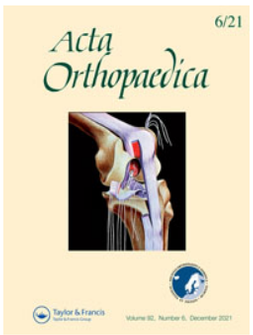

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Lars Nistor

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CONSERVATIVE TREATMENT OF FRESH SUBCUTANEOUS RUPTURE OF THE ACHILLES TENDON

LARS NISTOR

Department of General Surgery, Central Hospital, Halmstad, Sweden.

Twelve patients with rupture of the Achilles tendon were successfully treated with immobilization in plaster for 8 weeks and with raised shoe-heels for 4 weeks. The results are discussed in the light of earlier literature on surgical versus conservative treatment.

Key words: achilles tendon; athletic injuries; tendon injuries

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After having danced a whole night in 1766 John Hunter sustained a rupture of the Achilles tendon, which he himself successfully treated with bandaging (Dobson 1969). In 1929, however, Quénu & Stoianovitch found that the results of published cases were often poor when the rupture had been treated conservatively, but good when treated surgically. The finding was corroborated by Christensen (1953) and Arner & Lindholm (1959), after which it was generally accepted that treatment of the condition should be surgical. This opinion was, however, seriously questioned after Lea & Smith's publication (1972) of 66 cases treated conservatively.

To assess the value of such conservative treatment, from January 1973, all cases seen at the Department of Surgery, Central Hospital, Halmstad were treated conservatively.

MATERIAL AND METHODS

Twelve men, aged between 30 and 53, with rupture of the Achilles tendon sought medical advice within 24 hours of the injury. In nine of the men the rupture occurred during the performance of athletics and in three it occurred at work. Eleven patients had a subcutaneous rupture with a typical history of acute, intense heel pain followed by inability to raise the heel when standing. They reported severe dorsiflexion of the foot when the ball of the foot was loaded. In one patient the tendon was severed by metal shavings on the workshop floor.

The diagnosis was based on palpation of a defect of the tendon and positive "calf squeeze test" (Hierton 1960, Thompson & Doherty 1962).

The patients were treated in accordance with the method of Lea & Smith (1972) with the foot in "gravity equinus position", first with the lower leg in plaster with a heel, and afterwards with raising of the shoe-heels by 2.5 cm. It was often necessary to change the plaster after 2–3 weeks because it broke or became too large. The plaster cast was maintained for 7 weeks in four of the patients and for 8 weeks in seven patients. After removal of the plaster the patients used shoes with a high heel for about 4 weeks and were instructed to exercise the foot without resistance. They were allowed to resume their athletic activities 4–6 months after the accident.

In one of the patients the tendon ruptured again. Three days after his first plaster had been removed he bent his knees and, while in the squatting position, he extended the healthy leg and loaded the affected leg in maximal dorsiflexion with the entire weight of the body. At his own request he was treated for a further

Table 1. Results of follow-up after conservative treatment of Achilles tendon ruptures. In patient 1 the tendon was severed. Patient 2 was troubled by thickening of the tendon. Patient 4 had a re-rupture and reported morning stiffness.

Patient	Age	Follow-up (months)	Range of motion (°) increase +, decrease — Plantar	Dorsal	Calf circumference (cm) injured/noninjured	Power in plantar flexion; per cent of that on non-injured side
1	32	19	0	+5	40/40	100
2	40	18	—10	0	38/40	95
3	45	18	0	0	34/35	85
4	39	14	0	0	32/34	90
5	38	15	— 5	0	39/40	95
6	43	11	0	0	34/34	95
7	49	10	0	0	35/34	100
8	53	9	—10	—5	36/37	80
9	47	9	0	0	38/39	75
10	30	6	0	0	37/38	100
11	39	5	0	+5	37/38	90
12	30	5	— 5	+5	38/39	75

8 weeks in plaster and was afterwards mobilized in the way described above without any complications.

RESULTS

All 12 patients were reviewed by the author 5–19 months after the injury.

One patient was troubled by thickening of the tendon and one by morning stiffness, but all 12 were satisfied with the results and all denied any consequent impairment of their athletic performance or their working ability.

The mobility of the injured foot was compared with that of the unaffected one and was found to be slightly limited in four of the patients, but none of them were aware of the difference. In most of the patients the circumference of the calf was 1–2 cm smaller on the affected side. But the decrease was not correlated with the gross functional strength of the calf muscles. The strength of the gastrocnemius muscles was assessed from the ability of the patient to stand tip-toe on one leg—which all could—and more objectively with the aid of an apparatus resembling that used by Gillies & Chalmers (1970) in their investigation of rupture of the Achilles tendon. Measured with this apparatus, the strength of the injured side was 70–100 per cent of that on the other side. The increase in breadth was found to be 0.5–1.0 cm, compared with the uninjured side. In the two patients examined 5 months after the injury the tendon was 1.5 cm broader. The results are summarized in Table 1.

DISCUSSION

Several authors have found surgical treatment of rupture of the Achilles tendon to produce good results (Quénu & Stoianovitch 1929, Christensen 1953, Lawrence et al. 1955, Arner & Lindholm 1959, Savill 1960, Hooker 1963, Schönbauer 1964, Viernstein & Galli 1964, Gillespie & George 1969, Goldman et al. 1969 and others), but only three of them have discussed cases treated conservatively.

Quénu & Stoianovitch (1929) traced several literature cases that had been treated by bandaging or rest for a varying period. Of 15 patients in whom the results were known, six made a good recovery. Christensen (1953) reported

"satisfactory results" in nine out of 16 patients who had received only expectant treatment. Of Arner & Lindholm's (1959) six unoperated patients, two had been treated with plaster for 2 and 5 weeks, respectively, and four with only an elastic bandage. In only one case was the result satisfactory. So it would seem that in earlier papers rejecting conservative treatment, the cases referred to had been immobilized inadequately or not at all. It was therefore considered justifiable to reconsider conservative treatment.

It has been shown in experimental animals that the Achilles tendon can heal even if part of it is resected (Conway et al. 1967, Lipscomb & Wakim 1961). That the Achilles tendon can heal even after division was shown by Boyd et al. (1949) in a study of intermittent claudication. Savill (1960) described a case of necrosis of the skin and tendon which healed with the foot fixed in lower leg plaster for 10 weeks. He said: "It seems to indicate that satisfactory recovery can be expected without operation if the foot is immobilized in full equinus for 8 weeks after the acute injury."

Recent investigations (Gillies & Chalmers 1970, Lea & Smith 1968, 1972) have corroborated this assumption and have shown that adequate conservative treatment of rupture of the Achilles tendon can produce good results comparable to those obtainable by surgery. The results achieved in the present investigation lend further support to this impression.

Owing to the relatively insignificant, though demonstrable reduction in strength after recovery, Moberg (personal communication) feels that one should consider operation on patients such as elite athletes who place very high demands on their muscles and joints. Gillies & Chalmers (1970), who compared the results of surgical and conservative treatment, found no difference in reduction of strength between the two groups. Their relative loss of strength was the same as that noted in the present investigation.

The disadvantage of conservative treatment is the frequency of re-rupture (Sadow 1973, Inglis 1973, Forste et al. 1974). Re-rupture occurred in one of Gillies & Chalmers (1970) six cases; in seven of Lea & Smith's (1972) 66 cases; in four of Inglis' (1973) 50 cases; and in one out of 12 cases in the present series. This means an overall percentage of somewhat less than 10 per cent. In the operated series, Christensen (1953) reported re-rupture in only two cases (6 per cent) and Arner & Lindholm (1959) in four (4 per cent).

The frequency of re-rupture must, however, be considered in relation to per- and postoperative complications. Arner & Lindholm (1959) reported a case in which the patient died from pulmonary embolism during the postoperative period. But wound infection, skin necrosis and fistula formation must also be regarded as major complications. Minor

Table 2. Complications of operative treatment of Achilles tendon ruptures. Major complications: Death, wound infection, skin necrosis, tendon necrosis, fistula formation. Minor complications: Scar fixation, disturbance of sensibility, ugly scars.

Author	No. of cases	Major compl.	Minor compl.
Arner & Lindholm (1959)	86	19	39
Gillespie & George (1869)	46	–	16
Gillies & Chalmers (1970)	6	1	–
Goldman et al. (1969)	33	4	1
Hooker (1963)	28	5	4
Lawrence et al. (1955)	23	3	1
Savill (1960)	33	6	–
Schönbauer (1964)	240	77	–
Viernstein & Galli (1964)	154	11	7
	649	126	68

complications such as scar fixation, disturbances of sensibility and ugly scars are rarely mentioned in the discussion of the results, but are nevertheless important in the comparison of surgical and conservative treatment. Those authors who have included postoperative complications in their publications have most often reported major complications in 10–20 per cent of their cases and minor complications in 10 per cent (Table 2).

It is perhaps possible to reduce the frequency of postoperative complications, but it may also be equally possible to reduce the frequency of re-rupture after conservative treatment. This might perhaps be achieved by placing the foot in equinus position with the leg raised early in the treatment to reduce the haematoma in the rupture. It is also possible that the immobilization in plaster should be prolonged or that more effective measures should be taken to prevent involuntary dorsiflexion after removal of plaster since it is then that the re-rupture is apt to occur.

The results of conservative treatment are comparable to those obtainable by surgery. Conservative treatment of subcutaneous rupture of the Achilles tendon is an easily justifiable method of treatment despite the relatively high frequency of re-rupture.

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Correspondence to: Lars Nistor, Department of Orthopaedic Surgery, Kärnsjukhuset, S–541 01 Skövde, Sweden.