

be diminished. Attention, too, may be directed to getting wounds in these situations into a healthy condition and closing them. Interruptions might be made to allow for dressings, but hitherto this has not been tried, as such changes would probably be at the expense of comfort and simplicity. Major M. Sinclair, R.A.M.C., has suggested that in the straight triangle splint the outer side might be made of two straight metal bars like those of the Thomas's arm splint and that the arm might be fixed to it in a similar manner—a plan which seems well worth trying. Another disadvantage is that there is no active extension. It would be possible to arrange for an apparatus for extension beyond the outer side of the triangle, but there is no doubt that in some cases of fracture of the humerus extension can be overdone, and when it is necessary it is best applied with the Thomas's splint. The axilla, too, is not a satisfactory place for counter-extension. It may again be pointed out that severe and very septic cases, and those where secondary haemorrhage is likely, are best treated on a Thomas's splint, at any rate until the local condition has greatly improved.

I have to thank Captain M. H. Watney, R.A.M.C., for many x-ray plates and for the photographs from which the illustrations are taken.

THE POSITION OF THE OPERATION FOR THE EXCISION OF A CARTILAGE IN MILITARY SURGERY.

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THE average stay in hospital following an operation of the excision of a cartilage is in the case of civilians three weeks; in four weeks the patient is again back at work. It has become increasingly evident that the prognosis in the case of soldiers is not nearly so good. At the request of General Sir Robert Jones the statistics of cartilage operations performed at Alder Hey Military Orthopaedic Hospital were investigated.

A. Conditions Present.

The total number of cases admitted with the diagnosis of displaced cartilage to the end of 1917 was 283. The total number of cases operated upon for the excision of a cartilage or a synovial fringe was 112. In many of the remaining 171 cases nothing abnormal could be found, while in others only slight wasting of the quadriceps was observed. In 20 cases definite osteo-arthritis was present, in 7 tuberculous disease, in 4 villous synovitis, and in one sarcoma of the lower end of the femur.

B. Comparison of Cases Admitted during the Corresponding Four Months of 1915, 1916, 1917.

	Admissions.	Operations.
1915	28	17
1916	50	16
1917	52	13

C. Results of Operations.

Of the 112 cases operated upon 8 were discharged as fit for general service immediately; 99 were discharged to a command dépôt as fit for general service within four months; 5 were discharged as fit for home service only.

D. Average Stay in Hospital.

The average stay in hospital before operation was 22 days, and varied from 3 to 50 days. The average stay in hospital after operation was 85 days, and varied from 21 to 135 days.

E. Final Category of Patients Discharged after Operation.

In order that the final category of officers and men discharged as fit for general service in four months should be known, a request was sent to Records for their posting after discharge with the present category. Replies were received in 36 cases.

	Number.	Percentage.
Class A (General Service)	19	53
Class B (Garrison Duty)	8	22
Class C (Home Service)	5	15
Class P (Reserve)	2	5
Unfit for further military service ...	2	5

Five of the Class A men had been killed in action.

F. Final Category of Patients not Operated on.

For comparison a similar proceeding was carried out in cases in which nothing abnormal was found with the knee, and the soldier was discharged to a command dépôt as fit for general service in four months. Replies were received in 27 cases.

	Number.	Percentage.
Class A	9	33
Class B... ..	4	15
Class C... ..	5	19
Class P... ..	6	22
Unfit for further military service ...	3	11

Symptoms of a Displaced Cartilage.

These are briefly as follows:

Stage of Dislocation.—Sudden locking of the joint with marked pain, followed by rapid effusion and tenderness over the cartilage. With proper treatment the effusion disappears and full movement is regained. In some cases complete recovery may follow, but there is a marked tendency for the dislocation to recur. Each recurrence is followed by less pain and a less marked tendency for effusion to arise.

Intervening Stage.—The patient may complain of weakness and instability of the knee, especially marked when walking on rough ground. There is usually tenderness over the edge of the cartilage and wasting of the quadriceps. At the time of dislocation physical signs are well marked. The intervening stage is characterized by the complete absence of such signs in many cases, and is the stage in which the soldier usually reaches the orthopaedic hospital.

The Effects of a Displaced Cartilage on a Soldier.

When a cartilage has once been displaced, a soldier runs the greatest risk of a recurrence in the face of the enemy, since the dislocation may recur during a charge, raid or patrol. Such an accident may be disastrous to him and to his comrades. Apart from this danger constant recurrence as a result of marching over the uneven ground at the front is only to be expected. This may lead to chronic synovitis and even arthritis. Therefore no soldier who has once suffered from a displaced cartilage should be returned to the firing line until this has been removed. There is not the same objection to returning such men to the A.S.C. or the Mechanical Transport.

Internal Derangement of the Knee a Favourite Complaint of Malingerers.

With the prolongation of the war there is a tendency for the soldier in all armies to become war weary and for malingering to develop, especially among conscripts. Simulated internal derangements of the knee are by no means uncommon, and such cases, especially in the intervening stages, are often exceedingly difficult to diagnose. The statistics given under B indicate that there is a tendency for malingering in this respect to increase.

It must not be inferred that malingering in the British army is common. To Alder Hey practically all doubtful cases from the Western Command were sent. These numbered 283 in three years, and in only 51 cases was nothing abnormal found, a small number for such a period.

Pre-operative Treatment.

In certain cases diagnosis was evident, as, for instance, when locking was still present. In the intervening stages no signs apart from tenderness over the cartilage and wasting of the quadriceps were present, and the diagnosis was often difficult. Wasting of the quadriceps occurs in all cases of internal derangement; it may also occur in a normal knee which is kept stiff and not fully used. Consequently, while the absence of wasting indicates that there is nothing abnormal in the joint, its presence, while supporting, does not prove that some derangement exists.

In all doubtful cases the soldier was put through a full gymnastic course each day, following which an examination for limited movement, effusion, etc., was made. Under no consideration was an operation performed until something more than the soldier's statement was present to

warrant the diagnosis. It was the necessity for finding definite physical signs which accounts for the prolonged average stay in hospital before operation (D).

Operative Treatment.

The operative technique and post-operative treatment introduced by General Sir Robert Jones was invariably carried out.

Post-operative Treatment.

Complete recovery following the operation was in many cases delayed. When the soldier was anxious to rejoin his unit the average stay in hospital was one month. In other cases the soldier was anxious to prolong his stay in hospital and complained of weakness and instability of the knee, though full movement was present. In such cases wasting of the quadriceps was the only physical sign. A soldier with such symptoms and the added wasting of the quadriceps might obtain sympathy when inspected by another medical officer. Consequently no soldier was discharged to a command dépôt until the quadriceps had regained its full volume and strength under massage, gymnastic exercises, and electrical treatment. Without the co-operation of the patient this was often delayed, and accounts for the prolonged post-operative stay in hospital (D).

When, in spite of all treatment, wasting persisted, the patient was discharged to sedentary work; this accounts for the five cases discharged as fit for home service only (C).

Further History of the Patient.

The patient on joining the command dépôt is often anxious to avoid long route marches, and now complains of pain in the scar, weakness and instability of the knee, and walks with a limp. Wasting of the quadriceps again arises. With an unsympathetic medical officer the soldier realizes the game is up, and is soon passed out Class A. Should the medical officer show any sympathy the symptoms persist, and the soldier is eventually passed out in a low category. This is especially likely to happen in the case of medical officers who believe that the excision of a cartilage prevents a soldier from again becoming fit for active service. Such judgement is not in accordance with facts, and simply encourages malingering.

That too much attention is paid to subjective symptoms and too little to physical signs is especially shown in the case of men discharged in whom nothing abnormal was present in the knee; only 33 per cent. of such cases were passed fit for active service (F). In both E and F all the soldiers, after a short stay at the command dépôt, should have been discharged as fit for general service.

The Position of the Operation in Military Surgery.

From a purely military aspect an operation of choice is only justifiable if it raises the soldier's category, or relieves him of a condition the persistence of which would be harmful. It is dangerous for a soldier, liable to recurrent dislocation, to be placed in the firing line (Class A). The highest category in which he should be put is B (garrison duty), and then only if recurrence is infrequent, otherwise arthritis may arise.

Internal derangement of the knee in the intervening stage is easily simulated. In a doubtful case the conscientious medical officer will often give the patient the benefit of the doubt, since he realizes the risk of sending the genuine case back into the firing line, and knows that subjective symptoms without definite physical signs are not uncommon. Were all such cases to be returned to the firing line a grave injustice would be done to the genuine case. On the other hand were all the cases to be placed in Class B malingering would certainly increase.

Careful investigation of all doubtful cases is essential, and owing to the increased facilities for diagnosis most of these cases find their way to the home hospitals. It is the difficulty of proving that anything wrong is present in the knee that accounts for the prolonged pre-operative stay in hospital.

Full movement of the knee after an operation is usually regained in three weeks, and graduated exercises should then be started. There would be no necessity for the cases to stay in hospital were it possible for them to be sent to a special command dépôt to be under the supervision of a medical officer who understands his work, and the method of developing the quadriceps by graduated and resistance exercises. The post-operative stay in hospital

would thus be considerably reduced, and a much larger percentage of the patients would rejoin their units in a much shorter period of time.

That only 53 per cent. of the men discharged are finally passed as fit for general service is due to lack of judgement and perhaps energy on the part of the medical officers at the command or regimental dépôts. During my term of office as registrar at Alder Hey on no occasion did any communication about a knee operation arrive. That the category of 47 per cent. should have been lowered without any reference to the nature of the operation indicates that far too much attention is paid to subjective symptoms. With proper supervision 95 per cent. of the cases operated upon should have been placed in Class A.

A CLEAN MILK SUPPLY.

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THE Sanitary Committee of the Manchester City Council has had under consideration for some years the improvement of the milk supply. The report which it recently published on the methods of testing cow's milk in relation to standards of cleanliness was prepared by me at their request to supply them with information as to:

1. The best method of determining the degree of contamination of milk for administrative purposes.
2. The actual state of the Manchester milk supply.

I may incidentally refer to the fact that the provision of a clean milk supply has been under consideration in Manchester since 1896, and that the question of controlling the distribution on lines resembling those recommended lately by the Minister of Food had received attention.

The methods of testing cow's milk are dealt with in the first section of the report, and in the second part the present state of the milk supply is shown to be very unsatisfactory. It was, for instance, found that the milk supplied to several hospitals and milk dépôts was highly contaminated, as can be seen by the following summary:

The number of bacteria growing on agar at 37° C. was—
Over 1,000,000 per c.c.m. in 39 per cent. of the samples.
100,000 to 1,000,000 per c.c.m. in 45 per cent. of the samples.

As regards the souring time at 30° C. it was found to be—
Less than ten hours in 26 per cent. of the samples.
Ten to fifteen hours in 55 per cent. of the samples.
Fifteen to twenty hours in 13 per cent. of the samples.

It was also found that the proportion of tuberculous samples was three times as great as before the beginning of the war.

As in my opinion this deplorable state was only in small part due to errors in the methods of distribution I felt it my duty to give additional information regarding the ways in which the milk becomes contaminated, and the methods of collection and distribution which should be adopted to protect milk against pollution.

Detailed evidence is given in the report showing that the most serious sources of pollution are to be found at the farm, where dirt from the cow, the shippin, and the milkers, is allowed access to the milk at the time of milking, and where dairy vessels of various kinds may, even when apparently clean, harbour numerous bacteria. It is also demonstrated that the strainer on which the farmer depends for the removal of gross dirt is an important source of contamination, and that even the cooler is not above reproach.

Of the experiments mentioned in the report the following is instructive:

Three cows were milked into sterilized covered vessels, and their milk was mixed in a sterilized churn. Part of this milk was then strained through a common strainer in use at the time, and received in an ordinary, apparently clean, but not sterilized churn. The unstrained milk remaining in the sterilized churn, and the strained milk transferred to the ordinary churn was carried to town by road, and examined two and a half hours after milking.

The unstrained milk was found to contain 1,500 bacteria per c.c.m.
The strained milk was found to contain 43,200 bacteria per c.c.m.