

Orthopaedic Clinic of the Rheumatological Institute, Warsaw, Poland.

## THE TREATMENT OF FLEXION CONTRACTURE OF THE KNEE JOINT WITH POSTERIOR CAPSULOTOMY IN RHEUMATOID ARTHRITIS PATIENTS

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In rheumatic diseases a flexion contracture of the knee is apt to develop frequently. In the initial phase the contracture can be eliminated by conservative methods, but in the course of time it may become fixed and then it is only through an operation that extension of the joint can be obtained.

In cases marked by extreme tension in the flexor tendons and a fixed flexion contracture of more than 15°, one of the methods of operative treatment is posterior capsulotomy as described by Putti in 1921 and Wilson in 1929, and later modified by Preston in 1953. In rheumatic diseases it was Wilson who first applied it.

### MATERIAL AND METHOD

In the Orthopaedic Clinic of our Institute 37 patients underwent 47 posterior capsulotomies because of flexion contractures of the knee joint. A total of 26 women and 11 men aged 6-67 years were operated on. Of these, 20 patients with 30 operated knees underwent a follow-up study 1-6 years after surgery.

The angle of the contracture before the operation is shown in Table 1. In 13 knees there were coexistent deformities (valgus and/or external rotation of the

Table 1.

The angle of the contracture before capsulotomy	The number of knee joints
15 - 30°	1
30 - 50°	24
50 - 90°	3
90 - 100°	2

tibia and/or posterior subluxation). The range of movement in the majority of the patients was from 30–60° before the operation (Table 2). Out of 20 patients only 5 managed with great difficulty to walk by themselves.

*Table 2.*

The range of movement before capsulotomy	The number of knee joints
trace – 30°	6
30 – 60°	18
60 – 90°	5
more than 90°	1

*The indications for posterior capsulotomy were:*

1. Flexion contracture of the knee joint of more than 15°, conservative treatment being without effect and there being no indication for primary synovectomy;
2. mobility of at least 10–15°;
3. slight radiological alterations in the joint;
4. good psychical condition and good cooperation.

*The following were considered as contraindications:*

1. Flexion contracture with absence of mobility;
2. severe radiological changes in the joint;
3. lack of cooperation;
4. no possibility for improving the general mobility of the patient even after capsulotomy;
5. contraindications for general surgery.

*The technique of the operation:*

Through a 12–14 cm long incision on the lateral side of the thigh and knee joint tractus iliotibialis, the biceps tendon (just above its insertion) and the lateral head of the gastrocnemius are severed. A longitudinal incision into the joint capsule is made and the posterior recessus of the joint is opened; the femoral insertion of the capsule and the periosteum are displaced proximally. Sometimes the insertion of the gastrocnemius is not cut but is detached together with the capsule. When there is coexistent valgus and external rotation of the tibia it is necessary to cut through the tense lateral intermuscular septum and push it up and down with a raspatorium. Sometimes we cut through the insertion of the fibular ligament. A second incision is made on the medial side of the thigh and knee joint. If necessary the flexor tendons (gracilis, semitendinous and semimembranosus) may be severed. The insertion of the medial head of the gastrocnemius is cut and the posterior recessus of the joint is opened through a longitudinal incision in the capsule. If necessary a transverse incision through the popliteal fascia is made and the tibial insertion of the capsule is severed. Sometimes full straightening is achieved only after cutting the posterior insertion of the anterior cruciate ligament.

In exceptional cases the procedure should be expanded by simultaneous debridement of the anterior part of the joint, cutting the intra-articular adhesions, removing the patella or doing a patella-plasty.

The procedure is completed by suction drainage and skin sutures only, and fixation of the extended limb in an tight plaster dressing. The operation should be finished with full extension of the knee; it should be mentioned however that this may be hindered by excessive tension of the nerve-vessel bundle and skin.

After 24 hours the suction drainage is removed and exercising of the quadriceps muscle is started. On the fourth or fifth day we begin to raise the limb. After one week the plaster is removed, leaving it as a splint at the back of the knee in full extension for 6-8 weeks during the periods between training of the knee joint, and at night. Within seven to ten days we begin with passive and within 15-20 days active flexion. Walking with crutches is started when the force of the quadriceps is almost normal. Full weight bearing is allowed after 6 weeks.

In our procedures there were no complications during the operation; they appeared however within the postoperative period: In one case there was transient paresis of the peroneal nerve; in three cases there were haematoma in the wound; in one case there appeared wide-spread necrosis of the skin in the popliteal area, which occurred after correcting the contracture from 90 to 30°; in one case there was superficial wound infection. These complications hampered extensively the correct postoperative rehabilitation.

## RESULTS

1. During the operative procedure 25 knee joints acquired full extension. Two knee joints had residual contracture due to errors in the operative technique. Three knee joints had 30-50° of contracture because of a large initial contracture (110°, 95° and 30°) and severe tension of the neurovascular bundle and skin in the popliteal area. Posterior capsulotomy in these 3 cases was considered to be preliminary to a following operative treatment (arthrodesis, supracondylar osteotomy of femur and hinge-prosthesis).

2. During the time of follow-up the residual contracture left during the operation increased in 2 joints. In 5 joints secondary contracture from 10-20° developed, owing to difficulties in rehabilitation as a result of wound haematoma in 2 cases, and because of insufficiency of the quadriceps muscle in 3 cases. In 20 knee joints full extension was obtained (Figure 1).

3. The range of movement improved remarkably. The number of knee joints with a reduced range of movement decreased, but those with a range of 60-130° were increased (Figure 2).

4. After posterior capsulotomy walking was greatly improved. Among 9 non-walking patients before the operation only two could not walk after because of coexistent contractures in other joints of the

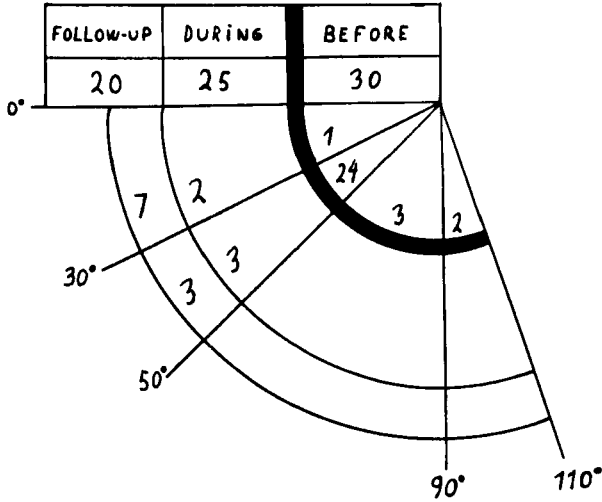


Figure 1. Angle of flexion contracture before, during and after operation.

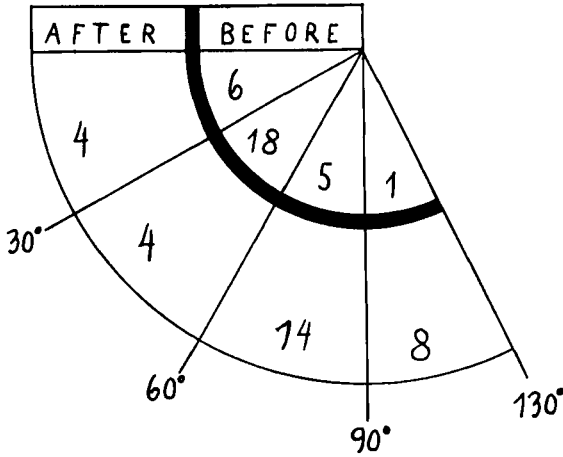


Figure 2. Range of movements before and after posterior capsulotomy.

lower limb. They were assigned for further operative treatment (Figure 3). It should be mentioned that in several cases flexion contractures in the hip joint were eliminated by a conservative or operative method, enabling full use of the limb after posterior capsulotomy was carried out.

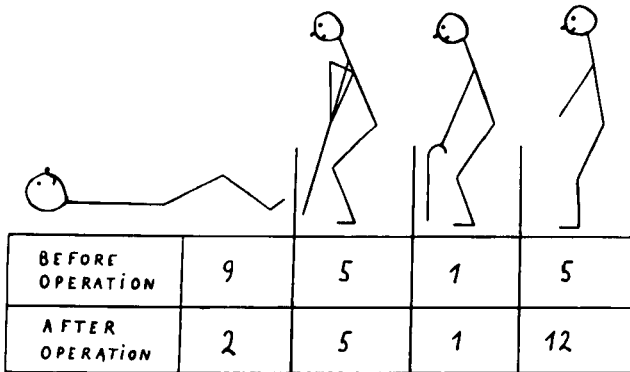


Figure 3. Walking before and after posterior capsulotomy.

*The criteria of the results were:*

**Good:** The axis of the limb improved, there was full extension, the range of movement increased and walking improved.

**Satisfactory:** The axis of the limb improved, there was residual contracture up to  $15^\circ$ , more or the same amount of movement as before the operation and walking improvement.

**Bad:** No axis improvement, contracture greater than  $15^\circ$ , the range of movement the same as before the operation or even reduced, no walking improvement.

The results obtained: 18 (60 per cent) good, 10 (33 per cent) satisfactory and 2 (7 per cent) bad. Among the satisfactory results there were the three cases with gross contractures ( $30-50^\circ$ ) in which the capsulotomy was considered as a preliminary operation.

#### DISCUSSION

To obtain good results after posterior capsulotomy, it is necessary according to Preston (1953) to adhere to the following procedures during the operation: Full passive extension; reconstruction of the extensor apparatus thus enabling efficient active extension; removal of intra-articular causes which make the blockade in the anterior part of the joint.

In our procedure we did not apply reconstruction of the extensor apparatus to any patient. In 3 patients the secondary contracture was due to inefficient quadriceps muscle, and in these cases it is supposed that reconstruction should have been carried out.

Fulfilling the third of Preston's points, the medial meniscus was removed in 4 cases, the posterior part of the anterior cruciate ligament was cut in 3 cases, patella-plasty was done in one case, the patella was removed in one case and in 2 cases the anterior part of the joint was cleaned, giving the possibility of full extension.

The postoperative procedure for our patients differs from that of Preston as described above.

After posterior capsulotomy of 13 knee joints with follow-up 6-24 months after the operation Preston obtained good results in 82 per cent of the cases. In our material good results were achieved in 60 per cent, satisfactory in 33 per cent; in this way improvement was obtained in 93 per cent of the cases.

#### CONCLUSIONS

1. Posterior capsulotomy eliminates flexion contracture of the knee joint, corrects the limb axis and expands the range of movement by the angle of the eliminated contracture.

2. It enables more efficient walking and even restores the patient's ability to walk without help.

3. As far as large flexion contracture is concerned, posterior capsulotomy may be employed as a first stage in the operative treatment.

4. Good operative technique and correct postoperative rehabilitation have a decided influence on obtaining good results.

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