

## THE DEVELOPMENT OF CYSTS IN CONNECTION WITH THE EXTERNAL SEMILUNAR CARTILAGE OF THE KNEE-JOINT.

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IN my work in the orthopædic department of Salford Royal Hospital I have now met with three instances in which cystic changes had occurred in the external semilunar cartilage. The condition has been recorded previously by several German observers. In 1904 Ebner<sup>1</sup> reported one case in great detail; in 1906 Schmidt<sup>2</sup> recorded a case, and in 1915 Riedel<sup>3</sup> described 6 cases upon which he had operated. Eden<sup>4</sup> also reported 2 cases in 1911. In 1909 Mr. Furnivall, who was then a member of the honorary staff of the London Hospital, told me of a recent example and referred to another case with which he had dealt. He presented a specimen to the museum of the Royal College of Surgeons. I have examined this specimen, which shows precisely the same condition as is seen in my own cases.

The museum catalogue describes it as follows: "The chief portion of a right semilunar cartilage removed by operation from the knee-joint. Projecting from the outer attached border there is a somewhat hemispherical swelling which extends for about half an inch along the cartilage and attains a maximum eminence of half an inch. As seen in the divided surfaces, the swelling consists of a series of well-defined spaces which, in the recent state, were filled with a thick, transparent, mucoid material. The smallest spaces appear as clefts between the bundles of white fibrous tissue at the periphery of the fibrocartilage, and seem to have arisen from a mucoid softening of the tissues and not in any way to be connected with the attached portions of synovial membrane. From a man, age 30, who slipped and fell, injuring the right knee four months before coming under observation. About a month later he noticed a swelling on the outer side of the joint; this slowly increased and troubled him in walking; it was especially uncomfortable at night and in the morning, without ever causing actual pain. On examination, there was found a swelling as large as a small filbert over the region of the external semilunar cartilage, just in front of the external lateral ligament: it was fixed to, and moved with, the tibia, and was unaffected by contraction of the biceps. The movements of the joint were smooth, and the other structures of the knee were normal. There was no affection of any other joint, and there was no history of gout or rheumatism. The parts shown were removed by longitudinal incision over the swelling.



FIG. 261.—Specimen in R.C.S. Museum.

"The swelling was wholly inside the capsule of the joint. The wound healed by first intention, and the function of the joint was afterwards perfect."

Fig. 261 shows a drawing which Mr. Sewell has made of this specimen. The clinical history of all the cases seems to be similar; all have a history of an injury, usually not severe, with gradually increasing pain and lameness, and with the development of

a swelling over the external cartilage about the junction of its anterior and middle thirds. The swelling is rounded, and varies in size from a half to one inch in diameter. It is tense but distinctly fluctuant. *Fig. 262* is a drawing from a photograph of one of the cases, and shows the appearance and position of the tumour very well.

My first patient, a man, age 40, had been operated upon eighteen months previously because of pain in the knee and the localized swelling. The cyst alone was removed. Six months later the swelling and pain recurred. A scar of an oblique incision over the anterior part of the cartilage was present. At operation I found that the cyst wall was

adherent to the skin scar of the first operation, and my incision opened up the cyst, from which a clear glycerin-like fluid escaped. I excised the whole cartilage with the cyst.

The second and third cases, men of 20 and 26 years, showed the same clinical picture, except that they had not been operated upon before, and in both of them the cartilage was removed with the cysts intact. The after-progress of all three cases was quite uneventful, and all recovered full function with freedom from any discomfort. *Figs. 263, 264, 265, and 266* illustrate the specimens removed from these men.

As to the pathology of the condition, I supposed at first that the cysts were probably the end-result of hæmorrhage or were produced by myxomatous degeneration of cartilage consequent on the trauma. Macroscopically the cysts are multilocular and appear to develop in the substance of the fibrocartilage near its outer border. They gradually enlarge and, taking the line of least resistance, project on the outer side. The lining is smooth and shining, and the contents are a clear mucoid material. Sections of the cartilage and cysts show, microscopically, a distinct lining to the cysts. The lining is a flattened endothelium similar to the synovial membrane endothe-



FIG. 262.

lium. The presence of this endothelial lining is entirely opposed to the idea of a degeneration cyst or a cyst following on a hæmorrhage. In the drawing of the specimen shown in *Fig. 263*, the large cystic spaces are well shown. In the section of the cartilage itself, immediately below the cyst, a small space in the actual cartilage is to be seen. This appears to be an early cyst in the process of distention. *Fig. 266* shows a large cyst occupying nearly the whole of the transverse section of the cartilage. This was part of the specimen taken from my first case, which had been operated upon eighteen months previously, and in which a recurrence had taken place. *Fig. 267* illustrates

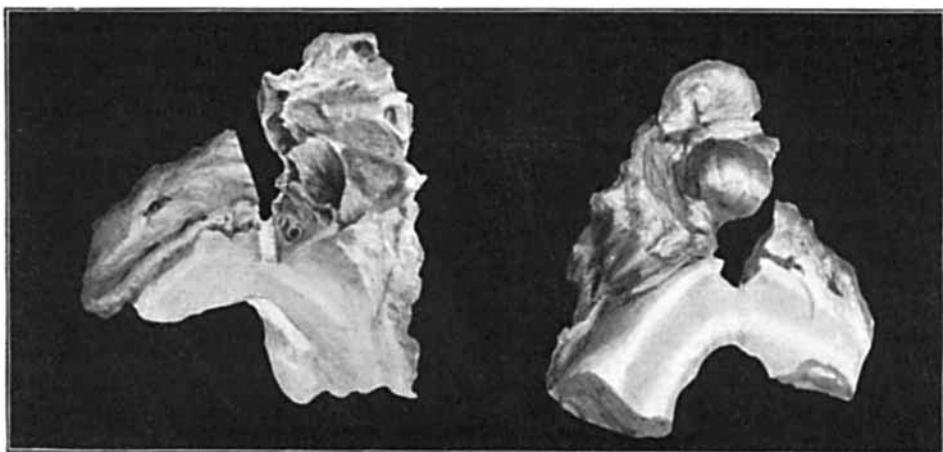


FIG. 263.—Specimen removed from second case. Note the small cyst developing in the cut surface of the fibrocartilage.

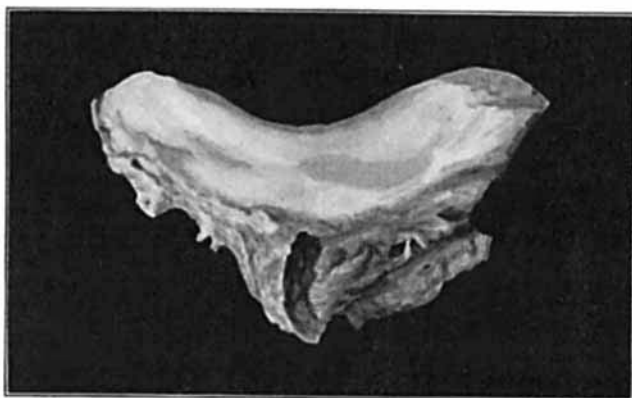


FIG. 264.—Specimen from third case.

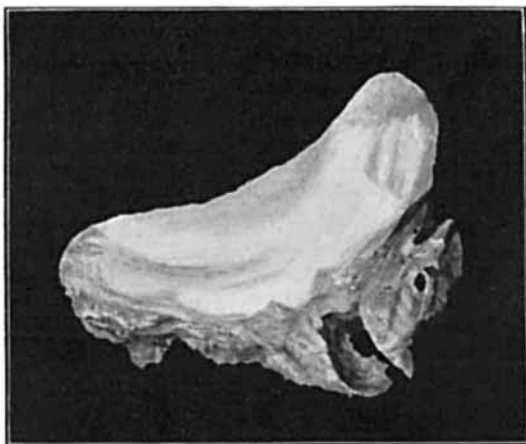


FIG. 265.—Specimen from third case.

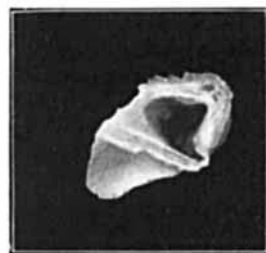


FIG. 266.—From first case. Showing a large cystic space completely surrounded by fibrocartilage.

the microscopical appearance of the cyst wall; the endothelial lining, with its nuclei, is well shown.

Ebner states that the cysts in his case showed no evidence of endothelial lining. Endarteritis of vessels in the surrounding connective tissue was present, though whether as a result of trauma or of pressure from the cysts he could not decide. In his case a yellow colour in the cartilage suggested degenerative changes. Schmidt found no endothelial lining in his specimen and no vascular changes. His case is particularly interesting, because he operated upon it three times before finally removing the cartilage. At the first and second operations he removed the cysts alone, and recurrences followed in four and six months.

Riedel had two recurrences in cases in which he simply removed the cysts. He remarks that in the case of wrist ganglia spontaneous disappearance is not infrequent, but that such an occurrence has never been recorded in the case of cysts connected with the knee cartilage.

In spite of this, Schmidt classifies these cysts as ganglia, defining a ganglion as a cyst formed by the softening of para-articular, tendinous, or periosteal tissues caused by colloid degeneration consequent on deficiency in nutrition following trauma. Riedel also refers to a case of Haehnel in which two operations for removal of cysts were each followed by recurrence, and a third for removal of the cyst-bearing cartilage effected a cure.

My own view is that the cysts are developmental in origin, due to small endothelial inclusions in the cartilage during its development, and that trauma causes an irritation and a distention of the spaces. In the



FIG. 267.—Microphotograph of the cyst wall, showing endothelium. (From the Pathological Department, Salford Royal Hospital. Dr. C. E. Jenkins.)

knee-joint the semilunar cartilages are developed in folds of synovial membrane which are derived from the interchondral disc, and it is not difficult to imagine that in the disappearance of the interchondral disc and its replacement by joint-cavity, capsule, and synovial membrane, small inclusions may occur in the folds of membrane in which the semilunar cartilages are ultimately developed. The lesion has occurred in the external cartilage in all of my three cases. It was also in the external cartilage in all the other reported cases. The explanation of this fact I am unable to determine. No instance of its occurrence in the internal cartilage has been reported. If trauma is a causative factor, it seems extraordinary that the inner cartilage, which is so frequently injured, should not be the seat of the lesion on most occasions. The pathological condition is obscure and interesting, and from the point of view of treatment the most important fact is that local removal of the cyst is frequently followed by recurrence, and that only a complete removal of the cyst-bearing cartilage provides a permanent cure.

#### REFERENCES.

- <sup>1</sup> EBNER, *Munch. med. Woch.* 1906, xxix, 1737.
- <sup>2</sup> SCHMIDT, *Ibid.* 1906, xxix, 1415.
- <sup>3</sup> RIEDEL, *Deut. Zeits. f. Chir.* 1915, Bd. cxxxii, 167.
- <sup>4</sup> EDEN, *Naturwissenschaftliche medizinische Gesellschaft zu Jena*, 1911, May 18.