TREATMENT OF CHRONIC SYNOVITIS OF
THE KNEE-JOINT.

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THE question of chronic synovitis of the knee-joint is of supreme importance in the army. Men who suffer from it are not fit for work with a battalion, as they always have an ever-ready excuse for avoiding duty; although in some cases it would be possible for them to continue their work. Every R.A.M.C. officer must be familiar with this type of case, as it is quite common to find in one's surgical wards men who state that, on several occasions, their knee has been "out."

The condition of the affected knee that one commonly finds is as follows: The knee-joint is full of fluid. The vastus internus muscle is invariably wasted, sometimes to a very marked degree. The vastus internus cannot voluntarily be fully contracted; this is best explained by two diagrams representing (1) the contraction of a normal vastus internus, and (2) that associated with a chronic effusion in the knee-joint, as registered by a Marie's tambour.

FIG. 1.

FIG. 1.—Normal contraction: A voluntary contraction rises sharply to A, and the top of the contraction curve can be maintained, A—B. Finally the relaxation of the muscle is controlled, B—C.

FIG. 2.

FIG. 2.—Contraction of vastus internus from a case of chronic effusion in the knee-joint: A voluntary contraction does not rise so sharply as in Fig. 1. There is a sudden drop, A—A1, over which the patient has no control (this can often be detected clinically). The top of the contraction curve cannot be maintained, and the relaxation is not under control.

In old-standing cases some lateral instability of the knee-joint is usually present. Tenderness on pressure may be elicited over various points around the head of the tibia. In most cases it is impossible from the indefinite history to diagnose a torn cartilage, unless the external cartilage is involved, in which case we have the true "clicking knee"—a click being felt every time the knee-joint is voluntarily fully extended—but this is rarely met with owing to the anatomical relationship of this cartilage. It is not attached to the external lateral ligament, whereas the internal cartilage is attached to the internal lateral ligament. In the majority of cases the cartilage is not at fault, and a diagnosis of this condition should not be made unless there is a very definite history of locking of the joint at the time of the original injury. Sudden locking *plus* sudden "going back" is diagnostic of a torn cartilage; if it diminishes and goes away slowly the trouble is not a cartilage. Again, a definite thickening over the anterior end of the internal cartilage *plus* pain behind the head of the fibula due to strain on the diametrically opposed portion of the capsule is due to an injured internal cartilage.

A strain of the internal lateral ligament causing an effusion into the joint is a common injury, and very often simulates a torn cartilage. A probable explanation of the clinical signs already mentioned is as follows. The knee receives a strain, an effusion into the joint takes place, and reflexly the vastus internus is thrown out of action; the reason is that the chief nerve of supply to the knee-joint is the nerve to the vastus internus, the nerve passing through that muscle and supplying it before it enters the joint. As a result of this reflex action the vastus internus rapidly wastes and loses tone, and a condition as represented in Fig. 2 is reached. By treatment the effusion is got rid of and the man returns to duty; but owing to the weakened condition of his vastus internus any small twist given to the joint again strains the knee, with the result that more fluid with further weakening of the vastus internus takes place, and so a vicious cycle is established. If, on the other hand, the vastus internus has regained its normal tone, any small twist to which the knee is subjected is at once counteracted by the voluntary bracing up of the vastus internus muscle. In the weakened type of

vastus internus already referred to, this bracing action cannot take place owing to that muscle being reflexly out of action (see Fig. 2, A1).

The treatment is to break this vicious cycle, and the obvious structure to attack is the muscle. If we provide for the injured structures as large a blood supply as is possible, we are using nature's method, and in order to do this it is necessary to use the affected muscles. We have seen, however, that the vastus internus responds only weakly to a voluntary stimulus, and it is therefore necessary first to re-educate this muscle to respond to a voluntary contraction. This is done by causing the patient to keep his leg perfectly straight, in which position he is instructed to practise bracing up the vastus internus; this is done daily. In cases of severe wasting, the use of an artificial stimulus, such as is produced by a Bristow coil, is recommended, until such time as a voluntary stimulus is again exhibited. The muscles of the thigh are massaged and subjected to contrast baths of hot and cold water. This treatment very soon produces a marked increase of tone and of muscular element in the vastus internus. It is possible within a fortnight (if the treatment is conscientiously carried out) to produce an increase in girth of the thigh at this level of from 1 to 1½ inches. No marked improvement will be noticeable unless the effusion in the joint is first got rid of, and this is also done by increasing the blood supply around the joint. The fluid in this chronically inflamed joint is pathological and will be absorbed. The greater the blood supply around the joint the more rapidly will the effusion disappear, and the effusion disappears only at the same rate as the stretched fibrous capsule of the joint retracts. The required toning effect on the capsule is amply provided for by the use of contrast baths, which also favours an increase of blood supply. To increase further the blood supply in the posterior part of the joint the patient is instructed to place the sole of the foot of the same leg as the affected knee on the dorsum of the foot of the sound leg, and by opposing the ankle extensions of the sound leg against the flexions of the bad leg considerable exercise can be given to these muscles, all of which increases the blood supply around the affected joint. The patient is not confined to bed, but he is allowed only light exercise and is instructed that he is not to walk over any uneven ground. Occasionally a tight bandage over wool is applied to the joint at night.

Under this treatment the fluid disappears from the joint, and the vastus internus regains complete tone, which will prevent a further recurrence of effusion into the joint. There is one type of knee-joint occasionally met with in which all methods fail to get rid of the fluid, except aspiration. As soon as it is decided that one is dealing with a case of this kind, aspirate at once, as it is all-important to get rid of the effusion. If the fluid is due to any intra-articular condition, the effusion will recur, and this fact helps in the diagnosis of an otherwise difficult case. If an operation is to be done, the tissues to be operated on and the knee-joint have been brought to a very healthy condition by the treatment outlined. Tender spots found at the insertion of tendons about the knee-joint are due to a local effusion of the fibres at their insertion. The above treatment, by contrast baths and massage, will cause these local patches of effusion to disappear. In a series of 300 cases treated by the above method it was found that in 75 per cent. of the cases no recurrence of the effusion into the joint occurred for some time afterwards, after continued football, etc. In these cases, the original symptomatic diagnosis was altered to "strain of knee-joint." If a further effusion occurred, some intra-articular lesion was diagnosed. Care must be taken to eliminate tuberculous knee-joint, and also an effusion of the joint due to a hypertrophic infrapatellar pad of fat, in which case suitable limitation of complete extension must be provided for.

In conclusion, chronic effusion of the knee-joint is, in 75 per cent. of cases, not due to an injured cartilage, but to a strain of some structure around the joint. This can be effectively dealt with by re-education of the vastus internus, *plus* the production of as large an increase as is possible in the blood supply around the joint. This latter is obtained by (1) contrast baths; (2) limited active exercise of all muscles around the joint; and (3) massage. If this treatment is instituted in every case of chronic effusion of the knee-joint the number of operations for a so-called injured cartilage will diminish, and many men will be able to enjoy various forms of sport which they otherwise would not be able to take part in for fear of "putting out" a knee again.