REMARKS

ON

THE OPERATIVE TREATMENT OF VARIOUS
INTERNAL DERANGEMENTS OF THE
KNEE-JOINT.*Read before the South-Eastern Branch of the British Medical Association.*

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I HAVE chosen this subject because the derangements of the knee-joint to which I am about to refer are, comparatively speaking, common, and are therefore conditions with which, whether we devote ourselves to surgery or to general practice, we are constantly brought in contact.

These derangements may be classed as: (1) Loose bodies; (2) detachment or displacement of the semilunar cartilages; (3) enlargement with nipping of hypertrophied synovial fringes; and (4) elongation of the ligamentum patellæ.

All of these conditions may be attended with somewhat similar symptoms, namely, effusion into the synovial membrane, a feeling of weakness or disability in the joint, some limitation in the range of flexion and extension, pain, often sudden, and even excruciating during certain movements, and at times a sensation of something slipping in or round the joint. There is further generally a history of some injury more or less severe, such as a fall or blow on the knee, or a sudden sprain or twist of the joint.

The most obvious sign, perhaps, attending the various derangements I have above enumerated is the synovial effusion, and the case is probably diagnosed, and correctly, as one of synovitis; but it is synovitis and something more, and unless this additional something is made out, except it consists in a mere rupture of some ligamentous fibres, the routine treatment of synovitis will not as a rule cure the patient. The progress of such cases, in my experience, is this: after treatment by rest, evaporating lotions, bandaging, perhaps a splint, the synovitis subsides, but recurs as soon as the patient begins to get about, recurrence being then often attributed to a fresh twist or strain. It is usually after there have been several such recurrences that these cases have come under my notice.

Where a loose body is the cause of the trouble the diagnosis is usually easy. It can be felt as a rule, as we all know, to slip about in the joint, not only by the surgeon but by the patient himself. The diagnosis is not, however, always obvious. I have lately seen two cases in which the loose body was only discovered with difficulty. In one of these it was not found until it had been searched for by the *x* rays, although a most careful examination had been made on more than one occasion, both by myself and by my house-surgeons. In the second case it was not till the joint had been explored by dividing the patella that the loose body was found stowed away in the intercondyloid notch between the crucial ligaments. As far as I know, this is the first case in which a joint has been freely explored for the discovery of a loose body not previously felt and only merely inferred to be present from the symptoms. I will therefore briefly relate it:

The patient, aged 27, was sent to me by Dr. Pritchard, of Retford, in October, 1896. Three months previously she had wrenched her knee at tennis. She suffered great pain at the time, but felt nothing snap or give way. A subacute synovitis ensued, but subsided under appropriate treatment. Pain still however continued. It was referred to the back of the joint, and was increased on flexion and extension, both of which movements were considerably limited. I could observe nothing wrong in the joint, and as the patient thought the pain was increased on any sudden lateral movement during semiflexion, I ordered the well-known instrument for preventing rotation. After eight months she again came to see me. She thought the instrument had somewhat improved matters, but she still continued to limp and to suffer much pain at the back of the joint, especially on first rising from the sitting posture.

I now advised that the joint should be explored, as I felt pretty sure that the symptoms must be due either to a loose body or detached semilunar cartilage situated in the intercondyloid notch and interfering with the free action of the crucial ligaments. Before consenting to the operation the friends sought an independent opinion of my colleague, Mr. Howard Marsh, and he also advised that the joint should

be explored. A week or so later, therefore, I freely opened the joint by sawing across the patella. A flattened piece of cartilage, the size of half a walnut, was seen in the intercondyloid notch wedged between the crucial ligaments, whilst on the condyle there was an excavation corresponding to the size of the loose portion of cartilage, thus making the source of the body quite evident. The joint was washed out, the patella was wired, the synovial membrane and fibrous structures were accurately adjusted and sutured, and the limb was placed on a back splint. The wound ran an aseptic course, and at the end of three weeks, as the patient was of a highly nervous disposition, the joint was moved for the first time under gas. Twelve months after the operation she wrote to tell me that she had been to a ball, and had danced all the evening without the slightest inconvenience. Encouraged by this case, I repeated last year at St. Bartholomew's Hospital the operation on a soldier who had been discharged from the army on account of a wrench of the joint followed by synovitis and subsequent lameness, with pain and limitation of flexion and extension. He had been subjected to various forms of treatment for upwards of nine months, and then dismissed the service.

In this case, on sawing transversely across the patella a portion of the internal semilunar cartilage was found detached quite at the back of the joint. It was removed, and the wound treated in the same way as in the former case. The man made a satisfactory recovery. I regret to say I cannot give his subsequent history, as since he left the hospital I have had no means of discovering his whereabouts. In neither of these cases would it have been possible to find the cause of the trouble without the free exposure that was made.

The diagnosis between a detached semilunar cartilage and a hypertrophied synovial fringe is sometimes far from easy. The characteristic signs of a detached semilunar cartilage as given in our textbooks—namely, a sudden locking of the joint and evident projection of the displaced cartilage—is, in my experience, not common. Indeed, I have only met with a few cases of the kind. In one of these a young adult male, by semiflexing his knee and then rotating it, was able to drive, the detached cartilage from between the articular surfaces, so that it projected visibly beneath the skin, the joint at the same time becoming fixed till he drove the cartilage back into place by a sudden blow upon it with the palm of his hand. In such a case the trouble is of course obvious; more often I have not met with an actual projection of the cartilage, and the diagnosis has been based on a peculiar creaking or sudden click or snap over the inner portion of the joint combined with a partial locking and some limitation of movement, and perhaps slight swelling or pain on pressure over the situation of the cartilage.

The cause of this click or snap was seen in a case on which I operated last May. The patient had received a blow the previous October on the outer side of his left knee, and soon afterwards noticed the peculiar sensation above mentioned on flexing the joint. At the operation the internal semilunar cartilage was found bent on itself, and was seen during the operation to fly back like a spring each time the joint was flexed. The cartilage was removed and the patient made an uninterrupted recovery. In a second case—that of a printer's boy, aged 14, admitted under my care last November on account of pain and continual giving way of the right knee—a slight creaking sensation, which was the salient sign, was found to be due also to a doubling of the semilunar cartilage on itself; but the contiguous surfaces were becoming adherent, so that it did not spring back on flexion, as in the former case, and hence by the rubbing of the folded surfaces on each other produced a grating sound instead of the snap.

The signs of a hypertrophied synovial fringe are very similar, but there is not as a rule any locking of the joint nor much, if any, limitation of movement, and the fringe may frequently be felt to roll like a soft pad under the finger when applied over the line of the articulation. The disability, however, is at times quite equal to that produced by a displaced cartilage; but it will be found on careful questioning that the pain only occurs when the joint is semiflexed, and then not unless the semiflexion is combined with some slight lateral twisting of the tibia on the femur—that is, the semiflexion separates the articular surfaces and the

twisting movement carries the hypertrophied fringe between them, where it becomes nipped when the limb is again straightened. I have met with fringes that have attained the size of a small walnut as a result of this continued irritation.

More than one fringe, it is well to remember, may be present. Indeed, at times a series of fringes extending from the articular surface along the margin of the alar ligament may exist. In the case of a young man on whom I operated at St. Bartholomew's Hospital last year, after removing a hypertrophied fringe through a longitudinal incision parallel to the edge of the patella, I introduced my finger into the joint, as his symptoms were somewhat anomalous in that he had pain on the outer as well as on the inner side of the joint, and discovered a similar hypertrophied fringe on the outer side as well. This could only be removed by a second longitudinal incision parallel to the outer side of the patella. The synovial membrane and capsule were accurately sutured with kangaroo-tail tendon, and although the joint had been opened on both sides and its interior freely manipulated with the finger, an excellent result ensued.

An elongation of the ligamentum patellæ is less common, but as it gives rise to symptoms similar to those of the other conditions I have mentioned, it may be readily confounded with them. As in the case of a loose body, a detached semilunar cartilage, or nipped synovial fringe, the patient may fall to the ground with sudden pain, the joint becoming momentarily locked. It will be found on careful inquiry that what really happens here is that the patella, consequent upon its elongated ligament, momentarily slips over the external condyle, allowing the patient to fall. On measuring the ligament it will be found half an inch to an inch longer than that of the opposite limb; and when the patient sits with the knee flexed at a right angle the patella rests on the front surface of the condyle, so that its anterior surface, instead of being directed forwards and slightly upwards as in the normal knee, will be found to look directly upwards.

For all of these conditions excepting the last, it may sooner or later become necessary to open the knee-joint if a radical cure is to be obtained. If a loose body is present its removal is practically the only reliable method of giving relief. I wish it to be clearly understood that I am far from advocating the immediate opening of a joint in all cases of detached semilunar cartilages or hypertrophied synovial fringes. No doubt in some cases an apparatus limiting the movements of the knee to flexion and extension will suffice, but when an apparatus has failed, when a patient is unwilling to give up athletic exercises, or is a candidate for the services, or is going abroad where apparatus could not be readily mended, or is engaged in such occupation as necessitate mounting ladders, scaffolds, etc., where the breaking of his instrument might subject him to sudden locking of the joint and to a consequent serious fall, the joint in my opinion should be opened without delay. It is more especially for the purpose of calling attention to the safety with which the synovial membrane of the knee may be freely opened and explored, and the very satisfactory results that may be obtained by thus radically treating the affections I have alluded to, that these few notes have been put together. No one now hesitates for a moment to open the peritoneal cavity for the purpose either of treatment or exploration, but there is still apparently some hesitancy in applying like treatment to the joints. When we consider, however, how alike the peritoneum and the synovial membranes are to each other both in structure and in physiological functions, we should expect they would react in a similar manner when subjected to injury, and possess the same power of rapid physiological repair. Such is no doubt the case, and when proper precautions are taken a healthy synovial membrane may be treated as fearlessly as may the peritoneum, and with as great a certainty of success. In preantiseptic days we no doubt all remember how serious an operation the removal of a loose body from the knee was regarded, and how many ingenious, but as a rule unsatisfactory, methods were employed for extracting the body subcutaneously. Now however, with proper precautions, the knee may be freely exposed and explored with a reasonable degree of certainty that no harm will result. I find that within the last few years I have freely opened the knee-joint upwards of

twenty times and have never had a moment of anxiety. But whether a mere puncture or a full exposure of the joint is to be made the most rigid precautions are, of course, essential; for although when properly dealt with success can be almost absolutely assured, any slip in our methods of procedure may be attended with serious, or even disastrous, consequences. The precautions to which I would more particularly call attention are the five following:

1. *Preparation of Patient.*—This I hold to be most essential. He should be confined to his bed or couch for three or four days to a week, the secretions and diet regulated, the limb firmly secured to a Macintyre or such other back splint as it is intended he should wear after the operation, and the skin in the region of the incision rendered thoroughly aseptic. Neglect of these precautions may lead to most serious consequences. If any synovial effusion is present, this should be got rid of by appropriate treatment before the joint is opened. If this is not done there is considerable risk of septic trouble spreading to the interior of the joint should any superficial stitch-suppuration accidentally occur.

The asepticising of the skin, it goes without saying in these days, is of the highest importance, especially in hospital patients in whom the skin of the knee is often thickened and begrimed, and many washings and purifications are necessary to get rid of the excessive epithelium. The following exact directions are posted in my wards for the instruction of my house-surgeons and dressers for asepticising the skin for every operation, whether great or small: (1) Shave the surface to be prepared (if necessary); (2) scrub well with soap and water and rub in ether; (3) wash your hands, and sterilise them in biniodide of mercury lotion (1 in 1,000); (4) wash surface with biniodide of mercury lotion (1 in 5,000) for two minutes; (5) wash this off with biniodide of mercury lotion (1 in 2,000); (6) apply (a) sterilised carbolic gauze wrung out in biniodide of mercury lotion (1 in 4,000), (b) protective india-rubber tissue wrung out in carbolic acid (1 in 20); (c) absorbent or boracic wool, (d) bandage.

2. *Arrest of all hæmorrhage* before the capsule is opened by forcipressure, torsion, or ligature, if necessary, and the thorough cleansing of the joint after the operation from all blood clot by thoroughly flushing out the cavity with a warm mild antiseptic lotion, such as boracic acid.

3. *Accurate Suture of the Synovial Membrane and Capsule.*—For this I prefer fine strands of kangaroo-tail tendon, but silk may be used with safety if kangaroo tendon is not available. The serous surfaces of the synovial membrane should of course be placed in contact, and the capsule drawn together by the continuous method of suture.

4. *Absolute rest* on a well-fitting back splint till the skin wound is soundly healed, firm pressure being applied by a bandage over the joint to prevent oozing.

5. *Early Passive Movements and Massage.*—These I have usually begun on the fourteenth day, the patient being up and walking about on the twenty-first day. The early movement is most essential to success. It prevents the formation of adhesions, whilst the massage promotes absorption of any excess of inflammatory products in the healing of the wound.

I may perhaps mention here that I have found this early movement and massage particularly serviceable after wiring patellæ for fracture. By beginning at the end of the second week I am usually able to have the patients walking about with free movement of the joint at the end of the third week, at which date they are usually discharged from the hospital.

I will conclude with a few words on the treatment of the elongation of the patella ligament. If an attempt is made to shorten the ligament by removing a portion and then suturing the ends, it is found that the fibres fray out when the sutures are tightened. It is better, therefore, to cut off the tubercle of the tibia and transplant it the required distance lower down the tibia, where it is fixed by the insertion of an ivory peg. I have treated three or four cases in this way, and can strongly recommend the method to those who may have to deal with this condition. Time does not permit me to enter into the technique of the procedure; but an account of it may be found in a paper I read before the Royal Medical and Chirurgical Society, now published in the 76th volume of its *Transactions*.