History and description of an ossifying enchondroma connected with the testicle of a horse / by Joseph S. Gamgee.

Contributors

Gamgee, Sampson, 1828-1886.
Royal College of Surgeons of England

Publication/Creation

London : Printed by Compton and Ritchie, 1850.

Persistent URL

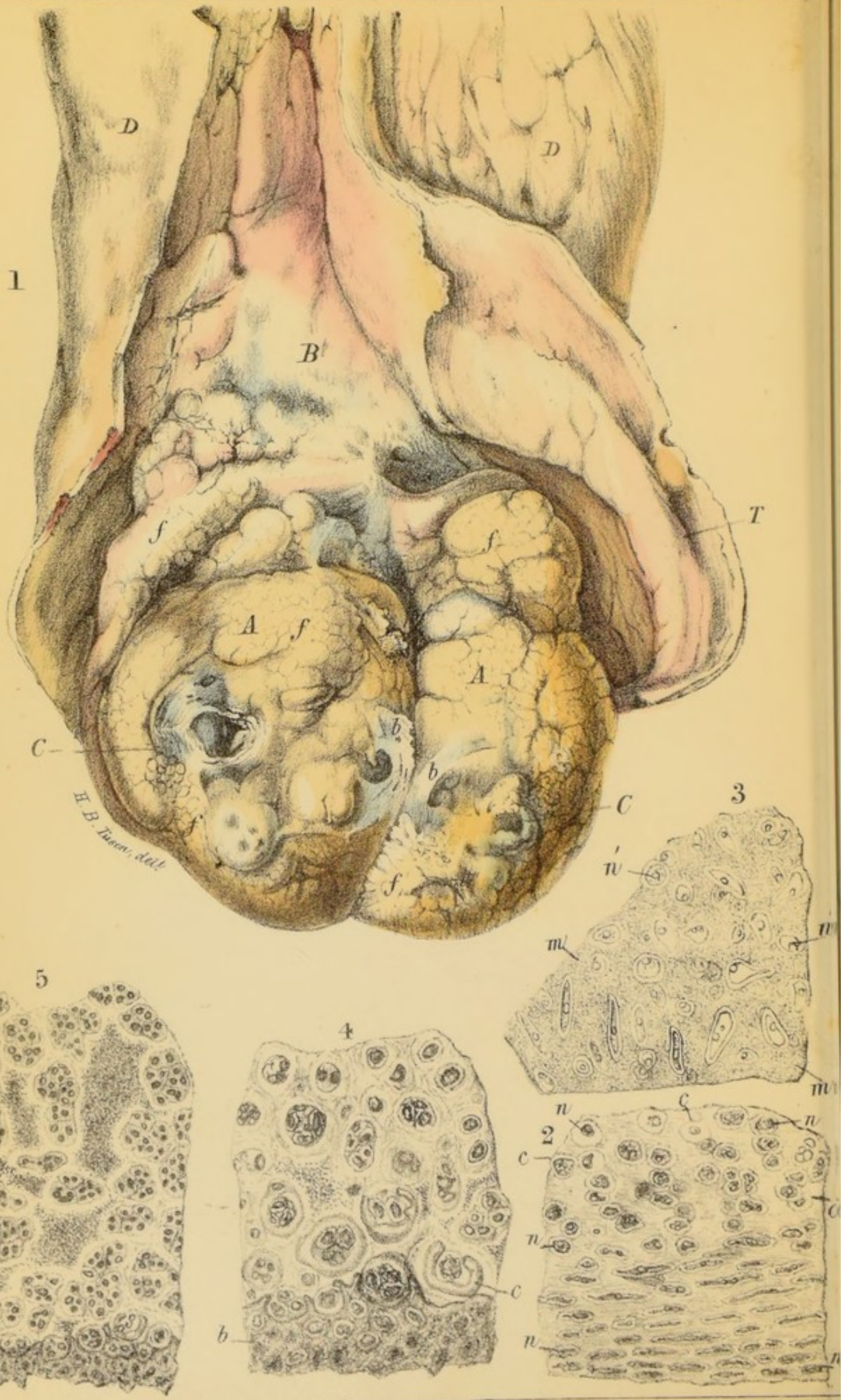
https://wellcomecollection.org/works/jy8m83wa

Provider

Royal College of Surgeons

License and attribution

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org


1
D
D
B
T
f
f
A
f
A
C
b
b
C
H.B. Tuson, del.
3
n'
n
m
m'
5
4
c
b
2
n
c
n
c
n
n
n

HISTORY AND DESCRIPTION

OF AN

OSSIFYING ENCHONDROMA

CONNECTED WITH THE

TESTICLE OF A HORSE.

BY JOSEPH S. GAMGEE, M.R.C.V.S.
STUDENT IN MEDICINE IN UNIVERSITY COLLEGE, LONDON.

ILLUSTRATED WITH A COLOURED PLATE.

LONDON:
PRINTED BY COMPTON AND RITCHIE, MIDDLE STREET, CLOTH FAIR.
1850.

HISTORY AND DESCRIPTION

OF AN

OSSIFYING ENCHONDROMA

CONNECTED WITH THE

TESTICLE OF A HORSE.

THE diseased specimen which is the subject of the present remarks was removed from a horse in the operation of castration, and forwarded on the 28th May, 1850, to the Editors of THE VETERINARY RECORD, by Mr. Robert Cook, veterinary surgeon at Erith. He stated in an accompanying note, that "the testicle was taken from a four-year-old horse, which appeared to suffer no inconvenience from its presence, although he had always been in an emaciated condition. The scrotum on the side whence it was taken had the appearance of hernia, the gland being much more pendulous and pouched than its fellow, which was quite free from disease, and very large. On making an incision into the diseased testicle, nearly an ounce of dirty-looking serous fluid escaped."

The testicle (see *coloured plate, fig.* 1) measures six inches in its long axis, and three inches from above downwards. It is soft and flabby, except at the posterior part, where a moderately hard tumour, A, about the size of a small orange, is connected with it. The gland is invested by the reflected or visceral portion of the tunica vaginalis, T, whose attachment, by a considerable amount of areolar tissue, is much looser than in the healthy condition, as it could readily be stripped off; moreover, the membrane is abnormally thick and opaque. Its general colour is a dead white, but pinkish at the supero-anterior part, near the commencement of the cord. The anterior extremity of the epididymis and the cord appear to be of normal size, and to preserve their usual relative position. The intermediate connecting portion of the vaginal tunic has been

torn asunder, and the extremity of the cord has been seared by the hot iron in the operation of castration. The spermatic artery measures $\frac{3}{16}$ of an inch in circumference; in its interior is a small quantity of coagulated blood, and in the structure of its coats no deviation from the natural condition can be detected by the aid of the microscope. The other constituents of the cord are apparently healthy. On dividing the testicle longitudinally, a hollow capable of containing a large pigeon's egg is exposed. The normal structure of the gland is nowhere presented to the naked eye; but from before backwards the tissue, indistinct in character and soft, gradually loses its red colour, becomes less in amount, and eventually degenerates into a dense white fibrous tissue, B, intimately connected with the diseased mass, A, which measures $1\frac{3}{4}$ inch from above downwards, $2\frac{1}{2}$ inches from before backwards, and, when cut longitudinally in the middle, $3\frac{1}{8}$ inches in the maximum transverse axis. The interior of the tumour being thus exposed, it presents two halves, of which the right is crescentic in shape, and measures $2\frac{1}{2}$ inches from before backwards, and $1\frac{1}{8}$ inch in breadth at the widest point; $\frac{6}{8}$ of an inch from its anterior extremity it is marked by a transverse groove. The left half is divided by one very deep and one shallow groove into three parts, of which the anterior and outer one is triangular, with its base turned forwards, united by a narrow and short slip of tissue, like the rest of the tumour, to the left half. The posterior portion is irregularly circular, and measures $1\frac{5}{8}$ inch transversely, and $1\frac{6}{8}$ inch from before backwards; between these two divisions of the left half is a third, much smaller, its longest axis not exceeding $\frac{7}{8}$ of an inch

The cut surface of the tumour has a pale yellow colour, and is marked by numerous shallow grooves which irregularly intersect each other, so as to divide the mass into irregularly-shaped lobules. It presents additionally three cysts, C, i. e., closed membranous sacs, each about the size of a large bean; two of them are situated on the left half and one on the right. They were distended with a transparent reddish fluid, the albuminous nature of which is proved by its conversion into a coagulated mass, after preservation of the specimen in a saline solution containing a small quantity of corrosive sublimate.

The physical appearance of the surface is neither that of genuine

adipose nor fibrous tissue, but is what would, *à priori*, be anticipated from an intersection of a mass of fat by bundles of fibres. The consistence of the tumour, in the greater part of its extent, is that of ordinary muscle; but in the centre of the exposed surface are two narrow crescents, *b b* (with their convexities in mutual contact), similar to cartilage in consistence, and in their pale bluish-white or greyish colour. This cartilaginous material may be seen and felt extending laterally into each half of the tumour, imbedded in the surrounding yellow adipo-fibrous tissue, to which it is so closely adherent as not to be detached by the aid of the forceps. By grasping with two fingers the right or smaller half of the tumour, an osseous mass is felt in its interior, and more particularly towards the outer surface, near the tunica vaginalis, from which it is only separated by a small quantity of fibrous tissue: this being dissected off, a dirty white surface is exposed; which is of bony hardness in a considerable part of its extent, but at one part yields to the knife. In this situation, a small piece of the apparently imperfect bone being removed, a cavity capable of containing a large filbert is exposed; its boundary is constituted by a thin layer of bone resting on cartilage, and lined by a closely adherent white fibrous membrane.

By microscopic examination, the tissues entering into the formation of the tumour are ascertained to be, firstly, fat and fibrous tissue (white and yellow); secondly, cartilage; thirdly, bone.

The yellowish tissue visible on the surface consists of fat cells (in no way differing from those of healthy adipose tissue) and fibres, which take a wavy and in some parts very irregular course between the fat cells. Some of the fibres are extremely fine and delicate, and may occasionally be seen placed side by side in considerable number to form fasciculi, while others present a well-defined outline, and are wider. The addition of acetic acid confirms the inference deduced from observation of the anatomical characters, *that the fibres are of two kinds*, white and yellow; for, while the majority of them are rendered indistinct by the chemical re-agent, a few remain intact, are very tortuous, and may in some instances be seen to divide, and to terminate abruptly.

Imbedded in the fibrous tissue above described, and very closely adherent to it, is cartilage. A thin perpendicular section of this texture, with some of the adjoining fibrous tissue (see *Fig.* 2)

being placed under the microscope, exhibits the true organization of cartilage; "nucleated cells disseminated in a solid mass or matrix." Those cells which are deeply seated, i. e., at a distance from the free surface, are irregularly oval and spherical, and their outline is indistinct. The nuclei are for the most part coarsely granular, and have a well-defined margin; their extreme measurements in the transverse direction are $\frac{1}{1000}$th to $\frac{1}{2000}$th of an inch. The remark made by Dr. Sharpey* may be here with justice repeated, "that it is often difficult to say whether a body contained within a cartilage cell is its nucleus, or merely the granular contents which have shrunk away from its sides and formed a mass of the same shape as the cell itself, in which the true nucleus is concealed." In some parts an eccentric nucleolus (from $\frac{1}{4000}$ to $\frac{1}{3000}$ of an inch in diameter) is seen within the nucleus; its outline is well defined, and the interior bright, bearing a resemblance to a particle of fat. It may be well to observe that those nuclei which possess nucleoli are less granular than others (see *fig.* 3). On approaching the surface—which is in contact with the fibrous tissue—the cell walls are scarcely visible, and some of the nuclei present an elliptical, others a fusiform and almost linear shape. In some parts the fibres may be seen extending in a transverse direction from the adjacent tissue, for a short distance, into the cartilage. A very large proportion of the fibres being rendered indistinct by the action of acetic acid, the cartilage nuclei then come into view; but their shape is so altered (linear), that their real nature can only be inferred by tracing the gradual transition from the oval and spherical shape.

The intercorpuscular substance or matrix is in some situations homogeneous and transparent, in others granular; and at wide intervals a few delicate fibres may be seen winding their course between the cells.

A transverse section of the bone seen under the microscope, by transmitted light, exhibits somewhat imperfectly the ordinary structure of osseous tissue. The Haversian canals are surrounded by lacunæ, which have a tendency to concentric arrangement, but are not so regularly disposed as in normal bone, and the canaliculi appearing as dark tortuous lines, spread out from the sides and extremities of the lacunæ.

* Elements of Anatomy, by Jones Quain, M.D. Edited by W. Sharpey, M.D. and F.R.S., and R. Quain, F.R.S Vol. I, p. cxxvi.

With a view to ascertain whether the bone owes its origin to intra-cartilaginous ossification, a perpendicular section of the cartilage has been made, including at one extremity a very small portion of the partially ossified structure. Under the microscope the walls of the cartilage corpuscles (see *fig.* 4) are observed to become very indistinct in proportion as the boundary of ossification is approached; they appear, in fact, to have become confounded with the matrix, which has undergone a change from its original character: it is more opaque and coarsely granular than in specimens of the unaltered cartilage (see *Fig.* 5), and the tissue appears mapped out into oval or irregularly-shaped figures, the boundaries of which are dark, while the interior is bright, and contains one or more nuclei, that are for the most part arranged in groups, are smaller, and more closely approach the circular form than do the nuclei at a greater distance from the seat of ossification. At the confines of the cartilage and bone, the opaque earthy deposit is evidently encroaching upon the matrix of the cartilage, and surrounding the corpuscles: some of these are completely enclosed by an opaque material arranged in concentric lines, within which the nucleus of the cartilage corpuscle is still visible. Some corpuscles, however, are not completely enclosed, but the earthy deposit is perceived advancing on each side of the cell, leaving it free at one part. On bringing a deeper and older portion of the bone into view, little oval cavities with dark boundaries are observed; their appearance and arrangement are very similar to that of the lacunæ in the piece of bone already alluded to, but no canaliculi can be detected. The quantity of ossifying cartilage obtainable in a section being extremely small, and the transition being apparently very sudden in the structure of the osseous tissue, from mere cartilage with earthy matter impregnating the matrix, to an imperfect appearance of Haversian canals and lacunæ, no sound inference can be deduced as to the mode of origin of the latter, or as to the eventual metamorphosis of the cartilage elements.

The precise structure of the morbid growth having been ascertained, the question arises, To what class of tumours does it belong? Insomuch as the naked eye characters differ from Müller's original enchondroma*, and microscopically the cartilage in the

* On the Nature and Structural Characteristics of Cancer, &c., by J. Müller, M.D. Translated by Charles West, M.D., 1840, p. 97 *et seq.*

tumour above-described presents the adult and not the embryonic type of that structure, reasons might be advanced for not citing the growth in question as an example of enchondromatous formation. It is, however, remarkble that, of all the cartilaginous tumours described by Müller, the only one which resembled the adult cartilage with isolated cartilage cells and intervening firm substance, was an enchondroma of the testicle*.

As Dr. Walshe observes†, "adventitious cartilage, at one time believed to take rank among the most common, is now known to be one of the rarest of new formations." True cartilage is undoubtedly the characteristic structural element of the tumour above-described, since positive proof is obtained of its conversion into bone; and appearances presented by a perpendicular section of the cartilage force on the observer's mind the idea that the deep-seated cartilage corpuscles, in their approach to the surface, are undergoing a gradual metamorphosis, eventually to form a part of the surrounding fibrous tissue. The difference in the naked eye characters does not appear to be a sufficient reason for not regarding this tumour as enchondroma. Though colloid, encephaloid, and scirrhus, are very different in their physical aspect, they are nevertheless regarded as varieties of cancer, since their anatomical characters and effects on the constitution are fundamentally alike.

Considering that the tumour above-described agrees with Müller's enchondroma in process of ossification, 1stly, in the essential identity of the structural elements, and, 2dly, in its benignant character‡, rather than create new pathological distinctions (always inconvenient and unprofitable, unless established upon very weighty reasons), we regard the tumour as an ossifying enchondroma, though, in the present state of knowledge, it must be considered a very rare, if not isolated, example.

* Op. cit., p. 125.

† The Cyclopedia of Anatomy and Physiology. Article, Adventitious Products.

‡ The benignity of the tumour is proved by Mr. Cook's statement (in reply to our inquiries), "that the wounds in the scrotum healed in the usual time, and the horse appears to have improved in condition since the removal of the testicle." Mr. C. adds, "the horse is the sire of several colts."

Explanation of Plate.

Fig I. Represents the testicle, D, connected by the fibrous membrane, B, to the tumour, A; *b*, cartilage; *c*, cysts, of fibrous tissue mingled with fat; T, tunica vaginalis.

Fig. II. A perpendicular section of the cartilage; *c*, is the cell wall; *n*, the nucleus. On approaching the surface the cells are seen to be flattened, their sections being oblong, and in some parts almost linear. Magnified 300 diameters.

Fig. III. A section of the cartilage exhibiting well-marked nucleoli *n'*, also the granular matrix, *m*; the latter, however, is represented too granular and dark. Magnified 300 diameters.

Fig. IV. A section of the cartilage in process of transformation into bone. The cells are seen arranged in groups, and masses of granules to pervade the matrix. At *b*, the cartilage is impregnated with earthy matter, which at *c*, is seen advancing around a cartilage corpuscle Magnified 300 diameters.

Fig. V. A section of the ossifying cartilage seen with a lower power: it has a mapped appearance, in consequence of the grouped arrangement of the corpuscles, and the irregularly shaped masses of granules pervading the matrix. Magnified 150 diameters.