CORRECTION OF THE OUTWARDLY ROTATED LEG FROM POLIOMYELITIS

Preliminary Communication

EMIL PAUKER, HAIFA, ISRAEL

From the Orthopaedic Department, Labourer's Sick Fund, Haifa

The outwardly rotated leg as an after-effect of paralysis of the gluteus medius and minimus muscles is one of the common complications of poliomyelitis. In consequence the patient drags his stricken leg awkwardly forward, and the femoral head in its unphysiological position further aggravates a statically troubled gait in a progressive fashion.

Dissatisfied with the methods of treatment used hitherto I have attempted to develop a simple and effective method of correction.

![Diagram of the human hip showing the mechanism of the transplant.](image)

**FIG. 1**
Model to show the mechanism of the transplant. Figure 1—Position of limb at rest. Figure 2—Forward movement of limb. The graft under tension pulls the femur into medial rotation.

Rotation osteotomy of the femur fails to align physiologically the whole of the leg, and arthrodesis of the hip, although useful in some respects, is a rather crippling operation. Transplantation of the ilioptosus muscle from its insertion at the lesser trochanter to the lateral part of the greater trochanter (Mustard 1952), may provide a solution in a number of cases, but this too is a rather formidable operation, and in addition it severely impairs the original function of the transplanted muscle.

Years ago I tried to dissect a strip of the iliotibial tract and to sling it forward from behind under the attachment of the vastus lateralis, in order to rotate the femur forward by
action of the tensor fasciae latae. This method failed, the short lever apparently being too weak to move the whole leg. The answer was therefore sought in a transplant providing longer leverage with the possible avoidance of action against gravity. The hamstrings seemed capable of providing such action.

**THE OPERATION**

A medial longitudinal incision is made over the lower third of the femur. The hamstrings are identified. The semitendinosus muscle, if available, is considered most suitable for transplant because of its long tendon. It is dissected up to the lower medial third of the femur, and the tendon is brought under the quadriceps (vastus and rectus) to the antero-lateral part of the femur about a small hand's width above the knee joint and threaded through a horizontal tunnel drilled from the lateral to the medial aspect of the bone, where its end is fixed to the bone, or to the tendon itself at the point of entrance into the drill hole. The semimembranosus muscle, or a combination of more than one muscle from the medial hamstring group, is equally suitable.

When no medial hamstring is available the biceps may be used, its tendon being passed behind the femur and fixed to the medial surface of the bone at the same level. If only one medial hamstring is available but the biceps is powerful I prefer to use the biceps. In one patient in whom the semimembranosus—the only acting medial hamstring—was used for transplantation the remaining strong biceps was thought to be responsible for the development of knock-knee.

Figures 1 and 2 show the mechanism of the transplant, and indicate how little power is needed for medial rotation. The femur, moved forward by active muscle power or simply by a swinging movement, automatically rotates medially by application of the one-sided “brake.” Every bit of active muscle power improves and reinforces this movement. I have transplanted muscles with a grading of 3 with good results.

**RESULTS**

The results in seven cases are shown in Table I, and illustrative photographs are reproduced in Figures 3 and 4. In assessing the results the term “excellent” was used for a gait without sway from the hip and with medial rotation of the leg possible with the heel off the ground. “Good” meant a swayless or nearly swayless gait, the foot coming down in good position while walking and medial rotation possible with the heel on the ground. “Fair” gave allowance for some sway from the hip, but less than before operation, the foot coming down...
with little or no lateral rotation, but with no active medial rotation. Lack of appreciable change from the condition before operation would have been called a poor result. Six of the seven patients subjected to this type of transplant ranged from four to seven years of age;

**TABLE I**

**CLINICAL DETAILS AND RESULTS (SEVEN CASES)**

<table>
<thead>
<tr>
<th>Case number</th>
<th>Age (years)</th>
<th>Length of follow-up</th>
<th>Transplant used</th>
<th>Result</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>15 months</td>
<td>Semitendinosus</td>
<td>Good</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>14 months</td>
<td>Biceps</td>
<td>Fair</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>21 months</td>
<td>Semitendinosus</td>
<td>Good</td>
<td>Moderate knock knee</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>7 months</td>
<td>Biceps</td>
<td>Excellent</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>14 months</td>
<td>Semitendinosus</td>
<td>Excellent</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>47</td>
<td>36 months</td>
<td>Semimembranosus</td>
<td>Good</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>9 months</td>
<td>Semimembranosus</td>
<td>Good</td>
<td>—</td>
</tr>
</tbody>
</table>

the seventh was a woman of forty-seven who was operated upon with good result after an arthrodesis of the knee for the same condition. It was remarkable that all the patients needed very little re-education in the use of the transplanted muscle.

**SUMMARY**

1. A method of correcting poliomyelitic lateral rotation deformity of the thigh by transplant of one or more of the hamstring muscles to the femur is described.
2. The results in seven cases are recorded.
3. Though it is emphasised that this is no more than a preliminary communication and the number of patients so treated is small, the satisfactory results suggest that the procedure is mechanically and physiologically sound.

**REFERENCE**