(FROM THE ORTHOPEDIC CLINIC OF THE KAROLINSKA INSTITUT)
(HEAD: PROF. S. FRIBERG)

DISCOIDS IN THE KNEE-JOINT

By

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A countless number of different complaints were once concealed behind the old designation, "dérangement interne", in the knee joint. To these also belonged an affection called "genou à ressort", "snapping knee" or "schnellende Kniegelenk". Its etiology varies greatly; rupture of the meniscus, free bodies, osteochondrites, etc. One hitherto very little known cause is the so-called discoid meniscus. In this the meniscus does not possess its normal semi-lunar shape, but instead consists of one complete disc with or without a perforated centre (fig. 1).

Judging from the literature on the subject, the complaint seems to be rather rare. It was first described by the anatomist Young in Glasgow 1889, while Kroiss in Innsbruck was the first to operate on such a case, 1909. Timbrell Fisher stresses the point that the complaint is not so rare as one would suppose, but that the scanty evidence of it in medical literature is due to the fact that it is largely unknown and therefore is not diagnosed. Here he draws a parallel with the lateral meniscus ganglions which at first were regarded as extremely rare. The more widespread the knowledge of these became, however, the more cases were published each year. During the period 1904-1914, only 5 cases were reported, during the period 1914-1924, a further 19 cases were published, while during the following 8 years, 82 more cases could be assembled from medical literature. Middleton's series of discoid cases also points to a similar conclusion. In 1936 he traced 49 cases in the literature, 48 of which had been operated on after 1928. Finally, Smillie has 20 instances of discoid menisci amongst 1133 cases of meniscus injury, in his work published in 1946.

Only in a small number of the cases operated upon earlier, was the existence of a discoid meniscus suspected before operation. Usually the indication for operation was a suspected injury to the lateral meniscus and the discovery of the discoid came as a surprise in most cases. Knutsson seems to have been the first to employ arthrography in

the pre-operative diagnois of discoid menisci, making use of a positive contrast medium (Perabrodil). Only one other work has been encountered in which this possibility was taken advantage of, that published by Meschan & McGaw, where a negative contrast medium was employed (pneumo-arthrography). At the Orthopedic Clinic of the Karo-

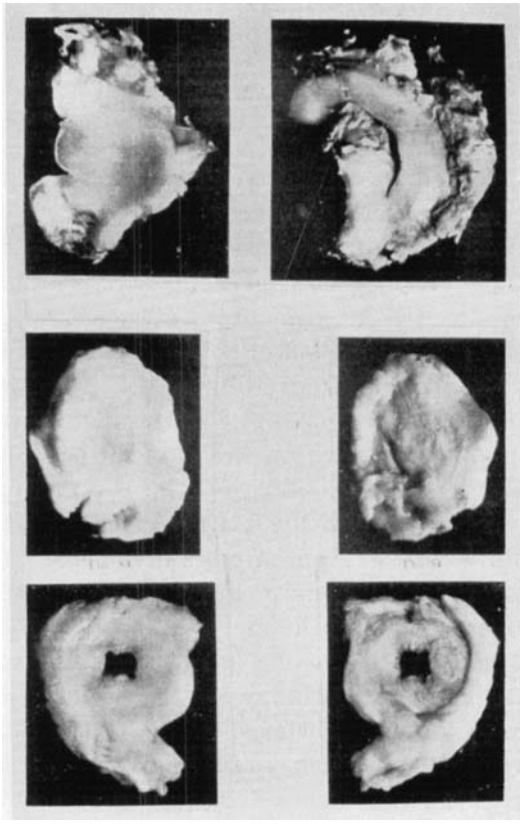

Fig. 1.
Different forms of the discoid meniscus (see Smillie, Injuries of the Knee-Joint. Edinburgh 1946).

linska Institut in Stockholm, 3 cases of discoid menisci have been encountered during recent years and these have been diagnosed with the aid of arthrography. Since exceedingly good, unambiguous photographs are obtained by this means and since the method is simple and almost without risk, it seems that an account of it may be of value.

Most writers seem to agree that the discoid meniscus is the conse-

quence of retarded fetal development. Only Langer and Jaroschy differ, as they consider its origin to be due not to this, but to a development disturbance which causes too large a formation of meniscus cartilage in the mesenchymal tissue forming the rudiments of the joints. In the animal kingdom the disc-shaped lateral meniscus is the norm amongst birds and reptiles (Jaroschy) while no animal higher than the saurian in the evolutionary scale is equipped with a complete disc.

In homo the rudimentary meniscus cannot be observed before the 3rd fetal month (Ishido). Dubinkin and Motnenko have examined 16 knee-joints of feti which vary from 9.5-71 cms in length, and 25-6000 gr:s in weight, that is to say, between the ages of 2½-11 months. The

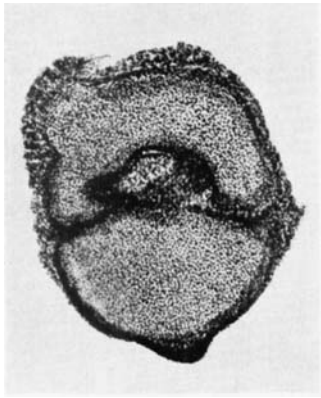

Fig. 2.

Cross-section of knee joint in 2½ month embryo. Rudiments of meniscus may be observed peripherally (see Dubinkin and Motnenko Arch. f. klin. Chir. 1931).

description of the development which is given below follows these writers in the main. In a 9. cm. fetus the region of the knee-joint is occupied by a homogeneous tissue, in some parts richer in intercellular substance, in others richer in cell nuclei. The undeveloped menisci may be observed peripherally (fig. 2), but are not yet differentiated. At the end of the 3rd fetal month two types of tissue appear—centrally, a tissue resembling cartilaginous tissue and constituting the undeveloped epiphyses,—peripherally surrounded by tissue resembling connective tissue. A division in the joint begins to appear, at first between the undeveloped epiphyses and the rudimentary meniscus, while the latter still remains attached to the undeveloped tibial epiphyses (fig. 3). The femoral division increases in extent during the 4th fetal month, while a tibial division

does not arise until the end of the 5th month. These two divisions finally unite during the 6th month, and in this manner a common joint cavity arises. At birth the greater part of the articular surfaces is

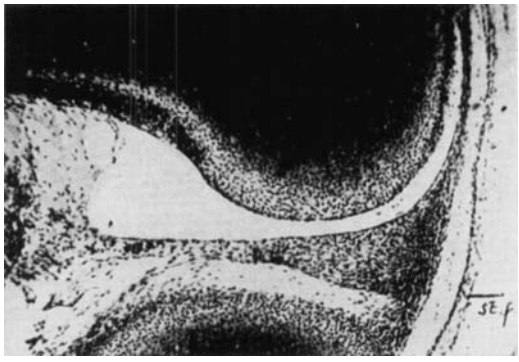

Fig. 3.

Cross-section of knee-joint from a 40 mm fetus. The femoral notch is developed. The rudimentary disc-shaped meniscus is interposed between the articular surfaces (see Raszeja, Bruns Beitr. z. klin. Chir. 1938).

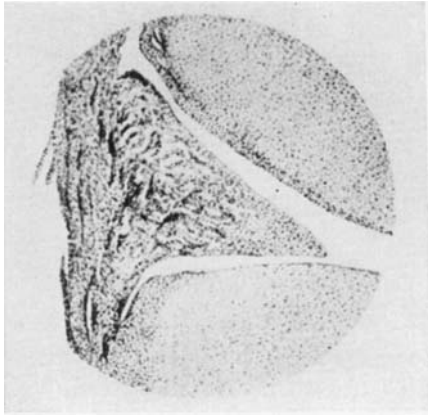

Fig. 4.

The appearance of the meniscus in a new-born baby (see Dubinkin and Motnenko, Arch. J. klin. Chir. 1931).

covered by widely-extended menisci, through which the opposite joint extremities come into contact only to a slight extent (fig. 4). It is only through the continual movement of the skeletal parts against each other that the centre thins out more and more and that thus a

wider contact between the joint extremities is established (Ishido, Dubinkin & Motnenko, Fisher) Genetically, the origin of the disc-shaped meniscus may be thus attributed to a lack of differentiation in the mesenchymal tissue between the joint extremities, i.e. it is an anomaly existent at birth, arising from the physiological persistence of the fetal type of meniscus.

The discoid meniscus appears to an overwhelming degree on the lateral side of the knee joint. Smillie describes 20 cases, of which 19 were located laterally and one medially, the latter combined with cystic degeneration of the meniscus. One further case of discoid meniscus, located medially, is described, without cystic changes (Dwyer

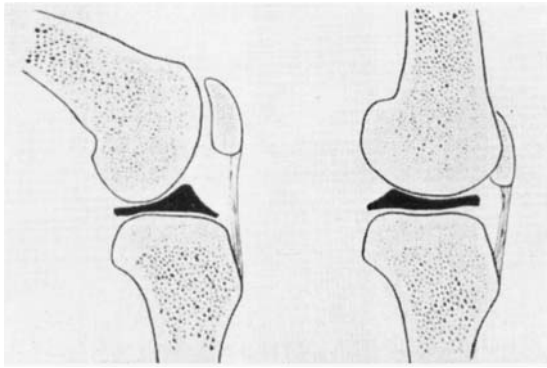

Fig. 5.

Displacement of the meniscus wall of cartilage in movements of the knee-joint (see Middleton, Brit. Journ. Surg. 1936/37).

& Taylor). All the other published cases concern the lateral meniscus. The proportion of women is very high. Charles has described 9 cases, all women, 2 white women and 7 negresses, Fisher, 9 cases, 8 of them women, Ellis, 2 women. All three cases below are women.

In the introduction, the different foreign terms denoting the complaint all reveal its main symptom, a jerky kind of interruption in the smooth normal rhythm of the knee-joint, most frequently combined with an audible crackling or snapping noise, as it were. Middleton reports 2 cases in which he was able to observe this symptom even during the first 2-3 months, and in which the parents had already noticed it, directly after birth. The great variation thus indicates that the symptom may arise very early, only to disappear in later life, although in most cases it only shows itself at a later period and often then is initiated by a previous trauma. Middleton explains it as due to

the displacement of a cartilage wall in movements of the joint. The symptom makes its appearance at about 20° of flexion, when the gliding movement of the leg becomes a flexing movement. In many cases there is complete freedom from pain, but in most cases slight or pronounced pain exists and this is the reason why the individual in question seeks assistance for his complaint. Apart from the above-mentioned symptoms a recurrent hydrops appears now and again.

As far as the treatment is concerned, it is operative, with the possible exception of young children, in whom the symptoms may disappear. If a case is not operated upon, the risk of early arthrosis is present. It should be noted that in the operation, after the Esmarch-bandage has been applied, the knee-joint is fully flexed, so that the discoid meniscus may be brought forward in its anterior position and thereby made more easily accessible. From this, semi-flexion can afterwards take place.

Case 1: 14½ year-old girl. Knocked lateral side of left knee against a bicycle 2 years earlier. No trouble for 1 month afterwards, but then pain was felt in the knee, after exertion, localised to the outer side. After this the same trouble was experienced from the right knee and left knee, alternately.

Status: No limp. Possibly slight swelling of capsule of left knee. 5° extension defect in each knee-joint. Pain felt on attempts to increase extension. Tender somewhat above the layer of fat on the lateral side of the patellar tendon.

Arthrography: (left knee-joint) In the lateral part of the joint space a disc-shaped body intervenes, giving rise to the suspicion that instead of a normal meniscus a kind of disc exists, interposed between the condyle surfaces (see fig. 6).

Arthrography: (right knee-joint): On the lateral side of the joint space the contrast medium gathers in a thin layer nor does any spheroid meniscus arise. Obviously a complete disk is present here, in contact with the articular surface of the tibial condyle, (see fig. 7). On both sides the medial meniscus appears normal.

Operation on right knee: the lateral meniscus continued centrally as a vertical septum. It was almost disc-shaped and of considerable thickness. The lateral margin was calculated to be from 7 to 8 mm. thick; its medial margin was not as knife-edged as usual ,but enlarged and rounded (see fig. 8) P.A.D.: Degenerated meniscus.

Examination after 4 months: knee-joint normal.

Examination after 4 years: no trouble at all from either the right or left knee after operation. Never had any attacks of locking, snapping or hydrops.

Walks any distance up to 2 miles. Stands all day as dentist's nurse. Objective examination showed completely normal condition of the right knee. Upon palpation of the left knee a slight little snapping was to be distinguished in hyperextension and/or in 20°-25° flexion; this was located in the lateral part of the joint cavity.

Case 2: 18 years. Female. (Bar waitress.) Slipped and fell full length, 4 months ago. Hurt both knees. Swelling appeared. Became better after elastoplast fixation in the local hospital, but 2 months later became worse again, with pain in right knee-joint, difficulty in walking, stiffness in the knee-joint and difficulty in flexing the joint. Had locking attacks, so she had to "shake loose" the knee.

Status: Limp on right side. Keeps knee-joint stiff when walking. Some degrees of extension defect. Pain felt on attempt to force extension. Tender above the medial meniscus' anterior and medial part. Otherwise nothing.

Arthrography: Normal medial meniscus. The appearance of the lateral meniscus is that of a large disc-like body, interposed between the articular surfaces and extending over a larger area than normal (discoid meniscus). No signs of fissure

Fig. 6.

Arthrography of left knee-joint in 14½ year old girl. In place of the normal meniscus defect in the contrast medium, a disc-shaped body is found, extending into the fossa intercondyloidea.

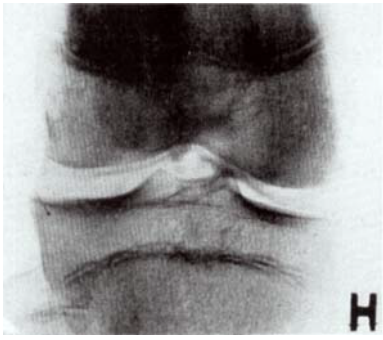

Fig. 7.

Same case, right knee-joint. Wide discoid in the lateral joint space in contact with the extremity of the tibia. Only a thin line of contrast medium is apparent between the discoid and the femoral articular surface.

formation (see fig. 9). After one month's physical therapy in her home town obvious improvement was shown.

Case 3. 9 year old girl. Hurt left knee about 6 months ago. After that, patient suffered recurrent effusion due to sudden giving way of the knee-joint. There was no proper locking.

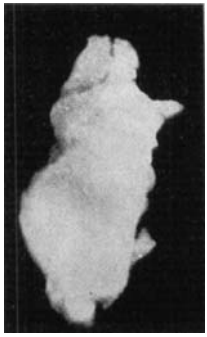

Fig. 8.
Extirpated discoid (see Knutsson, Nordisk Med. 1946: 31: 1995).

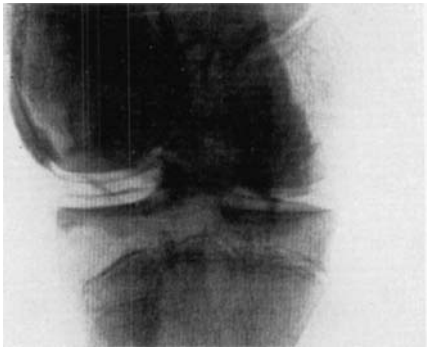

Fig. 9.
Normal meniscus defect is missing and is replaced by a wide discoid interposed between the articular surfaces.

Fig. 10.
The discoid appears as a contrast medium defect between the lateral sides of both articular surfaces.

Status: Slight pain on moving the loose joint—otherwise nil.

Arthrography: The lateral meniscus presents an anomaly in that it consists of a disc-shaped body, interposed between the articular surfaces of the condyles, and about 2 mm. high (discoid meniscus),—(see fig. 10).

Normal medial meniscus. Operation advised, but I shall wait and see, as the patient has no trouble for the time being.

SUMMARY

The author describes 3 cases of discoids in the knee joint in young individuals. Arthrography makes it possible to elucidate the anatomic conditions. Operation is recommended in cases of long-standing trouble.

RESUME

L'auteur décrit trois cas de troubles dans l'articulation du genou chez de jeunes individus. Grâce à l'arthrographie, il est possible de constater les conditions anatomiques. L'opération est recommandée dans les cas de troubles prolongés.

ZUSAMMENFASSUNG

Der Verfasser beschreibt drei Fälle von Diskoiden im Kniegelenk von jungen Personen. Arthrographie macht es möglich die anatomischen Verhältnisse aufzuklären. In Fällen, die langdauernde Beschwerden hatten, wird die Operation anbefohlen.

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