

Achille tendon rupture

Repair/reconstruction by
minimally invasive
technique



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Principles

Rupture of the Achilles tendon, banal as it may seem, is not easily treated

- Concerning the patient, whether the treatment is surgical or conservative : the duration of immobilization and incapacity is long and return of ankle mobility and muscular strength is slow,
- Concerning the surgeon : suturing of the retracted, torn up fibers, is not always easy nor satisfactory with respect to initial solidity.

The use of an intra-tendinous prosthetic frame, which we have been using for several years, has the merit of making the repair immediately solid and satisfactory for the surgeon, while simultaneously making the post operative rehabilitation for the patient more rapid and simple.

Ligament

It is a polyester tendon with 60 longitudinal fibers having a resistance of 2 600 N. No tissue intolerance to the fibers has been seen.

The reinforcement is built in 3 parts :

- the proximal portion is flat, corresponding to the proximal segment of the ruptured tendon,
- the intermediate portion has open longitudinal fibers corresponding to the ruptured area,
- the distal portion is cylindrical, with a diameter of 5.5 mm, corresponding to the distal portion of the ruptured ligament.

Minimally invasive surgical technique

Technique by Dr Nicolas DUVAL, M. D
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Patient is in prone position, the foot overhanging the table which permits movement of the ankle. Longitudinal incision of 5 cm centred above the Achilles tendon, starting 2 cm proximal to the rupture zone and extending proximally. A second incision, transverse, of 2 cm is made just above the insertion of the Achilles tendon.

The skin and the sheath are preserved between the two incisions.

A • Preparation of the proximal segment

The proximal segment is reached by means of the proximal incision.

A small vertical incision is made on the posterior face of the tendon, at the junction of tendon and muscle fibres. A long forcep, Bengolea type, is inserted through this incision making a path along the tendon's axis by spreading the fibres. This forcep grasps the flat extremity of the prosthetic tendon and pulls it through the tendon until the part of open fibres coincide with the rupture zone.

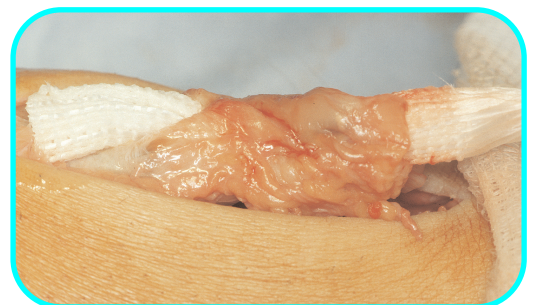
Multiple resorbable sutures of thick calibre are used to fix the prosthetic tendon to the proximal tendon. This fixation must be solid enough to make it possible to pull down the proximal tendon.



AT 60
Ref. L300605



1° A forcep is inserted into the proximal tendon from below upwards.



2° The flat extremity of the prosthetic tendon is inserted into the tendon's centre.



3° The prosthetic tendon is solidly fixed to the proximal portion.

B • Preparation of the distal segment

Through the distal incision, a vertical incision is made in the tendon just above its calcaneal insertion.

From this incision, the distal tendon is tunnelled from below upwards with a canula (inside diameter 6 mm) with a trocar point. This canula makes it possible to easily pass the prosthetic tendon through the centre of the ruptured tendon. The canula is removed.

By pulling the artificial tendon and, if necessary, by temporarily placing the ankle in equinus, the circular portion of the prosthetic tendon is pulled from the proximal incision to the distal incision.

C • Calcaneal anchorage

Starting from the portion anterior to the bony insertion of the Achilles tendon, as described by Besse et al. (1), a blind tunnel is drilled along the axis perpendicular to the calcaneus, 4 to 5 cm long with a 6 mm drill bit. The projecting prosthetic tendon is cut off and a thick resorbable stitch is placed at its extremity. A long needle with a trocar extremity is inserted into the blind tunnel and pulled out through the heel at its lateral side. By pulling the stitch, the prosthetic tendon is inserted into the blind tunnel with the desired tension to keep the foot slightly in equinus.

A fine k-wire is inserted in the tunnel adjacent to the ligament. It will serve as a guide for the placing of the ligament fixing screw LARS 7 mm x 30 mm. This screw is tightened until there is no projection.

A fluoroscopy is recommended in order to check the correct position of the blind tunnel and of the screw.

(1) Besse JL, Lerat JL, Moyon B, Brunet-Guedj E (1999) Achilles Tendon Repair Using a Bone-Tendon Graft Harvested from the Knee Extensor System : Three Cases. *The Journal of Foot & Ankle Surgery* 38(1):70-74

D • Suturing of the tendon

The overall stability is checked by moving the ankle.

A tendon suture is not necessary. Only the skin is sutured by means of some single sutures. A simple dressing is applied. The use of a right angle splint for analgesic purposes is generally not necessary and is within the surgeon's discretion.

Post-operative care

- immediate active mobilization of the toes,
- dressing and drains removed on 4th day,
- same day, moderate active-passive mobilization of the ankle is started and continued often each day,
- walking with a cane is started immediately, with caution,
- normal walking with weight bearing is authorized on the 35th day, providing that the ankle has regained a satisfactory range of motion,
- progressive return to sports can start after the 60th day.



7° Final aspect of the reconstructed tendon.

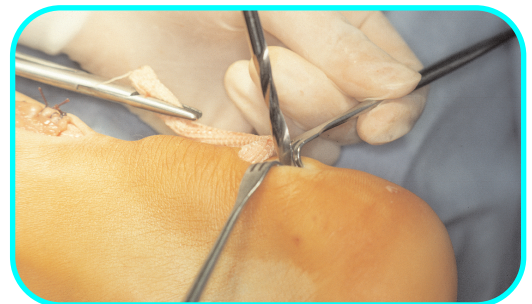


8° Final aspect of the operated foot.



4° Insertion of the LARS ligament into the sheath of the Achilles tendon and into the distal portion of the ruptured tendon.

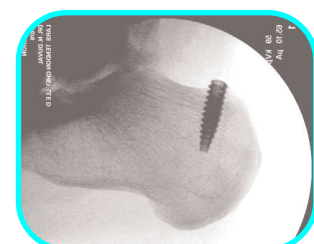
Cutaneous exit through a small counter-incision just above the insertion of the Achilles tendon.



5° Drilling of the calcaneal tunnel.



6° Placement of the screw after having inserted the prosthetic tendon into the blind calcaneal tunnel.



9° Final fluoroscopic aspect of the ligament fixing screw LARS.



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