

قسم التشريح
كلية الطب البيطرى - جامعة الفاتح - ليبيا
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دراسات تشريحية لعظيمات السمع فى القطط والارانب

ابراهيم أرناؤوطوفتش ، فؤاد عثمان

أجرى البحث على ثلاثون رأسا من القطط وخمسة وثلاثون رأسا من الأرناب .
تمت دراسة هذه العظيمات فى مكانها الطبيعى داخل الأذن الوسطى على
الجانبين علاوة على دراستها بعد استخراجها منها .

لقد أوضحت الدراسة أنه توجد ثلاثة عظيمات أساسية وهى المطرقة والسندان
والركاب فى كل من هذه الحيوانات وأنه فى حين أن هذه العظيمات متطورة
نسبيا فى القطط خاصة عظمة المطرقة التى تكون أكثرهم تطورا الا أن هذه
العظيمات صغيرة نسبيا فى الارانب لكن السندان أكثر وضوحا وأقوى صلابة
علاوة على هذا توجد فى كل من هذه الحيوانات عظمة أخرى وهى العظيمة
العدسية التى تتمفصل مع الفرع الطويل لعظيمة السندان .

كما أثبتت الدراسة أن هذه العظيمات فى القطط تتشابه عامة مع مثيلتها فى
الكلاب الا أنها تتميز بصفات خاصة أخرى . الا أن هذه العظيمات فى الأرناب
تنفرد بصفات متميزة مما يساعد على سهولة التعرف عليها من مثيلتها فى
الحيوانات الأخرى . زيادة على هذا أظهرت الدراسة أن المطرقة فى الأرناب
عظيمة رقيقة وترتبط بشدة مع السندان الأمر الذى يجعل فصل العظمتين عن
بعضهما مستحيلا .

تمت مناقشة النتائج مع مثيلتها فى الحيوانات الأخرى طبقا للأبحاث
المتوفرة فى هذا المجال .

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ANATOMICAL STUDIES ON THE AUDITORY OSSICLES OF THE CAT AND RABBIT

(With 2 Figs.)

By
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SUMMARY

Thirty fresh heads from cats and 35 from rabbits were examined. Three ossicles were found in each animal. The auditory ossicles of the cat are relatively large, the malleus being the most developed. The ossicles of the rabbit are relatively small but the incus is more pronounced. A small lenticular bone is found in both species. The individual auditory ossicles of these animals present some other characteristic features, which are described in the text.

INTRODUCTION

There are apparently no reports in the literature concerning the auditory ossicles in cat and rabbit. However, in the cat MCCLURE, DALLMAN and GARRET (1973) referred to the position of the bones. Some observations on the auditory ossicles have also provided in the horse (SISSON, 1975), ruminants (GANDI, 1975) and dog (ELLENPORT, 1975).

MATERIAL and METHODS

Thirty fresh heads from cats and 35 from rabbits were used. The bones had been investigated on both sides by dissection through the external acoustic meatus and tympanic bulla. A small electric drill was used to separate the stapes from the vestibular window. The ossicles in some of the heads were studied in situ within the tympanic cavity; some were removed and studied with the aid of an illuminated lens and microscopic slide projector.

RESULTS

CAT

The auditory ossicles of the cat are relatively large. They are generally resemble those of the dog, but show some distinctive features (Fig. 1 A.).

Malleus:

This is a well developed bone (Fig. 2.A.I). The head is elliptical and relatively small. The articular surface is saddle-like and is located on the caudo-medial aspect of the head. The non-articular surface is spherical, smooth and strongly convex. The neck is a slightly constricted part below the head. The handle consists of smaller horizontal and larger vertical parts. The former is strong, curved ventrally and is cylindrical in form. A few millimeters before its junction with the vertical part, it gives a 1-2 mm muscular process. At the same level projects a well developed (3-4 mm

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in length) rostral process which curves rostro-ventrally. The horizontal part also possesses a thin bony triangular plate. The dorsal border of the plate is attached to the neck of the malleus and horizontal part of the handle, while its rostro-ventral border is blended to the rostral process. The lateral process is well developed and projects from the dorsal end of the vertical part of the handle. The vertical part of the handle is slightly longer than the horizontal section. The whole resembles an elongated triangle, the base of which is directed dorsally and the apex ventrally. The vertical part of the handle together with the lateral and the rostral processes are completely embedded in the tympanic membrane.

Incus

This is small and teeth-like (Fig. 2.A.II). The articular surface of the body corresponds to that of the malleus. The long crus is curved, about 3-4 mm in length and is thinner but slightly longer than the short crus. The lenticular bone is noticeable. The short crus is straight, smaller and stronger than the long crus.

Stapes

This is triangular, long and narrow (Fig. 1.A.III). The head (Fig. 2.A.III) is small and the neck appears as faint constriction below it. The crura are very weak, especially at their junction with the base. The foramen for the obturator membrane is relatively large and elliptical in outline. The muscular process is faint and projects either from the neck or from the initial part of the caudal crus. The rostral crus is a slightly longer and more curved than the caudal one. The base is in the form of a thin elliptical plate which extends a short way beyond the junction of the crura.

RABBIT

The ossicles of the rabbit are relatively small, but the incus is the most developed (Fig. 1.B).

Malleus

The malleus of rabbit is a delicate bone and is intimately fused with the incus. It was therefore not possible to separate the malleus and incus from each other (Fig. 1.B.I). The head of the malleus is ill developed and appears to be flattened latero-medially (Fig. 2.B.I). There is a small triangular plate of bone projecting from the caudo-dorsal aspect of the head (non-articular part) and horizontal part of the handle. The shape and position of this plate give the bone a characteristic appearance. The neck is not obvious. The handle consists of two unequal parts, a smaller horizontal and a larger vertical. The horizontal part is very small, directed dorsally and rostrally towards the head of the bone. It has a very weak junction with the vertical part and during the separation of two bones it was very difficult to extract the two portions of the handle together. The strong lateral process projects from the angle of junction between the two divisions of the handle. The vertical part of the handle is well developed and four times larger than the horizontal one. It is flattened rostro-caudally, with a slight inclination towards the end. The vertical part of the handle is well embedded in the tympanic membrane.

Incus

This is a relatively well developed and strong bone (Fig. 1.B.II). As in other animals it has a body and two crura. The body is irregularly quadrilateral in outline. The articular surface is adapted to take the malleus and forms the complete caudal aspect of the bone. The two crura form the non-articular surface of the body. The long crus is triangular in form, slightly curved and about four times longer than the short one. Its end articulates with the small lenticular bone. The short crus is directed rostrally and appears as a small pointed projection close to the root of the long crus.

AUDITORY OSSICLES OF THE CAT, RABBIT

Stapes

This takes the form of a small triangle (Fig. 1.B.III). The head (Fig. 2.B.III) is pronounced and the neck is obvious. The muscular process for the stapedius muscle is relatively well developed and projects close to the head. The crura are nearly equal in length, each crus being about 2-3 mm in length. The base is relatively large and oval in outline. The stapes encloses a small rounded obturator foramen.

DISCUSSION

Present findings concerning the number and position of the auditory ossicles in the cat are in accordance with those of the McCLURE, DALLMAN and GARRETT (1973). In the rabbit, the ossicles are generally like those in other domestic animals. However, the individual bones of each of the two animals presents some characteristic features.

The presence of a triangular bony plate, located between the head and horizontal part of the handle and rostral process of the malleus gives a characteristic feature to the malleus of the cat*. A similar plate is found only in the sheep (GANDHI, 1975) and dog (GETTY *et al.* 1956 and ELLENPORT, 1975). Moreover, these latter authors mentioned that there is a distinct rostral curve in the distal part of the handle of the dog. Present findings show that in the cat the vertical part of the handle is almost straight and with the horizontal part forms a vertical right angle. The plate is also found in the malleus in the rabbit but it projects from the caudo-dorsal aspect of the bone. Moreover the rabbit malleus is firmly attached with the incus. In addition it is worthy of note that the rabbit is the only animal in which the articular surfaces of malleus and incus are strongly connected to one another, while the junction between the vertical and horizontal parts of the handle is very weak.

GANDHI (1975) stated that in the ox the long crus is twice as long as the short one, although in sheep it is three times longer. However, in the present study the long crus in the cat was found to be slightly longer than the short crus, while in the rabbit it is four times longer than the short one giving the incus of rabbit a distinctive appearance. This author also stated that the lenticular bone is absent in the ox and sheep. The existence of a small lenticular bone in cat and rabbit is in accordance to the observations of SISSON (1975) in the horse, and GETTY, *et al.* (1956) and ELLENPORT (1975) in the dog.

The stapes of cat and rabbit are similar to that of the dog (GETTY *et al.* 1956) and ELLENPORT (1975) and horse (SISSON, 1975), but the corresponding bone in the cat and rabbit is clearly triangular with a well defined base.

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* Previous references consider the neck as that part of the bone between the head and lateral process. However, in the present work it is considered as constricted part below the head and the rest of malleus as a handle. This is why the handle has been divided into two parts, horizontal and vertical, which in the cat and rabbit is very clear.

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EXPLANATION OF FIGURES

Fig. (1): Left auditory ossicles of cat and rabbit (medial view). I.A. Malleus of cat, I.B. Malleus and Incus of rabbit, II. A. Incus of cat, II. B. Incus of rabbit, III. A. Stapes of cat, III. B. Stapes of rabbit.

Fig. (2): Diagram of the left auditory ossicles of cat and rabbit (medial view).

I. Malleus

1. Head, 2. Articular surface for incus, 3. Neck, 4. Rostral process, 5. Muscular process, 6. Lateral process, 7. Osseous lamina, 8. Vertical part of handle.

II. Incus

1. Body, 2. Articular surface for malleus, 3. Short crus, 4. Long crus, 5. Lenticular bone.

- III. 1. Head, 2. Rostral crus, 3. Caudal crus, 4. Muscular process (attachment of stapedius muscle), 5. Base, 6. Obturator foramen

- A. Cat. B. Rabbit.

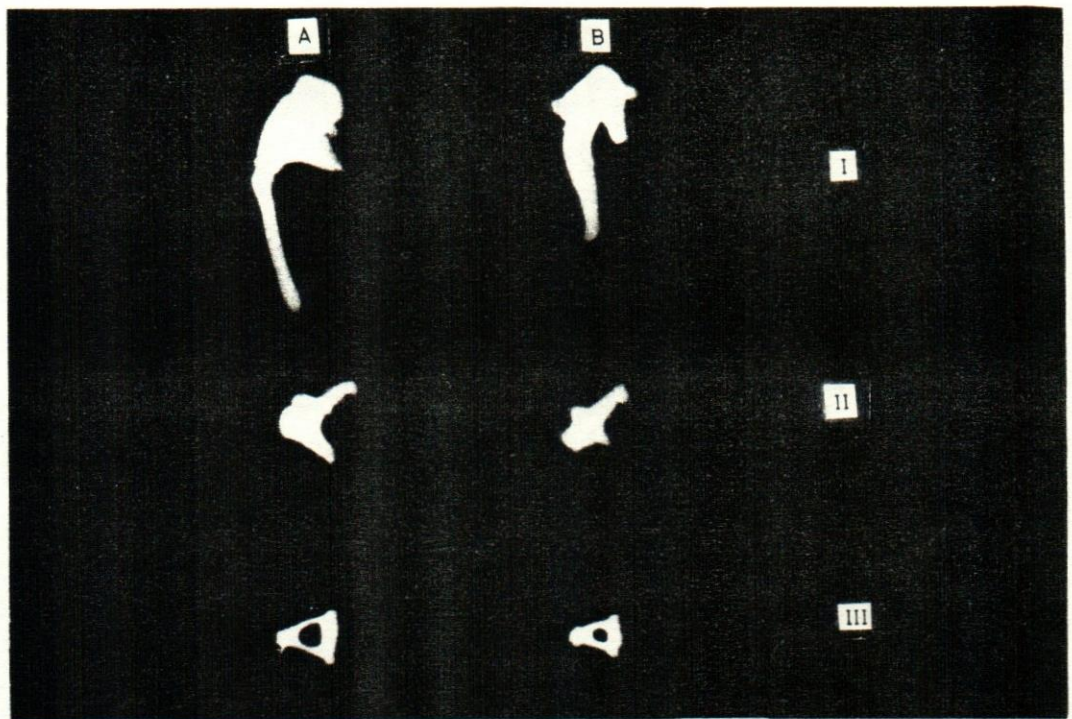


Fig. (1)

	A	B
I		
II		
III		

Fig. (2)



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