Mr. H. L. Martyn of Windsor has performed this operation twice for the relief of strangulated herniae—in the inguinal and femoral regions respectively. Mr. Martyn found access to and division of the strictures easy to perform behind the strangulated intestines. He points out the advantage of being able to deal with a resection of the bowel from the same wound at the same time. He also points out that in femoral hernia the abnormal obturator artery would be seen and ligatured before being cut.

I may here say that I have approached femoral herniae by the same method. It has been quite easy. In some cases I have covered the internal opening of the crural canal by turning up a flap of periosteum from the pubes and by turning outwards and upwards a larger periosteal flap from the back of the symphysis pubis. In other cases I have blocked this opening by coiling up into a plug the internal saphena vein, which I dissected from the thigh as far as the knee.

It is too soon to report upon the success of these measures of occlusion in femoral herniae, but all is well so far.

LOOSE CARTILAGE.

BY

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THOSE clinical conditions of the knee-joint variously referred to as "loose cartilage," "displaced internal cartilage," and "internal derangement of the knee-joint," have in the past been a more prolific source of lay antagonism to the medical profession than almost any other delinquency of the human frame. Indeed, the unqualified bone-setter is the offspring of "loose cartilage" and "surgical apathy." Nor is the layman alone in looking askance at surgical methods of treatment for this condition; we have only to recollect the almost reverential awe in which internal derangement of the knee-joint was held by the R.A.M.C. during the late war. A man suffering from this condition was almost invariably boarded out of the service, partly, no doubt, because of the congested condition of operating theatres and the possibility of infection in certain cases, but far more often because "he would never be of any more use in the army."

The treatment of these wrongs is not easy, and the diagnosis is, to my mind, more difficult still; yet such gloomy pessimism should not exist in the mind of many, nor would it survive if it had not a very real foundation on the rock of fact.

The results of operative treatment for loose cartilage (like all results) are grouped into three large classes: (1) Those cured or much improved; (2) those in whom no change has taken place; (3) those who are definitely worse.

It is with the first class only that I wish to deal here. The cures are in the minority, and in just that type of man which most commonly is the sufferer they are, if not an extremely small moiety, at least nothing like a majority—I refer to the athlete. During the last two years I have made personal inquiries among a large number of patients who have had the internal semilunar cartilage removed. Rugby footballers, cricketers, and soldiers nearly all made the remark, "The knee is better, but of course it will always be weak"; on inquiring this was generally interpreted as meaning "no more football." It may be argued that football should not be the test of a radical cure, yet to my mind the condition is not cured unless the patient can return to his normal mode of life and pleasure.

The clinical condition after operation which prevents the taking of violent exercise is, in nearly every case, an undue laxity of the knee-joint with lateral mobility of the leg on the thigh, and in order to understand how this has been brought about the anatomy and pathology of the condition must be briefly studied.

Anatomy.

The inner aspect of the knee represented in the accompanying drawing of a dissection made by myself in the anatomical department of Cambridge University, shows the various layers which go to make up or strengthen the capsule of this joint. Superficially the fascia lata invests

the knee tightly, and when this has been reflected the capsule proper is exposed. This consists of bundles of connective tissue coursing in various directions, and often easily separable into layers and individual structures. Notable is a well-marked crescentic layer of dense fascia derived from the semimembranosus tendon behind and passing across (superficial to) the internal lateral ligament and the fibrous expansion of the insertion of the vastus internus (2). In the drawing it is not as prominent or extensive as I have seen it, and it should have been represented as rising well above the joint line. It is inserted into the subcutaneous surface of the tibia. The fibrous expansion derived from the vastus internus is an integral part of the capsule, and blends with the internal lateral ligament to the medial side. This latter is a ribbon-shaped structure 1 to 1½ in. in breadth, and though its thickest and strongest part passes down from the medial surface of the inner condyle of the femur just below the adductor tubercle, yet it is a much more extensive band of fibrous tissue than is described in textbooks, and extends well forward, where it is in danger of being wounded in the usual incision for removal of the internal cartilage. Furthermore, its intimate attachment to the internal cartilage renders it extremely liable to injury when this is displaced pathologically or removed surgically, the innermost fibres of the internal lateral ligament being torn, or at least stretched, when the internal cartilage parts company from it.

Left Knee. 1, Fascia lata. 2, Slip from semimembranosus. 3, Expansion from vastus internus. 4, Internal lateral ligament. 5, Vastus internus. 6, Internal condyle of femur. 7, Tendon of adductor magnus. (Cambridge Anatomy Dept., 1921.)

where it is in danger of being wounded in the usual incision for removal of the internal cartilage. Furthermore, its intimate attachment to the internal cartilage renders it extremely liable to injury when this is displaced pathologically or removed surgically, the innermost fibres of the internal lateral ligament being torn, or at least stretched, when the internal cartilage parts company from it.

Pathology.

The pathology of loose cartilage is of some interest owing to the large number of aliases by which this clinical condition is known. These aliases really hide various stages or types of the same affection.

Practically the term "loose cartilage" refers to a clinical and not a pathological condition. Indeed, it is a most useful term, comparable with that alias for a mild gastritis, a "bilious attack." In practice a true loose cartilage—that is, one detached from all its connexions—must be extremely rare, if, indeed, it ever exists. Broadly speaking, there are pathologically three groups:

1. The unduly mobile cartilage, which after some stress or strain has severed its connexions with the internal lateral ligaments, but remains connected by its anterior or posterior horns and coronary ligaments to the head of the tibia; it tends to become "shunted outwards," resulting in a condition of "knee lock."

2. A partial fracture of the cartilage, which is torn tangentially or transversely to its circumference.

3. A cartilage with one horn detached from its moorings and bent into an abnormal form, or with part of it detached, which may wander about the joint as a loose body.

Be the condition which it may, injury almost always results to the internal lateral ligament—injury which is still further augmented by the consequent synovitis which follows a "knee locking" from the wedging of a detached or semi-detached portion of the semilunar cartilage between the condyle of the femur and the head of the tibia. Repeated or prolonged effusions into the knee-joint will give rise to a laxity of the ligaments and capsule. Those most affected will lie at the point of greatest strain—that is, to the inner side. This is partly by reason of the oblique "set" of the femur on the tibia, and partly because this space between tibia and internal condyle of the femur (normal one-eighth of an inch) will have been forcibly increased by the impaction of a foreign body between them if knee locking has taken place.

Treatment.

The methods of treatment in vogue at the present time consist of removal of the diseased or damaged cartilage combined with careful suturing of the capsule in one layer. As far I know, no attention has been directed towards remedying the lengthened internal lateral ligament, if one may except a caveat uttered against incising it in opening the capsule. This removal, even if it has been performed before the internal ligament has appreciably lengthened after the softening of a synovial effusion, will leave an internal lateral ligament relatively lengthened by one-eighth of an inch, which serves as an excellent starting point for a further actual lengthening, just as an imperfectly removed sac results in a "recurrence" of inguinal hernia, be the sac merely a "dimple" in the peritoneum. In addition, the usual incisions used for removal of the internal semilunar cartilage almost invariably encroach on the anterior fibres of the internal lateral ligament, which is still further damaged thereby. I refer to the curved incision passing to the inner side of the patella and then backwards just below the joint line, or the horizontal one on a level with this internal cartilage. Bearing this in mind, I have during the last two years operated with my eyes turned to the internal lateral ligament as the chief offender in the resultant lack of function of this joint.

Formerly I adopted the horizontal incision, but as this almost invariably resulted in severance of the anterior fibres of the internal lateral ligament, or an insufficient entrance to the joint cavity, I have now returned to the curved incision convex anteriorly.

The skin incision should be large, considerably larger than that which is made through the capsule; this having been found and all bleeding stopped, the internal lateral ligament is defined and thereby protected from damage; if it is so extensive as to reach far forward, its anterior fibres are deliberately divided, and in view of the knowledge of this severance can be united afterwards by separate sutures. The internal semilunar cartilage is then removed in the ordinary way, care being taken not to damage the internal lateral ligament at its attachment to the circumference of the semilunar cartilage, which may need careful division with knife or scissors.

The closing of the wound is the most important part of the operation. The incision through the capsule should be enlarged and the edges of the capsule excised so that at least one-eighth of an inch reduction in its vertical measurement is brought about, the edges are then tightly secured. The internal lateral ligament is shortened in its entirety by two or three mattress sutures, and, finally, the slip of fascia from the semimembranosus is detached from the muscle and swung forwards more vertically to act as an additional stay to the inner side of the joint and attached to the structures to the inner side of the condyle of the femur. If this slip is absent, a strip of fascia lata can be fashioned into an additional superficial internal lateral ligament to assist in the support of the inner aspect of the knee.

The chief points in the operation I wish to emphasize are:

1. The large skin incision, of "flap" form, allowing of the identification of the internal lateral ligament, and, when present, the slip from the semimembranosus.
2. The avoidance of damage to the internal lateral ligament, or the deliberate severance, when it cannot be avoided, of its anterior fibres.
3. The excision of a portion and tightening of the capsule by one row of sutures.
4. The shortening, or even plecting, and, where damaged, the reconstruction, of the internal lateral ligament by a second row of sutures.
5. Lastly, the manufacture of an additional superficial internal lateral ligament.

Passive movements should be begun early, but the leg should not be used to carry the weight of the body for one month, and exercises should be gradually initiated.

As to results, I can only plead that they appear satisfactory. I have only employed this method in some half-dozen cases, and though (as yet) I am quite satisfied with their condition, they have not been as severely tested as I could wish. No vigorous athlete appears among them, and the most strenuous are a railway porter and a policeman, both heavy men, continuously on their feet, and used

to a fair amount of sudden turns. The knees are not in any sense lax, and lateral movement of leg on thigh is absent, as in a normal knee.

The most striking result is shown in a man with very lax lateral ligaments who was having repeated attacks of synovitis, and, as he expressed it, need no longer "lead a life in a straight line, but can turn corners with the best." Yet my purpose in publishing this paper is not to presume to teach my surgical superiors but rather to ask for a frank recognition on our part that the condition of loose cartilage has not been blessed by surgical cures in sufficient numbers to warrant a satisfied complacency with the present methods of treatment, and the possibility (it is almost a probability) that treatment of the cartilage itself is not the only procedure necessary for the repair of a damaged joint.

Lastly, I trust that others with more surgical experience of these cases than myself may come forward with criticism or condemnation of the methods advocated above.

THE MODERN DIETETIC TREATMENT OF DIABETES MELLITUS.*

BY

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At the close of the eighteenth century John Rollo discovered that abstinence from starch and sugar benefited the symptoms of diabetes. For more than a hundred years this epoch-making discovery dominated the treatment of the disease. From the middle of the nineteenth century onwards physicians, however, began to realize that glycosuria did not always disappear on a purely animal diet and to recognize the danger of the supervention of acidosis and coma on such a dietary. Towards the close of the century it was discovered that sugar could be derived from protein as well as carbohydrate and that the fats played a vital rôle in diabetes. During the first decade of the present century various observers, such as Naunyn, von Noorden, and Guelpa, recognizing the advantage to diabetes of occasional abstinence from protein and fat as well as the starches, instituted periodic fast or semi-fast days. The adoption of these methods met with considerable success, but glycosuria commonly recurred when the former diet was resumed; this was especially the case when, as was customary, the patient afterwards was fed the more generously in the hope of making good the loss of tissue incurred during the period of restricted diet. The main object of treatment was to maintain the patient at the highest possible level of weight and nutrition with the intention of assisting him to withstand a wasting disease. As the result of Allen's experimental work at the Rockefeller Institute, the very opposite object is now kept in view, for we have learnt that the permanent reduction of bodily nutrition is in itself beneficial to the diabetic state.

Minkowski and von Mering in 1889 had shown that complete extirpation of the pancreas in animals caused permanent diabetes; and in 1900 Opie and others demonstrated the association between degeneration of the islands of Langerhans and the existence of glycosuria. Allen based his researches on the assumption that these islands furnished an internal secretion which supplies substances required by the body cells in the metabolism of carbohydrates. In 1913 he reported the results of his attempts to secure a "working model" of the disease by experiments on partially depancreatized dogs. Virtually every detail of clinical diabetes could be reproduced by removing varying proportions of the pancreas in animals, mild or severe diabetes being secured at will. The animals were then rendered sugar-free by fasting; in other words, by affording physiological rest to the external pancreatic secretions associated with the grosser digestive processes, the flow of the more specific internal secretion of the gland was augmented.

These experiments showed not alone why fasting was advantageous, but indicated practical methods for preventing the return of glycosuria when fasting was completed. Diabetic animals which from the outset were kept

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