Chronic rupture of tendo Achillis

LONG-TERM RESULTS OF OPERATIVE MANAGEMENT USING POLYESTER TAPE

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We report the long-term results of the surgical treatment of chronic rupture of tendo Achillis using polyester tape. This requires minimal postoperative splintage and allows early mobilisation and a prompt return to work and sport. We reviewed 16 patients (10 women and 6 men) at a mean period of three years after surgery. The median time from injury to operation was 16.8 months (3.9 months to 13 years), and the median age of the patients was 52 years (27 to 78). The median time to full weight-bearing was 40 days and the median time for return to sport was 18 weeks (5.4 to 32). One patient required further surgery and one had numbness along the distribution of the sural nerve. After surgery only two patients had increased dorsiflexion of the ankle compared with the uninjured side. There were no cases of rerupture. We recommend this technique for the treatment of chronic rupture of tendo Achillis.

Patients and Methods

Six men and ten women with a median age of 52 years (27 to 78) presented with chronic rupture of tendo Achillis. The median time from injury to operation was 16.8 months (13.9 months to 13 years). In all patients the diagnosis of rupture of the tendon had been missed after the original injury and all had considerable persistent disability. The mechanism of injury was sports-related in six, chronic tendonitis in two, and other mechanisms in eight. No patient could stand on tiptoe on the injured leg, with or without the support of the uninjured leg. Only one was able to continue sporting activity after the original injury and all reported a loss of ‘spring’ in their step. All had a functional deficit which they considered was sufficient to warrant surgery.

Operative technique. The operative procedure is similar to that reported by Jennings, Sefton and Newman\textsuperscript{12} for the treatment of acute injuries to the tendon although an open procedure is undertaken rather than a percutaneous one. An open-weave polyester tape (CTP 10 × 800 mm, 102-1080; Xiros Plc, Leeds, UK) was used. Under general anaesthesia and tourniquet control the patient was placed prone. Intra-venous antibiotic prophylaxis was given. A posteromedial incision was made close to the site of the rupture and the proximal part of the tendon and the gastrosoleus complex identified. An incision 0.5 cm long was made on the lateral side of the calcaneum and either flexor digitorum longus or flexor hallucis longus. An allograft of tendo Achillis has been used, as have Dacron weave, carbon fibre and Marlex mesh. All require postoperative splintage for six to eight weeks or longer.

We report 16 patients who were treated with polyester tape. This requires minimal postoperative splintage and allows earlier recovery of function compared with these more traditional techniques.

Chronic rupture of tendo Achillis is a debilitating injury which is difficult to treat. There is usually a considerable gap between the ends of the tendon, scarring and retraction of the calf muscles. Rupture is classified as chronic if it has been present for four weeks. Various techniques have been described to address this problem including synthetic or autogenous augmentation, allograft, and free tissue transfers. Autogenous tissues which may be used include a strip of the central aponeurosis of gastrocnemius, peroneal tendon, fascia lata, a VY gastrosoleus technique and either flexor digitorum longus or flexor hallucis longus. An allograft of tendo Achillis has been used, as have Dacron weave, carbon fibre and Marlex mesh. All require postoperative splintage for six to eight weeks or longer.

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the lateral end through the proximal tendon to create a Bunnell-type suture. This was tensioned so that the ankle could dorsiflex to neutral, but not beyond. In each patient there was a considerable gap between the two ends of the tendon which could not always be closed, and a gap was sometimes left since correct tissue tension is important for the biomechanics of the tendon. The design of the tape is such as to allow the formation of scar tissue in the gap. The tape was tied and the knot buried within the damaged ends of the tendon using a few 2 ‘0’ vicryl sutures. The tendon sheath was closed, where possible. A below-knee backslab with the ankle plantigrade was retained for two weeks in order to allow the wound to heal, albeit under tension.

After removal of the backslab, a shoe raise and insole were provided. Rehabilitation proceeded as previously described for acute injuries. Patients were allowed to bear weight partially at two weeks with full weight-bearing as pain allowed at six weeks.

All patients were reviewed at two and six weeks, at three months and at a mean of three years (0.5 to 8) after surgery.

The final review was conducted independently of the operating surgeon. Eleven patients attended for clinical review and three responded to a questionnaire. One patient died seven years after surgery. The 16th patient was reviewed at the time of follow-up by the operating surgeon since he required excision of the lateral scar. At the final follow-up, patients were asked about pain, swelling and stiffness using a visual analogue scale in which 1 represented no symptoms, 2 mild, 3 moderate, and 4 severe symptoms. The levels of activity were recorded using a Tegner score and the ability to stand on tiptoe on the injured leg. The circumference of the calf was measured at three points, 10, 20 and 30 cm above the floor when standing. The power of plantar flexion of the hind- and midfoot was measured using a device designed with the help of technicians from the University of Leeds. This allowed isometric measurements to be taken. The range of movement of the ankle was also recorded and compared with that on the normal side. A paired means test was used for statistical analysis with the level of significance being p < 0.05.

**Results**

The median time to partial weight-bearing was 17 days (8 to 73) and to full weight-bearing, 5.9 weeks (3.9 to 16.4). The median times for return to work, driving and sport were 7 weeks (2 to 14), 8.6 weeks (2 to 25.4) and 18 weeks (5.4 to 32), respectively. After surgery only two patients had increased dorsiflexion of the ankle compared with the
uninjured side. Two patients were unable to stand on tiptoe on their injured leg, and one felt that the injured leg was stronger than the uninjured leg. For those on whom power measurements were made (7/15) the operated leg had a mean 238.7 N of isometric power compared with 281 N for the uninjured leg (p > 0.05). At 30 cm from the floor, the mean circumference of the operated leg was 32.1 cm compared with 36.6 cm for the unoperated side (p < 0.001).

Most patients had minimal symptoms after surgery (Table I) although there was considerable thickening of the tendon in some. The mean circumference of the heel in the region of the thickened tendon was 23.1 cm on the normal side and 23.4 cm on the operated side (p > 0.05). Six patients engaged in sporting activity before injury and returned to sporting activity afterwards, albeit in three at a lower level. The mean Tegner activity score for all patients decreased from 2.7 to 1.8 (p < 0.05). There were no reruptures during this period.

**Complications.** Three patients, all over 70 years of age at the time of surgery, had superficial wound infections. All settled without further operative intervention. One patient required further surgery for excision of the tape from around the calcaneum and subsequently had no problems. He had an associated Haglund deformity at the time of the rupture. This patient was reviewed by the operating surgeon. One patient had persistent numbness in the distribution of the sural nerve.

**Discussion**

Many procedures have been described for reconstruction of tendo Achillis following a missed diagnosis. Most create considerable morbidity by the harvesting of tendons from around the ankle. We believe that our method has considerable advantages.

It is easy to perform with no associated harvesting morbidity. Minimal immobilisation is required. The two-week period of splintage is simply to allow the wound to heal in its best position. Early weight-bearing is important since some patients are elderly and may have difficulty in non-weight-bearing. Our first patient was treated with a cast but subsequent experience showed this to be unnecessary.

Before operation, many patients had suffered several months of restricted mobility, in two for 12 and 13 years. After surgery, most patients are able to stand on tiptoe on the injured side and have regained the ‘spring’ in their step. Although there was a significant reduction in the circumference of the calf muscle on the operated side, the deficit in power was only 15% (238.7 N versus 281 N).

The tendon becomes thickened after operation but this does not seem to cause long-term problems and is characteristic of surgery to this area. MRI was carried out in one patient because of tendinitis in the opposite tendon. This showed that the tape caused no osteolysis or irritation (Fig. 2). It also showed complete incorporation of the tape into new tendinous tissue one year after surgery. This suggested to us that there would be no long-term stretching of the tendon. No patient required further external assistance with mobilisation. The speed of recovery for the six patients who returned to sporting activity was quicker than for any other technique described and is probably due to the rapid mobilisation of the ankle after surgery. Mann et al. and Wapner et al. both restricted sporting activity for at least six months, which is longer than in our series. Their patients were non-weight-bearing for four weeks and used a splint for a minimum of three months, compared with two weeks each in our series.

It is important to recognise that these patients are often middle-aged or elderly and do not easily tolerate splintage or restricted weight-bearing. Our technique allows patients to mobilise quicker than with other techniques described. Our series comprised 16 patients, which is one of the largest series to be reported for reconstruction of chronic rupture.

We believe that our technique offers considerable advantages when compared with traditional methods of managing chronic rupture of tendo Achillis. It is a straightforward operation which gives a faster recovery, a minimum of external splintage and increased patient acceptance.

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**References**