NERVE GRAFTING FOR TRACTION INJURIES OF
THE COMMON PERONEAL NERVE

A REPORT OF 17 CASES

L. SEDEL, R. S. NIZARD

From Hôpital Saint-Louis, Paris, France

We report 17 patients who had grafting of the common peroneal nerve after traction injuries. Sixteen were reviewed at a median follow-up of 36 months.

The nerve gap ranged from 7 to 20 cm. A functionally satisfactory result was achieved in six patients (37.5%), a fair result in six and a poor result in four. Seven patients had, in addition, a posterior tibialis tendon transfer; this improved the result in five. Grafting produced some satisfactory results even when the nerve gap was as long as 20 cm.

Received 1 December 1992; Accepted 9 February 1993

The common peroneal nerve is often damaged in severe varus injuries of the knee. Neurapraxia is the most frequent lesion and spontaneous recovery is commonly seen. When there is axonotmesis or neurotmesis, recovery does not occur. Clawson and Seddon (1960) advised posterior tibialis tendon transfer (PTTT), and Bleton, Alnot and Oberlin (1989) and Wood (1991) reported that nerve repair gave poor results.

For tumours or iatrogenic lesions, occasional good or excellent results have been reported from nerve repair even when the gap was more than 8 cm. Traction injuries can damage the nerve over lengths as great as 15 cm, and repair is then a challenging problem.

We have compared grafting alone, or in association with later PTTT, and have assessed the value of improved techniques of nerve grafting and the significance of the length of the nerve gap.

PATIENTS AND METHODS

We reviewed the clinical records of 17 consecutive patients (13 men, 4 women) treated by nerve grafting after traction injury of the common peroneal nerve. Their median age at the time of surgery was 19 years 5 months (17 years 1 month to 46 years 9 months). The initial injury caused severe varus angulation of the knee in all cases. Three patients had associated vascular trauma and three had associated fractures (medial femoral condyle, medial tibial plateau, tibial shaft).

The indication for operation was complete palsy of the peroneal nerve that had failed to show any clinical or electrical evidence of recovery three months or more after the injury. The median delay between injury and repair was 9 months (3 to 15). Ankylosis restriction of passive dorsiflexion at the ankle, at least to the neutral position, was a contraindication.

Operative technique. The grafting operations were performed with the patient in the prone position through an extensive ‘Z’-shaped incision. All were done by the senior author (LS). The lesions sometimes extended so far proximally as to require separation of the peroneal nerve from the sciatic nerve trunk before the bulge of the proximal neuroma could be reached. Distally, the nerve was always healthy at the level of the neck of the fibula. The nerve gap ranged from 7 to 20 cm (median 14.5), operative microscopy being used to determine the limits of damage. The donor sources were the ipsilateral, contralateral or both sural nerves. These provided an average of four cable grafts (2 to 5) held in place by one or two nylon sutures. Three patients had a vascularised graft, leaving the sural nerve in its natural bed and suturing its ends to the common peroneal nerve. Suction drainage was used, and the leg was splinted for 15 days. Rehabilitation was then started using a splint, and physiotherapy was continued for up to two years after surgery.

Motor results were evaluated on the MRC scale for tibialis anterior, extensor hallucis longus, extensor digitorum longus and the peronei. Functional evaluation used the Millesi (1987) system. The results were graded as ‘excellent’ when there was a normal foot and ankle, ‘satisfactory’ when the patient could dorsiflex to 0° and had no difficulty in walking or running, ‘fair’ when

L. Sedel, Professor of Orthopaedic Surgery, University of Paris
R. S. Nizard, Chef de Clinique, Assistant des Hôpitaux
Service de Chirurgie Orthopédique, Hôpital Saint-Louis, 1 avenue Claude Vellefaux, 75475 Paris 10, France.
Correspondence should be sent to Professor L. Sedel.

©1993 British Editorial Society of Bone and Joint Surgery
0301-620X/93/5674 $2.00

772

THE JOURNAL OF BONE AND JOINT SURGERY
dorsiflexion was to 0° against gravity without a tendency to invert the foot but with some functional inefficiency, (which can be achieved by a successful PTTT), and 'poor' when any less dorsiflexion was recorded.

Electrical tests were performed at 6 months, 1 year and 18 months.

RESULTS

The median follow-up for the whole series was 36 months (10 to 93) and a minimum of 18 months was necessary for adequate evaluation. Sixteen patients had this minimum follow-up; the other one was lost to follow-up at 10 months at which time his result was poor. Seven of the 16 patients also had PTTT at a mean of 27 months after nerve grafting (21 to 31). This was combined with lengthening of the tendon Achilles in six patients, and a subtalar arthrosis in three.

Five patients (31.3%) showed no recovery in any of the muscles (Fig. 1). Four had recovery in one of the four muscle groups. One recovered in three of the four muscle groups. Six patients (37.5%) showed some activity in all four muscle groups. Recovery was always incomplete: the maximum strength recorded was 4 on the MRC scale of 0 to 5. Electrical evaluation did not predict recovery.

Table 1. Results of nerve grafting for common peroneal nerve injury in 16 patients

<table>
<thead>
<tr>
<th>Results*</th>
<th>Preoperative</th>
<th>MRC grade</th>
<th>Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Satisfactory</td>
<td>Fair</td>
<td>Poor</td>
</tr>
<tr>
<td>With PTTT†</td>
<td>7</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Without PTTT</td>
<td>9</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

* see text
† posterior tibialis tendon transfer

Table I gives the functional results. All patients were able to return to work. The numbers were too small for statistical analysis of the factors influencing the result. The vascularised grafts gave two satisfactory and one poor result. All three patients with initial vascular trauma had poor results before PTTT. The functional results did not appear to improve with the increasing experience of the surgeon; later cases had no better outcome than the earlier ones (Fig. 2).

DISCUSSION

Unlike Bleton et al (1989) and Wood (1991), we had five satisfactory results (29.4%) after nerve grafting of the common peroneal nerve for traction injury. The median size of the nerve gap was 13 cm (7 to 20), much greater than the usually accepted limit of 8 cm (Sedel 1985). We believe that excision of all fibrous scar is absolutely necessary, irrespective of the resultant gap. The use of vascularised nerve grafts could improve the results, but more experience is needed before definite conclusions are drawn. Vascular damage, even if it is adequately repaired, appears to be a contraindication to common peroneal nerve grafting. We found electrical evaluation of little use; progress or the lack of it is as well shown by the Tinel sign.
No conclusions can be drawn about the efficacy of PTTT combined with nerve grafting, although one patient improved from fair to satisfactory after the transfer. A decision on transferring the posterior tibialis tendon should not be made until at least two years after nerve grafting. Incomplete recovery after nerve grafting may vary as to the predominant muscle or muscle group, and thus influence the site of attachment of the transfer. A subtalar arthrodesis may be avoided if the peroneal muscles become strong enough to stabilise the subtalar joint.

In our small series we were unable to assess the predictive value of patient age, repair delay, number of cables, nerve-gap length, or the experience of the surgeon. In 37.5% of our cases, we obtained results which were better than those of successful PTTT. Nerve grafting may be undertaken before PTTT even for defects of over 8 cm; this is indicated when there is no suggestion of recovery at three to six months after injury. Failure of a nerve graft may be partially rectified by late PTTT.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCES


