbycusis in the Brown Norway rat. *Audiol Neurootol*, 13(1): 37-52.
- Kristensen, F.; Jacobsen, J.O.G. and Eriksen, T. (1996). *Otology in cats and dogs*. 1st ed. LEO, Stockholm. Pp: 37-52.
- Kurtul, I.; Cevik, A.; Bozkurt, E.U. and Dursun, N. (2003). A detailed subgross morphometric study on the auditory ossicles of the New Zealand rabbit. *Anatomia Histologia Embryologia*, 32(4): 249-252.
- Lees, S.; Hanson, D.B. and Page, E.A. (1996). Some acoustical properties of the otic process of fine Whale. *The Journal of the Acoustical Society of America*, 99: 2421-2427.
- Mohammadpour, A.A. (2004). comparative anatomical and morphological study of middle ear bones between camel and other ruminant. *Researches & Biological products*, 64: 70-75.
- Mohammadpour, A.A. (2011). Morphometrical study of the temporal bone and auditory ossicles in guinea pig. *Veterinary Research Forum*, 2: 7-12.
- Mohammadpour, A.A. (2014). Anatomical study of middle ear ossicles in rats. *Veterinary Researches and Biological Products*, 104: 27-22.
- Nummela, S. (1995). Scaling of the mammalian middle ear. *Hearing Research*, 85(1-2): 18-30.
- Oschman, Z. and Meiring, J.H. (1991). A morphometric and comparative study of the malleus. *Acta Anatomica (Basel)*, 142(1): 60-61.
- Pracy, J.; White, A.; Mustafa, Y.; Smith, D. and Perry, M. (1998). The comparative anatomy of the pig middle ear cavity: a model for middle ear inflammation in the human? *The Journal of Anatomy*, 192(3): 359-368.
- Ravicz, M.E.; Cooper, N.P. and Rosowski, J.J. (2008). Gerbil middle-ear sound transmission from 100 Hz to 60 kHz. *The Journal of the Acoustical Society of America*, 124(1): 363-380.
- Sarrat, R.; Guzman, G. and Torres, A. (1988). Morphological variations of human ossicula tympani. *Cells Tissues Organs*, 131(2): 146-149.
- Sarrat, R.; Torres, A.; Guzmán, A.G.; Lostalé, F. and Whyte, J. (1992). Functional structure of human auditory ossicles. *Cells Tissues Organs*, 144(3): 189-195.
- Vrettakos, P.A.; Dear, S.P. and Saunders, J.C. (1988). Middle ear structure in the chinchilla: a quantitative study. *American Journal of Otolaryngology*, 9(2): 58-67.
- Ziaie, H. (2008). *A field guide to the mammals of Iran: 100 distribution maps*. Department of the Environment, 2th ed. Tehran. Iran. Pp: 337-342.