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EDITED BY
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The meeting was opened by the chairman, surgeon in chief
Gunnar Frising, M. D., Lund.

H. HINRICSSON, UMEA:

ON GANGLIA OF THE MENISCI OF THE KNEE-JOINT

The two menisci of the knee-joint which anatomically as also functionally have certain dissimilarities are, as is well known, particularly liable to traumatic lesions. Such lesions, however, often vary fairly much in nature, giving rise to a great many retrogressive and degenerative processes.—Amongst these pathological changes ganglia have also in recent years begun to attract the attention of surgeons generally as well as of orthopaedic specialists.

In the past these meniscal ganglia have really only been described by clinicians, among others by *J. Delchef* (2 cases of the external meniscus in two female patients), *R. Ollerenshaw* (18 cases of which 14 of the external meniscus), *A. Folliasson* (1 case of the external meniscus), *F. Mandl* who is also speaking of foreign-body cysts after meniscectomy, *L. Badorsl* (2 cases together with meniscal rupture), *Tobler* (3 cases of the external meniscus) and further in this country among others *N. Silfver-skiöld* (2 cases of the internal meniscus) and *O. Aleman & S. Friberg* (3 cases of the external meniscus) and, finally, by *K.*

Furster (who has recently shown a case of external meniscal ganglion). Of these authors it is above all *Tobler* who has investigated his material patho-anatomically by systematically examining post mortem all menisci of knee-joints (400 cases). The outcome of this investigation was that degenerative processes of these cartilages were very common phenomena. He thus found fatty degeneration in no less than 67 % of the cases—earliest at the age of 15, regularly after 32 years of age—in 21 % calcification, in 30 % hyalinization, further pure necrosis and asbestos degeneration and finally in no less than 50 % mucoid degeneration—earliest at 16, regularly recurring after 37 years of age. This latter form of degenerative changes—colliquation necrosis—may perhaps be regarded as a preliminary stage of multilocular ganglia; in that case they would make up, to use *F. Mandl's* classification, the so-called intrameniscal forms. There would not seem to exist any directly qualitative but only a purely quantitative difference between these colliquation necroses and true small ganglia. By further development, possibly through confluence of several muco-degenerated parts, these latter may pass into true uni- or multilocular ganglion formations which may then also become localized almost entirely outside the region of the true meniscus, in some cases only connected with this by a more or less thin pedicle. These so-called parameniscal ganglia generally attain a size of a hazelnut or walnut and is that form of ganglion formation in the meniscus which more especially brings the patient to the doctor.

As to the etiology of ganglia it is held by many authors that they are the sequence of some metabolic disturbance in the connective tissue, nearly always arisen as a result of some injury, according to some pathologists in connection with some vascular disturbance, an endarteritis obliterans. A decided view as to the etiological factor is still, however, lacking. It is well known that some parts of the body are obviously predisposed to the formation of ganglia, e. g. the radial dorsal part of the wrist. It is in persons exposed to continuous traumatic wearing of this very joint that such formations are found as, for instance, in persistent fencing; it might thus be called a pure sport injury.

In the knee-joint it is not perhaps equally easy to refer the lesion to any one-sided trauma, but also here there are certain places of predilection, viz. in the popliteal space and the external region. There is no doubt, however, that when we are dealing with meniscal ganglia the nature of the trauma plays some part. As it has been found that according to statistical inquiries ganglia of the external meniscus are 5—6 times more frequent than such of the internal one but, on the other hand, that injuries to the latter would be 5, according to some statements even 10 times more frequent than to the external meniscus, it cannot be said to be a chance coincidence that the latter meniscus becomes the most common seat of ganglia. Ganglia and ruptures sometimes occur simultaneously but since the latter of the inner meniscus nearly always occur through tearing while in the outer meniscus they arise through crushing, the latter form of trauma should of course be regarded as playing a decided rôle in the production first of all of colligation necroses and later of intra- or parameniscal ganglia, a state of affairs which, as far as I am aware, has not earlier been duly considered.

With regard to the sex it is nearly always males that are the victims of this condition (*Delchef* has, however, recorded cases in females, similarly was the operated case recorded here by G. Söderlund a woman) and as a rule it is a question of younger individuals (*Silfverskiöld's* both cases, however, were 40—50 years old).

It should be observed that the symptomatology and diagnosis of meniscal ganglia are different for the intrameniscal and parameniscal type. In the first case, on lateral localization, the patient shows practically the same symptoms as in an ordinary meniscal rupture which of course in some cases can also be traced in the history. There is then a partial synovitis typically localized over the lateral joint-space above the head of the fibula, between the posterior thinner border of the ilio-tibial aponeurosis and the collateral ligament with simultaneous pain, besides a certain feeling of stiffness and instability in the knee in conjunction with definite limitation of movement. The meniscus itself may sometimes be palpable. On greater exertion

effusion in the joint occurs now and then and like what happens in any lesion of the knee which persists sufficiently long we often get well-marked muscular atrophy. It would seem in the first place to be the pain and stiffness that bring the patient to seek medical advice. As a rule there is no direct signs of locking, such being on the whole exceedingly rare in injuries to the outer meniscus. Regarding the parameniscal ganglia we also here get the symptoms just described but in addition the patient generally notices, more than is the case in the intrameniscal ganglia, a small ball-shaped swelling at the lateral joint space, a »lump« which, until it has reached sufficient size, may at times be very painful. On medial localization of the ganglia, on the other hand, symptoms arise most like those of rupture of the internal meniscus, with the difference, however, that locking symptoms do not occur in the absence of simultaneous rupture.

From the point of view of differential diagnosis ganglia of the menisci do not as a rule offer any greater difficulties. On medial localization a tumour can generally be felt located in the meniscal area, giving rise to no locking symptoms, nor showing any signs of malignity. Radiography of the knee-joint yields in these as well as in all cases of ganglia of the menisci no positive findings, possibly with the exception of a soft shadow corresponding to the palpable distension. In all forms of meniscal ganglia tuberculosis and lues must be excluded by all available diagnostic means. Also in lateral localization of the meniscal ganglia it must be remembered that the tuberculous sponge-like tissue may off and on adopt about a similar character, and cases are described where a meniscal ganglion had originally been regarded as tuberculosis originating from the fibular head (a case operated on by R. Hanson, the diagnosis made prior to operation; the doctor who sent the patient, however, had suspected tuberculosis). When of the intrameniscal type the lateral meniscal ganglion is difficult to diagnose as such but its presence may be suspected by the characteristic partial slightly tender synovitis which points to the meniscus having possibly undergone changes. In the lateral parameniscal type there is likewise partial synovitis at the characteristic place as mentioned before

but here we have the additional observation that the swelling feels very much tenser and that the tumour on extension of the joint, and particularly on a few degrees of flexion, is more prominent than on extreme flexion.¹⁾ In Hoffa's disease or patellar chondromalacia localized to the apex as pointed out by Aleman the synovitis is generally differently localized than in cases of meniscal ganglia, namely bilaterally and more around the patellar ligament. Loose bodies may also sometimes be localized to the same region as the meniscal ganglia but here we also get locking symptoms in the history. Another change that may also be born in mind in this relation are lipoma or fibroma situated at the level of the joint-space, in size as large as hazelnuts or walnuts. Because of their location within the subcutaneous tissue they can, however, on careful palpation without difficulty be distinguished from the ganglion formations. It is presumably more difficult to distinguish a ganglion arisen from the joint capsule itself at the level of the joint-space, from one originating from a meniscus but its more superficial position and its constant size in different phases of movement may nevertheless aid the diagnosis.

As to the prognosis of these formations the intrameniscal form must have, if it supports a synovitis, a deleterious effect upon the joint which on account of its continuous state of irritation must be more liable to arthritis deformans than a sound joint.

Similarly would seem to be the case with the parameniscal type, more so since the meniscus in these cases may also be *pathologically altered*. In one of Silfverskiöld's cases, however, examined patho-anatomically by Henschen, the meniscus showed no other changes.

As to the treatment of parameniscal ganglia it is held by some surgeons to be sufficient to remove the formation con-

¹⁾ Particularly in reference to the former type of ganglion »meniscitis« has been seen used in the literature, a term which is exceedingly inappropriate, among other reasons because of the absence of any true inflammatory elements which on the other hand are found in the extremely rare cases of true meniscitis.

cerned, while others, e. g. F. Pozet, maintain that extirpation of the entire meniscus is indicated in all the cases. Since this operation, however, when we are concerned with the external meniscus is a much more extensive one and technically at times fairly troublesome and, moreover, may result in functional disturbances of perhaps a more severe kind than those present before the operation, it may be advisable in the first place to remove the ganglion only together with the adjacent portion of the meniscus and then await further events to see whether this operation may not be sufficient for getting rid of symptoms and prevent recurrence. The cases recorded from Umeå have all but one been treated along these lines and as far as can be judged at present with exceedingly good results (there has been no need of any further operation beyond removal of the meniscus). With regard to the internal meniscus one should always, when necessary perform meniscectomy since the risk of functional disturbance is exceedingly slight and the operation itself a relatively simple one.

In illustration of what has been said above a few cases will be related below (see separate sheet).

ABSTRACT

The author is recording 9 further cases of ganglion which have all arisen from the external meniscus of the knee-joint. In none of the cases did the diagnosis offer any appreciable difficulties, presenting as they did symptoms characteristic of a meniscal ganglion which was readily palpable in all cases of parameniscal type. The author is of the opinion that the colliquation necroses, of extremely common occurrence in the menisci, behave in a similar manner as on the whole in all tissue where ganglia form, i. e. they may develop into multilocular small ganglia which subsequently in their turn may develop into multi- or unilocular ganglia of intra- or parameniscal type. The author further holds that the mainly lateral localization of meniscal ganglia is in the first place due to the fact that the meniscus in this part of the joint is subjected to a different

form of trauma (wearing or crushing) than the internal one, where there is more a question of tearing, and that just those first-mentioned often repeated minor crushing traumata would be a predisposing factor in the formation of colligation necrosis with perhaps subsequent formation of ganglia. Of value for the differential diagnosis is further on internal localization the ganglion palpable directly over the internal meniscus and the absence in the history of any locking symptoms and on external localization the tensely elastic tumour found over a definite area of the lateral joint-space and varying in size on different movements of the joint.

As to treatment the author suggests in the internal variety, when symptoms are present, meniscectomy, and in the external variety the same operation for the intrameniscal type but in the parameniscal type only removal of the ganglion itself and adjacent part of the meniscus, since in the latter case there is no certainty of other parts being pathologically affected and, furthermore, symptoms from the joint after such an operation need not necessarily arise. Should, however, the symptoms continue or even get worse or, finally, the ganglion recur, meniscectomy is also now advised.

CASES

CASE I.—Umeå Central Hospital. (Journal 2322/1932). A 21-year old corporal who the year before admission had in jumping over a plinth during the Swedish drill class injured his right knee; after a few days the knee was well again until 3 months ago since when he has often had aching pains on the outside of the knee which has been slightly swollen but never been locked.—On admission one found at a place corresponding to the lateral joint-space a little in front and above the fibular head a rounded tense tumour, at least the size of a hazelnut, which on strong flexion seemed to disappear into the joint; the joint was otherwise normal. (Fig. 1). On operation (W. Möller) the tumour was found to extend from the anterior part of the external meniscus and to be a multilocular and cystic formation with a gelatinous content. The ganglion was removed while the rest of the meniscus, apparently normal, was left intact. (Patho-anat. ex.—C. W. Lundquist. Ganglion. Section through the tumour submitted shows macroscopically a large central irregularly shaped cavitation filled up with a yellowish gelatinous transparent mass. Microscopically

it is noticed how the cysts have arisen through degenerative processes in a loose fibrous oedematous tissue. In the periphery there is a more coarsely lamellar connective tissue in which is seen some cystic spaces of smaller size, some of them with endothelial lining). The patient was discharged 13 days after the operation with good mobility in the joint; this has never caused him any trouble since, not even after strenuous cross country skiing.

CASE II.—Umeå Central Hospital. (Journ. 420/1933).—Labourer, aged 25, who for the past 3 years had had aching pains in his right knee

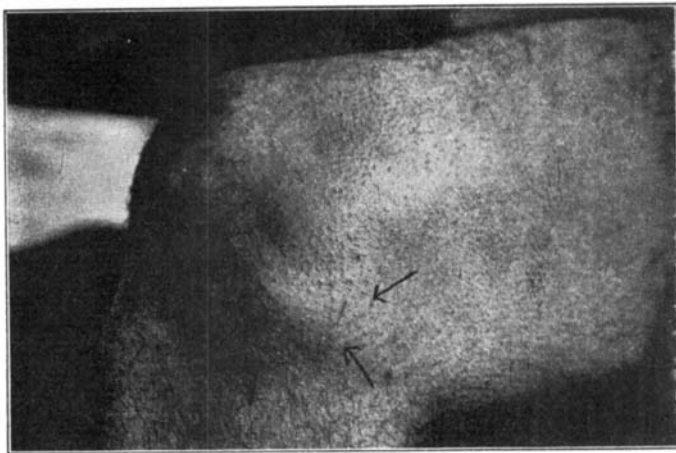


Fig. 1.

without any known cause and who about ten days before admission had had similar symptoms particularly on stronger flexion of the joint; the pains had always been localized to the outer part of the joint where the patient had also noticed a lump which had lately grown larger. He did not seem to have had any locking symptoms.—On admission there was no signs of inflammation of the knee but at the level of the external joint-space, above and somewhat in front of the fibular head, there was seen a rounded tensely elastic tumour, about the size of a pigeon-egg, which partly disappeared into the joint on full extension but appeared more readily on slight flexion. (Fig. 2).—The ganglion, as large as the end of a thumb, coming off from the apparently normal external meniscus was removed (W. Möller) and the patient was discharged practically free from symptoms 18 days after the operation. (Patho-anat. ex.—C. W. Lundquist. Ganglion. The tumour has the typical appearance of a so-called ganglion. Portions of the external meniscus show well-marked retrogressive changes in the form of loosening of the tissue, fibrillation

and formation of larger and smaller vacuoles filled with a mucoid kind of tissue. The histological changes in the meniscus greatly resemble those found in the ganglion. No inflammatory changes observed). After-examination has proved the patient to be subjectively as well as objectively quite well.

CASE III.—Umeå Central Hospital. (Journ. 6/1934).—Form foreman, aged 36, who for the past 4 years had had some trouble with his right knee, a small swelling appearing on its outer side. Now and again he had

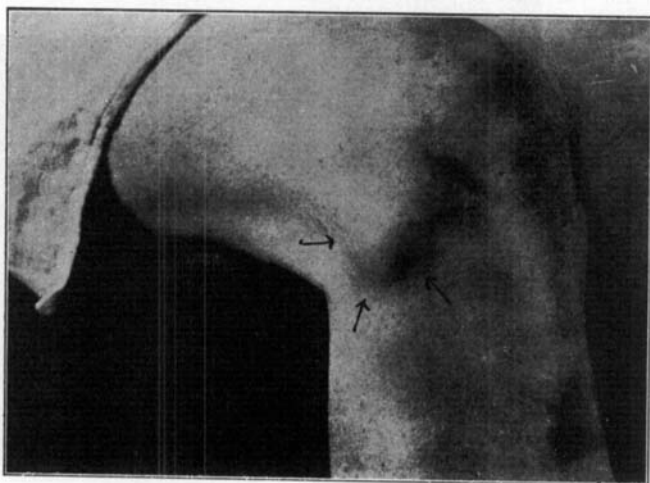


Fig. 2.

pain in the knee after exertions but never any locking symptoms. On admission to hospital one noticed at the level of the lateral joint-space of the right knee a tensely elastic rounded tumour, at least the size of a hazelnut, most prominent on 30° flexion (fig. 3).—On operation (W. Möller) the tumour proved to be a ganglion broadly extending from the external meniscus and the capsule and with a typically gelatinous content. Because of damage to the capsule arisen during the operation meniscectomy was deemed advisable in this case; the middle part of the cartilage was then found the seat of rupture (whether it had arisen during the operation was impossible to say). (Patho-anat. ex. Lundquist. Ganglion. No signs of inflammation. The meniscus shows retrogressive changes in the form of oedema, fibrillation of the tissue and here and there poor staining. No necrosis.—In frozen sections stained with Sudan there is in places a minute design of fatty degeneration in the tissue).

CASE IV.—Umeå Central Hospital. (Journ. 223/1934).—A farm-hand, aged 39, who in connection with some injury to the left knee, sustained

9 years earlier, (hit by a log) had noticed a small lump on the outer side of the joint which now and then had felt somewhat stiff. A fortnight before admission to the hospital he had sprained his knee which swelled up; had not had any locking symptoms. On admission to hospital he had slight effusion into the joint and over the external joint-space there was a slightly tender tensely elastic tumour, the size of a shell-almond, which was most prominent at about 30° flexion in the joint (fig. 4). The ganglion,



Fig. 3.

arisen from the external meniscus, together with adjacent parts of this were removed (W. Möller); this part of the meniscus around the tumour had undergone cystic changes. (Patho-anat. ex. C. W. Lundquist. Ganglion. The attached part of the meniscus showed well-marked retrogressive changes in the form of loosening of tissue, necrosis and here and there poor stainability. In frozen sections stained with Sudan there is well-marked fatty degeneration. Staining for mucus (muci-carmin) negative. No inflammatory changes.—The piece of external meniscus shows similar changes though not so well-marked). The leg subsequently swelled up below the knee. These complaints continued for rather a long time but have gradually abated and the patient is now quite well.

CASE V.—Garrison Hospital, Stockholm 1925.—Soldier, aged 21, who

without any known cause had had pains in the knee for six months before admission to hospital; no locking symptoms. He had a partial synovitis over the external joint-space of the knee-joint and was operated on for meniscal rupture (O. Aleman). Rtg. negative. The meniscus which showed signs of superficial rupture proved also to be the seat of ganglion formations.—Patient was discharged after meniscectomy and has had no trouble with his knee since the operation.

CASE VI.—Garrison Hospital, Stockholm, 1923.—Soldier, aged 23, who without any known injury had had trouble with his knee three weeks be-



Fig. 4.

fore admission; no locking symptoms. The patient showed signs of partial synovitis over the external joint-space and was operated on for meniscal rupture (O. Aleman).—Rtg. neg.—The meniscus was ruptured cross-wise and presented a number of small ganglia.—He was discharged well after meniscectomy and has since then had no trouble with his knee.

CASE VII.—Garrison Hospital, Stockholm, 1930.—Midshipman, aged 21, who a few weeks before admission had sustained some injury to his knee while doing some jump in the gymnastic class; no locking symptoms. On inspection of the knee one found partial synovitis over the external joint-space. Rtg. neg.—On operation for meniscal rupture—meniscectomy (O. Aleman)—the meniscus also proved to be the seat of small ganglia.—The patient was discharged well and has had no trouble with his knee since.

CASE VIII.—Garrison Hospital, Stockholm, 1931.—Soldier, aged 21, who without any known injury for six months before admission had had slight but gradually increasing pains on the outer side of his left knee;

locking had taken place repeatedly, latest on the day of admission when the knee remained in a position of 20° flexion. This locking passed off after about 12 hours leaving merely tenderness over the lateral meniscus. Rtg. neg. On meniscectomy (H. Hinricsson) the meniscus proved, besides the rupture, to have a yellowish discoloration, to be markedly swollen and to show signs of »small ganglia«.—The patient who was discharged almost free from symptoms has never had any trouble with his knee since.

CASE IX.—Royal Seraphimer Hospital (Journ. 2050/1929).—Married woman, aged 29, who without any known trauma has had diffuse pains in the right knee for about twelve months, generally at night. A small swelling has gradually appeared on the outer side of the knee. On admission to hospital was observed over the joint-space, in front and above the fibular head, a somewhat tender fluctuating swelling, the size of about half-a-crown; no redness and no »patellar dance«. Rtg. neg. On operation (G. Söderlund) a ganglion was removed filled up partly with a typical clear gelatinous mass, partly with blood. Laterally the ganglion terminated in a dome-like manner and inwards it extended on the deep aspect of the tendinous insertions towards the front aspect of the joint, passing over into the external meniscus. Since, as far one could see, it was possible to remove the ganglion in toto removal of the meniscus was deemed unnecessary. (Patho-anat. ex. Henschen.—Multilocular ganglion).

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DISCUSSION:

P. Haglund, Stockholm:

Related the case of cystic degeneration with foreign bodies in the internal meniscus of a young woman. Extirpation was carried out 20 years ago and she has been perfectly well ever since. Wondered whether the term ganglion did not cover a good many different things.

H. Hinricsson, Umeå:

1. By ganglion I mean in this relation every cystic non-malignant tumour filled with typically gelatinous contents and arisen from connective tissue, thus—if you like—a purely clinical conception, in complete analogy with the terminology used by most authors who have dealt with this question. So does Silfverskiöld call tumours described by him ganglia, yet this word is not mentioned in the report on the patho-anatomical examination by Henschen who is describing cystic tumours with gelatinous contents.—Certain forms of foreign-body cysts can therefore be referred to these formations.

Kjell Bergman, Malmö:

There is no principal difference between intra- and parameniscal ganglia. By ganglion we mean a mucous degeneration of the capsule and since the meniscus is to be regarded as part of the capsule the intrameniscal ganglion does not occupy any special position that distinguished it from ganglia in any other place. Nor need the intrameniscal ganglia be situated intra-articularly but may force their way through the fibrous capsule and appear externally. Para- and intrameniscal ganglia may also occur simultaneously of which I have once seen an instance.

H. Hinricsson, Umeå:

2. As I have just said it is undoubtedly of a certain practical importance to classify the meniscal ganglia into para- and intra-meniscal ganglia since the treatment, at any rate, may clearly be different. That in addition to this we get transitional forms and the two forms occurring simultaneously is of course another matter. I would further like to point out that the mode of classification just mentioned is not my own but was originated by Mandl who has devoted much elaborate work to this chapter of meniscal changes.