HORIZONTAL APPROACH TO THE MEDIAL SEMILUNAR CARTILAGE

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During the recent war it became apparent that the results of removing a semilunar cartilage varied considerably both with regard to immediate freedom from effusion and ultimate function of the joint. In the first year, many end-results were unsatisfactory, but subsequently much more satisfactory results were obtained when better selection of cases before operation was enforced. Such selection, however, did nothing to elucidate the cause of some defective results which can follow meniscectomy: it evaded the question as to why results were variable; why there was so little relationship between success in the end-result and the amount of cartilage removed; and why the mere existence of ligamentous laxity appeared so seriously to prejudice the results of meniscectomy. In considering these problems, details of technique were keenly scrutinised in one hundred and fifty operations, particular attention being paid to: 1) size of the incision; 2) direction of the capsular incision; 3) double incisions with separate removal of the posterior horn; 4) division of the medial collateral ligament (Tavernier); 5) total meniscectomy as compared with removal of the displaced portion alone; 6) suture materials—catgut, thread, and no synovial suture; 7) haemostasis, using local anaesthesia without tourniquet; 8) post-operative dressings—pressure bandage alone, bandage with back splint, or bandage with plaster cylinder; 9) early or late ambulation and exercise.

It was sometimes evident that the size of the capsular incision was at least one factor accounting for post-operative trouble: it was noted that the smaller the incision the less was there likelihood of early or late effusion. Occasionally it was noticed that the scar became thickened, indurated, and of almost cartilaginous consistency. With the palpating finger resting on the scar an unpleasant click could be felt as the joint was extended actively from the flexed position. Those scars which were suspected as being a source of mechanical trouble were always vertical or oblique, and it seemed possible that the trouble might be due to movement of the scar from the articular to the non-articular surface of the femoral condyle. One such scar, which was markedly nodular, was removed. Beneath it was discovered a pannus extending on to the articular surface of the femoral condyle. In transit from the non-articular to the articular surface of the femur the scar produced a click on the bony ridge which separates these two surfaces. On its synovial surface the scar showed as an irregular white line, hard and gritty, and with histological evidence that there were no mucous cells on the synovial surface so that scar tissue was exposed in the joint cavity.

In view of these findings it was decided to use a horizontal incision at the level of the head of the tibia so that the scar could have no contact with the femoral articular surface (Fig. 1). This approach was condemned by Alwyn Smith (1928) for the reason that, in his view, it gave inadequate exposure and endangered the medial collateral ligament. Only brief reference was made to it by Abbott and Carpenter (1945) and Smillie (1946). In Manchester it has been used for many years by Sir Harry Platt.

Operative Technique

A two-inch incision is made horizontally at the level of the head of the tibia from the medial border of the ligamentum patellae to the medial collateral ligament. The capsule is incised along the same line. The upper lip of the divided capsule is then dissected from the underlying synovial membrane and retracted upwards. The synovial membrane is opened along the upper border of the medial meniscus. The level of this incision is determined by first making a half-inch opening into the small synovial sac which lies below the meniscus, introducing a blunt hook, and passing it from below to the upper border of the meniscus.
By cutting down on to the point of the hook the definitive incision into the synovial cavity can thus be made at the lowest level. The anterior attachment of the meniscus is divided and vision into the joint, which till then has been restricted, becomes unobstructed. When the medial collateral ligament is retracted the low angle of vision into the joint by this approach is appreciated (Fig. 7). The rest of the meniscus is removed in the usual way. In closing the synovial membrane the suture should be started near the medial collateral ligament while the knee joint is still flexed (Fig. 9). Having started the suture at this point the joint must be extended to complete the suture. This is an important point because if the joint is extended before suture is begun the posterior part of the synovial incision becomes inaccessible under the medial collateral ligament. It will be observed that the suture line lies on the head of the tibia and cannot give rise to friction against the femoral condyles in any movement of the knee. Figs. 2-5 illustrate this and show how a horizontal suture obliterates the raw bed of the meniscus.

Fig. 1
Showing the relation of scars to the articular surface of the femur in flexed and extended positions of the joint. A vertical scar comes in contact with the non-articular, synovial-covered surface of the femur in extension; and there is a point of transition to the articular surface, marked by an oblique ridge, at which level the scar may produce a pannus spreading from the non-articular to the articular surface. The horizontal scar, if kept low on the tibial head, bears the same relationship to the femoral articular surface in flexion and extension (A—extracapsular; B—intracapsular; C—articular cartilage).

END-RESULTS
The total number of cases in which the medial meniscus was removed for undoubted lesions was one hundred and three. The results may be analysed thus:

<table>
<thead>
<tr>
<th>Category</th>
<th>Cases</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect</td>
<td>35</td>
<td>34-0</td>
</tr>
<tr>
<td>Much better than before operation</td>
<td>43</td>
<td>42-0</td>
</tr>
<tr>
<td>A little better than before operation</td>
<td>15</td>
<td>14-5</td>
</tr>
<tr>
<td>The same as before operation</td>
<td>2</td>
<td>1-9</td>
</tr>
<tr>
<td>Worse than before operation</td>
<td>7</td>
<td>6-5</td>
</tr>
<tr>
<td>Much worse than before operation</td>
<td>1</td>
<td>0-9</td>
</tr>
</tbody>
</table>

Analysis based on the soldier's subjective view which did not always coincide with the surgeon's objective opinion. Thus the first two categories could not be distinguished from each other; nor was there physical explanation in the case of the patient who stated that his knee was "much worse."
The medial meniscus has been removed in the cadaver through a horizontal incision which has then been sutured. The synovial aspect of the suture line is viewed from the interior of the joint by removing the lower end of the femur after dividing the cruciate ligaments. The suture line has obliterated the raw bed from which the cartilage has been excised and lies remote from contact with the articular surface of the femoral condyles.

The medial meniscus has been removed in the cadaver through a vertical incision which has then been sutured. The synovial aspect of the suture line is viewed from the interior of the joint by removing the lower end of the femur after dividing the cruciate ligaments. The raw bed from which the anterior half of the rim of the cartilage has been excised is visible, as well as the vertical suture line which lies in relation to the femoral condyles.

Showing horizontal suture line concealed below the level of the head of the tibia—dissection opened out to reveal it.

Showing horizontal suture line concealed below the head of the tibia—dissection closed up as in the normal joint.
The synovial cavity is opened for half an inch below the level of the meniscus by cutting down on the head of the tibia, and a blunt hook is passed under it and pulled out above to demarcate the upper level for the main horizontal incision (Fig. 6). After detaching the anterior horn a good view of the interior of the joint is secured with a low angle of vision (Fig. 7).

The rim of the meniscus is detached under direct vision with a tenotomy knife as used by Robert Jones (Fig. 8). The posterior horn is seen and divided. The first synovial suture is seen in Fig. 9; the joint is then extended and the edges of the synovia come together easily.
It was my impression that immediate recovery was quicker and less eventful after the horizontal incision than after meniscectomy through other incisions; but it will be seen that the late end-results were no better than the average of results published by other surgeons. Smillie (1946) reported completely successful results in 75 per cent. of cases, and incompletely successful results in 25 per cent. Du Toit and Enslin (1945) found a similar percentage of failures, and suggested that chondromalacia of the patella might be a frequent source of imperfection in the results.

In this series of one hundred and three cases no coincident lesions such as early arthritis, ulceration of articular cartilage, or ligamentous instability were discovered at operation in eighty cases; whereas such complications were recognised at operation in twenty-three cases. These two groups were analysed separately and yet no material difference was found in the percentage of successful results. The series was also divided into those cases in which removal of the meniscus was total and those in which it was sub-total, and again no material difference was found in the percentage of good and bad results. Indeed it appeared that the results of total removal were not quite as good as those of incomplete removal.

SUMMARY

1. It is suggested that slow recovery and post-operative effusion after meniscectomy may often be due to "scar friction" when the incision in the synovial membrane is in contact with the non-articular surface of the femoral condyle.

2. The advantages of a horizontal incision are discussed, particularly with regard to early recovery.

3. The results of one hundred and three cases of meniscectomy are analysed. An attempt to trace the cause of incompletely successful results in 25 per cent. of cases failed to show any relation to minor coincident lesions discovered at operation, or to the amount of meniscus removed.

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REFERENCES


