

# ACUTE ACHILLES TENDON RUPTURE EVALUATION OF TREATMENT AND COMPLICATIONS

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The overall purpose of this thesis was to evaluate the treatment of patients with an acute Achilles tendon rupture with regard to complications, function and patient-reported outcome. Moreover, the purpose was to develop and evaluate new outcome measurements.

**INTRODUCTION:** Controversy still remains about whether surgical or non-surgical treatment is the best option to treat patients with Achilles tendon ruptures. There are only a few randomised, controlled studies that compare surgical and non-surgical treatment, when both groups receive early mobilisation. Many outcome measurements found in the current literature are non-validated and based on a mixture of assessments. In patients with a chronic rupture or a re-rupture of the Achilles tendon, the recommended treatment is surgical. Various surgical techniques have been reported in the literature; however, the outcome is rarely evaluated, using appropriate end-points. Venous thromboembolism (VTE) is a major complication and a high incidence has been reported in previous studies of patients treated for an Achilles tendon rupture. The majority of patients with an Achilles tendon rupture have strength deficits and it is desirable to evaluate function with valid, reliable methods, which are sensitive enough to detect possible differences between treatment groups.

**MATERIAL, METHODS AND RESULTS:** In *Study I*, a new patient-reported instrument, the Achilles tendon Total Rupture Score (ATRS), was developed for measuring outcome, related to symptoms and physical activity after treatment in patients with a total Achilles tendon rupture. The ATRS was found to be a valid and reliable patient-reported instrument with good responsiveness. In *Study II*, 97 patients with an acute Achilles tendon rupture were followed for one year. Surgical and non-surgical treatments were compared; both groups were treated with early mobilisation. The patients were evaluated using the ATRS, functional tests. Re-rupture rate was 2 (4%) and 6 (12%) in the surgical and non-surgical groups, respectively. There were no significant differences when comparing surgically and non-surgically treated Achilles tendon ruptures, in terms of re-ruptures and patient-reported outcome. Functional tests indicate a difference between the two groups when evaluated 6 months after initial treatment, with better results in the surgically treated group. This was not, however, seen at 12 months, except in the heel-rise work test. In *Study III*, a new surgical method to treat a chronic rupture and re-rupture of the Achilles tendon was used and evaluated in 28 patients, 29 (12-117) months after surgery. The surgical technique involved a single incision, with a free gastrocnemius aponeurosis flap to cover the tendon gap after an end-to-end suture. The patients were evaluated as described in Study II. The use of a free gastrocnemius aponeurosis flap rendered a good outcome in the majority of patients. In *Study IV*, a new heel-rise work test was evaluated in 78 patients. A heel-rise test that measures both the height of each repetition and the number of repetitions had good validity and a greater ability to detect differences between the injured and uninjured sides. In *Study V*, 95 patients from Study II were screened for deep venous thrombosis using Colour Doppler Sonography (CDS). The incidence of asymptomatic and symptomatic deep venous thrombosis was high (34%).

**CONCLUSION:** We found no strong evidence to suggest that surgical treatment is preferable to non-surgical treatment with regard to re-rupture rate and patient-reported scores in patients with an acute Achilles tendon rupture. However, clinically small yet significant differences in favour of surgery were found in muscle function at 6 months, at the 12-month evaluation, the results were similar except in the heel-rise work test. The functional tests showed that muscle function deficits remained between the injured and uninjured sides after 12 months, regardless of treatment. The use of a free gastrocnemius aponeurosis flap appears to be a useful alternative when treating a chronic rupture and a re-rupture of the Achilles tendon. The new heel-rise work test can be recommended as a better test compared with only measuring the number of heel rises. There was a high incidence of DVT after Achilles tendon rupture and there is a need to evaluate the benefit of thromboprophylactic treatment.

**KEY WORDS:** Achilles tendon rupture, free flap, augmentation, deep venous thrombosis, movable brace, re-rupture, ATRS, heel-rise work test

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- I. **The Achilles tendon Total Rupture Score (ATRS): development and validation.**  
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*Am J Sports Med.* 2007;35:421-426.
- II. **Acute Achilles Tendon Rupture: A Randomized, Controlled Study Comparing Surgical and Non-surgical Treatments Using Validated Outcome Measures.**  
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- III. **A new surgical method to treat chronic ruptures and re-ruptures of the Achilles tendon.**  
Nilsson-Helander K, Swärd L, Grävare Silbernagel K, Thomeé R, Eriksson BI, Karlsson J.  
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- IV. **A new measurement of heel-rise endurance with the ability to detect functional deficits in patients with Achilles tendon rupture.**  
Grävare Silbernagel K, Nilsson-Helander K, Thomeé R, Eriksson BI, Karlsson J.  
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- V. **High incidence of deep venous thrombosis after Achilles tendon rupture – a prospective study.**  
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