Open Repair of Acute Achilles Tendon Ruptures

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KEYWORDS

• Achilles tendon • Acute rupture • Open repair
• Techniques • Outcomes

Although the Achilles tendon is the strongest in the body, it also is the most often ruptured. Achilles tendon rupture most often occurs during sports activities in middle-aged men. The most frequent mechanism of injury is forced eccentric loading of a planar flexed foot, but ruptures of the Achilles tendon also may occur as the result of direct trauma or as the end result of Achilles paratenonitis, with or without tendinosis. Most Achilles tendon tears occur in the substance of the tendon, approximately 2 to 6 cm above the calcaneal insertion.[1–4]

Risk factors associated with Achilles tendon rupture include:[5]

- Recreational athlete (“weekend warrior”)
- Relatively older age (30 to 50 years)
- Previous Achilles tendon injury or rupture
- Previous tendon injections or fluoroquinolone use
- Abrupt changes in training, intensity, or activity level
- Participation in a new activity

Reports of the treatment of Achilles tendon ruptures date back to 1575, when Ambroise Paré[6] described the use of taping and casts, which resulted in suboptimal outcomes. Despite the frequency of the injury and the long history of its treatment, the indications for and superiority of nonoperative or operative management of Achilles tendon rupture remain controversial. In the early twentieth century, closed treatment was widely accepted as the standard of care, but with the increasing functional demands of the athletic population and improved surgical techniques, operative treatment has become a more popular treatment method. Several investigators have reported rerupture rates ranging from 10% to 20% in conservatively managed

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patients, and higher rates of wound complications in surgically treated patients (2%–20%).[7–18] Rettig and colleagues, in a series of 89 open repairs, found a rerupture rate of 4% and a wound complication rate approaching 4%, leading them to advocate surgical repair of Achilles ruptures.[19]

Few studies have directly compared the outcomes of operative and nonoperative treatment. In a level I prospective study of 111 patients with acute ruptures, Cetti and colleagues found a higher rate of rerupture in those treated nonoperatively (13%) than in those treated operatively (4%,) and a lower return to previous sports or activity (29% compared with 58%). Two deep infections occurred in the operative group.[16] Wong and colleagues, in a quantitative review of operative and nonoperative management of Achilles tendon ruptures, identified 125 articles reporting outcomes of 5370 patients, including 645 treated nonoperatively and 4001 who had open repair.[20] Rerupture rates were 11% in those treated nonoperatively, compared with 2.2% in those treated with open repair and immobilization and 1.4% in those treated with open repair and early mobilization. Skin-healing complications were lowest in those treated nonoperatively (0.5%) and highest in those treated with open repair and immobilization (14.6%). General complication rates were lowest in those treated with open repair and early mobilization (6.7%). Inglis and colleagues compared strength, power, and endurance in 48 patients treated operatively and 31 patients treated nonoperatively, and found all to be significantly greater in the operative group.[21]

Operative repair of acute Achilles tendon ruptures is indicated in active and athletic individuals who wish to resume their activities at their preinjury levels. Age alone should not be considered a contraindication, because good results can be obtained in older patients, many of whom have active lifestyles that involve sports participation. Rettig and colleagues found a rerupture rate of 16.6% in 24 patients younger than 30 years compared with no reruptures in 65 patients older than 30 years after open repair and early mobilization.[19] Contraindications to operative repair include arterial insufficiency, poor skin and soft tissue quality, poorly controlled medical comorbidities (such as diabetes), and inability to comply with an appropriate postoperative rehabilitation protocol.

Operative repair of a ruptured Achilles tendon can be accomplished with a variety of techniques ranging from open repair, to minimally invasive technique, to endoscopic-assisted repair. Each has its proponents and detractors, and the choice of procedure must be individualized based on the patient's age, rehabilitation potential, and activity expectations, as well as the preferences and experience of the surgeon.

OPEN REPAIR OF ACHILLES TENDON RUPTURES

For repair of an acute (<4 weeks) Achilles rupture, several suture techniques, suture materials, and graft materials have been described, including

- End-to-end repair (Bunnell, Krackow, pullout wire)[17,18,21–24]
- End-to-end repair with plantaris reinforcement[25,26]
- Fascial flaps[21,27,28]
- Synthetic grafts[26,29,30]
- Direct repair with allograft augmentation[25]

GENERAL OPERATIVE CONSIDERATIONS

The goal of surgical treatment is to restore the anatomic length of the triceps surae by approximating the ruptured tendon ends. The repair of the Achilles can be done with general[21,25,28] or regional/local anesthesia.[23,31–33] The optimal time to repair without