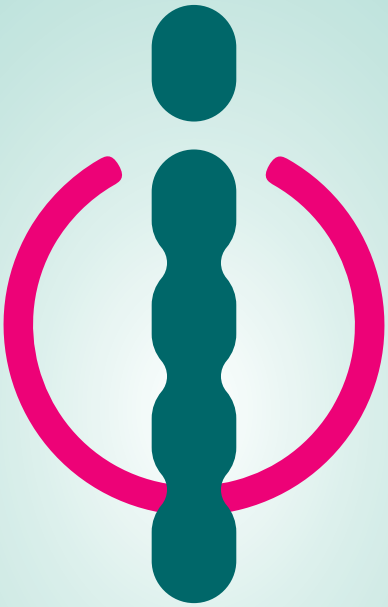

intercus

Surgical technique

Percutaneous suture of the Achilles tendon with the Dresdner Instrument

Description Page

INTERCUS GmbH, email: info@intercus.de, I-NET: www.intercus.de

dresdner instrument

Patent number: DE 100 15 944

The Dresdner Instrument

The Dresdner Instrument for minimally invasive treatment of a fresh Achilles tendon rupture

Material

Instrument steel

Indications

» Percutaneous suture of the acute Achilles tendon rupture

The pDI suture is indicated for recent Achilles tendon rupture. For a recent, distal Achilles tendon rupture there is the indication for a pDI suture with transosseous anchoring via a bore through the Tuber calcanei.
Conservative-functional therapy is preferred for proximal rupture of the musculotendinous transition.

Contraindications

Contraindications for pDI suture are constituted by chronic and spontaneous Achilles tendon rupture, since direct contact healing is complicated with hardened or substantially degenerated tendon stubs and the defect zone cannot be closed with irreversible contraction of the M. triceps surae.

Characteristics

» Minimises the risk of a lesion of the sural nerve

» No incision in the rupture area, allowing the preservation of the peritendineum

» Stabile intratendinous anchorage for the suture material

» Optimised adaptation of the tendon stumps as the suture material runs in a parallel, paratendinous direction

» Just one small skin incision that is not located in the shoe contact area

Doctors responsible for the design

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This surgical technique is based on the author's many years of experience as a surgeon. Its content was carefully considered and tested by the author. However, it cannot take all of the specifics of the individual case into account and is therefore only a recommendation. All information in this surgical technique is provided without guarantee by the author. The author assumes no liability for damages of any kind.

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Medium-Term Follow-up of 100 Cases.
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Is Percutaneous Repair Better Than Open Repair in Acute Achilles Tendon Rupture?
Clin Orthop Relat Res 2011

C. Ortiz, E. Wagner, P. Mocoçain, G. Labarca, A. Keller, A. Del Buono, N. Maffulli:
Biomechanical comparison of four methods of repair of the Achilles tendon
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Patient education

- General surgical risks
- Rerupture
- Healing disruption
- Infection
- Strength decrease
- Nerve damage

Instruments

2 Dresdner instruments (I1 + I2)
1 angled blade

Recommended suture material

Standard:

- 3 nonabsorbable, coated, braided polyester suture
  750 mm long, thickness 0 and straight needles 65 mm long
  e.g. Ethibond® Excel 0

or

- 2 slowly absorbable, monofilament polydioxanone sutures
  thickness USP1 and straight needle L 65 mm
  e.g. Ethicon PDS II® thickness USP1

Lower leg fascia and subcutaneous tissue:

- absorbable suture material
  e.g. Vicryl® 3 x 0 or 4 x 0

Operative preparations

An ultrasound examination to assess the rupture location and determine adaptation of the tendon ends in 20° plantar flexion should be conducted (Amlang et al. 2011).
Timely, single-shot antibiotics prophylaxis with cephalosporin is recommended (30 – 60 minutes prior to the skin incision).

As an independent procedure, regional anaesthesia has proven itself via a distal sciatic nerve block. Additionally, given the recommended total dosage of local anaesthetic, infiltration of the incision area with xylonest 1% with adrenalin 1:200000 is possible. Because no tourniquet is used during the intervention, the tendency to bleed in the operation area can be reduced.

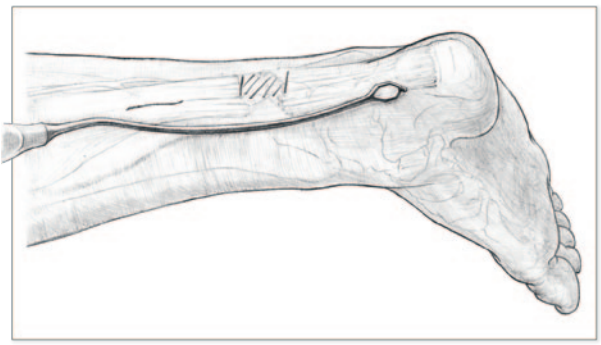
SURGICAL TECHNIQUE

Patient Positioning

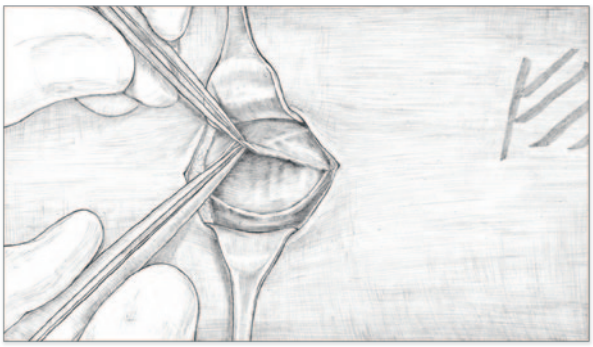
Operation in the prone position. A pneumatic tourniquet is not needed. Sterile covering of both lower legs for exact adjustment of prestress to the musculus triceps surae as compared to the healthy opposite side. The positive Matles test shows the loss of prestress to the M. triceps surae by the Achilles tendon rupture.

Positioning of the instrument

A 3-cm dorsomedial incision is made at a distance of at least 3 cm from the rupture zone once the instrument is set for planning later positioning, marking of the rupture zone and skin incision.

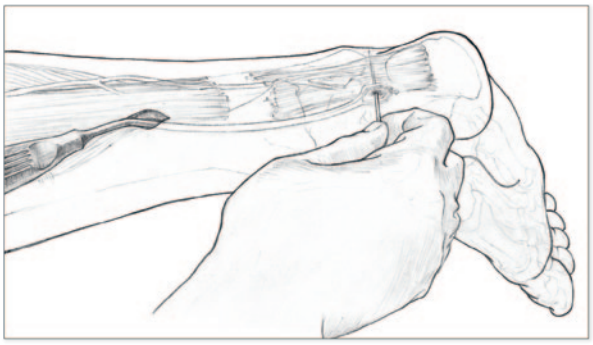


The lower leg fascia is exposed and opened and the peritendineum can be seen in the depth. The peritendineum will not be opened. The first instrument is inserted into the layer between lower leg fascia and peritendineum.

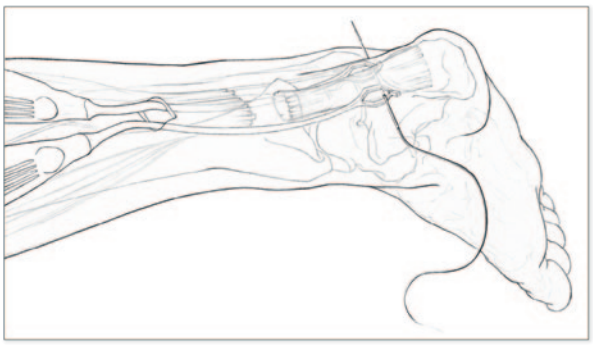


Surgical technique

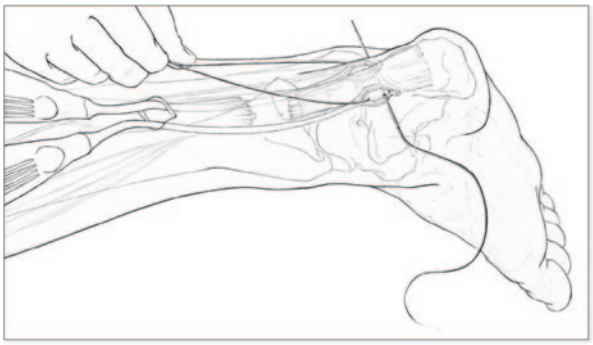
The instrument opening is placed approx 1 cm proximally to the Achilles tendon insertion. The needle (Ethibond EXCEL®, gauge 0 with straight needle) is inserted percutaneously through the opening of the instrument and through the Achilles tendon. In the process maximal cross-section of the Achilles tendon should be gripped as closely to the insertion as possible.



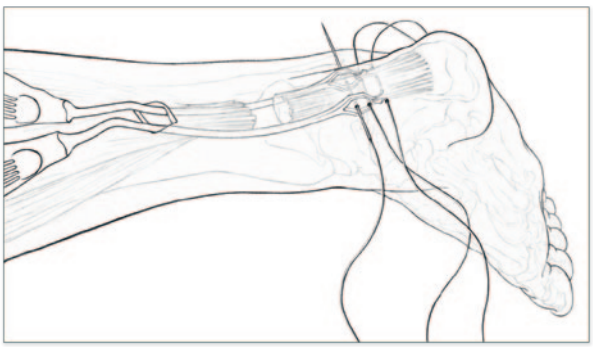
The second instrument is inserted on the opposite side of the tendon as far as the needle. The needle is pulled back into the tendon. The second instrument is further advanced until the opening of the instrument is at the same level as the needle. The needle is now inserted through the opening of the second instrument, and the thread is pulled through.



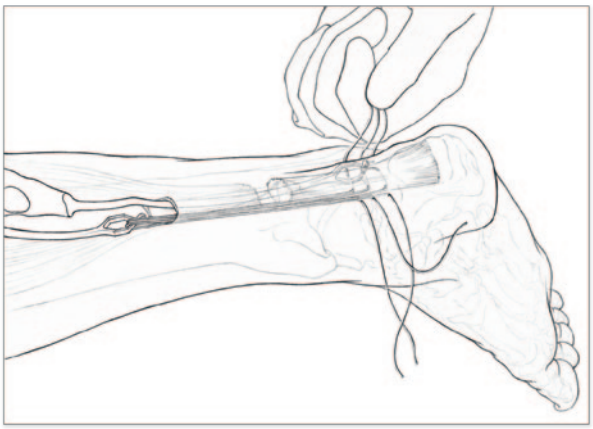
The threads ends are secured.



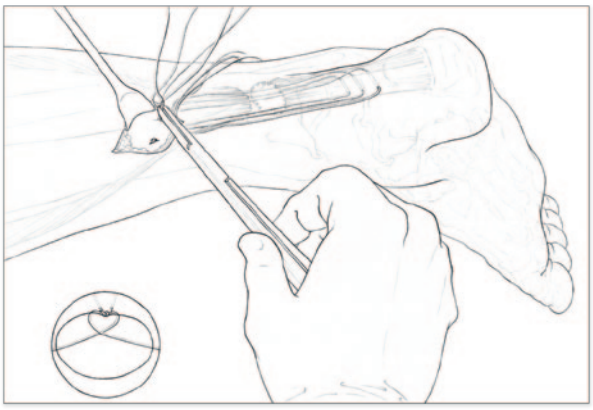
Immediately place a second and third thread at a distance of ca. 0.5 cm or respectively 1 cm from the first suture as described here.



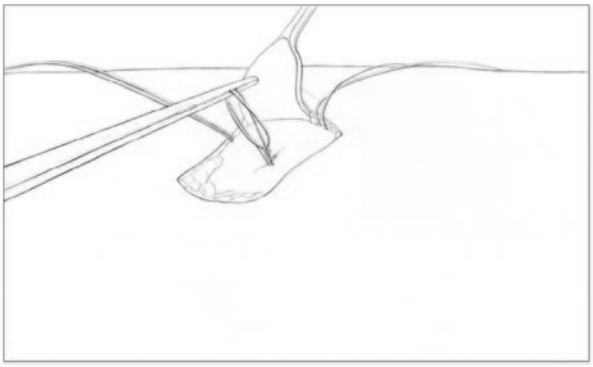
The thread ends of one side are fixed, and the instrument of the opposite side is withdrawn. Then the thread ends already withdrawn are fixed and the second instrument is removed. The secure grip of the threads in the tendon is checked by pulling strongly to the point of maximal plantar flexion of the foot. In case of insecure grip the suture must be reseated. The tear strength is checked separately for each thread.



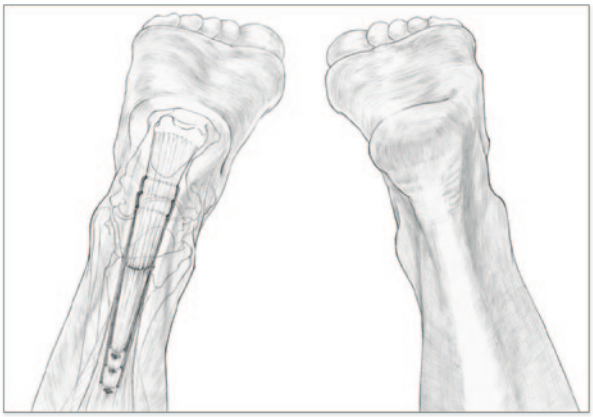
The proximal anchoring of the threads is ensured by a suture with a strong, free needle with a 3/8-curve from lateral or medial to central, where the distance of both thread ends should be ca. 5 mm to 7 mm.



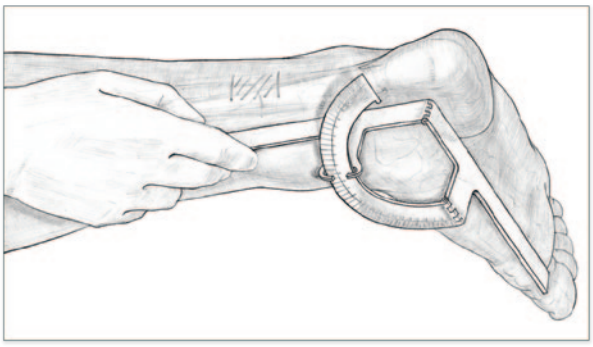
The assistant holds the foot in maximal plantar flexion, a knot is set and pulled tight. The knot is held tensed. The assistant releases the foot, and the plantar flexion angle is measured with the knee bent at 90° (Matles test). Then set the prestress with slight over-correction of 5° and then completion of the knot. Two more threads are fixed ca. 1 cm or respectively up to 2 cm proximally to the first knot in the same way, and the primary strength can be increased by additional looping.



The knots are recessed by clamping of both threads and piercing directly next to and proximally to the knot. The lower leg fascia and the subcutaneous tissue are sealed with resorbable suture material (Vicryl® 3x0) and the wound is closed by intracutaneous suture.



Since the uninjured foot is covered in principle by sterile means, the prestress can be correctly adjusted in contrast to the opposite side with this technique via the Matles test. The aim here is slight over-correction of 5°. Insufficient prestress must be avoided.



Special features

With distal Achilles tendon rupture the instruments are guided down as far as the calcaneus and the three threads are anchored transcalcaneously through the opening of the instrument via a bore D 2.5 mm using a drill guide.

Risks, failures, complications

- Inadequate thread grip (intraoperative test): replacing with sufficient experience or transcalcaneous anchoring, alternatively incision widening and switch to conventional, open technique
- Skin incision too close to the rupture zone (3-cm distance), ruptured tendon tissue proximal fixation is inadequate: incision widening proximally, the proximal stub is pulled distally by the first suture,
- Intraoperative injury of the peritendineum: suture with Vicryl® 3x0 USP, subsequently continuation of percutaneous suture
- Wound infection: operative revision with complete removal of the suture material
- Fistulation: surgical revision with complete removal of the suture material
- Rerupture: open tendon suture
- Suralis lesion: surgical revision (injury to the nervus suralis with the described technique would be feasible only if the skin incision were made not dorsomedially, but in the interests of simplifying the technique in the median direction across the Achilles tendon and if the nerve would be gripped with a subcutaneous suture).

Postoperative treatment

- Postoperative immobilisation of the foot is carried out with the ventral synthetic longuette in 20° plantar flexion up to the 3rd or 4th postoperative day. Subsequently the patient wears a Vario-Stabil® shoe with 4-cm heel height increase and the shoe for the opposite side. The ventral synthetic longuette is worn at night up to the 6th postoperative week. A thrombosis prophylaxis with low-molecular heparin is recommended up to the 6th postoperative week, as that is when the ventral rail of the Vario-Stabil® shoe is removed and the upper ankle joint is free to move. The recommended control of the thrombocyte count should be performed as per guidelines.
- In the 6th and 7th week heel lowering of the Vario-Stabil® shoe on both sides by 1 cm.
- When the Vario-Stabil® shoe is taken off after 8 weeks the patient should have as far as possible regained a normal extent of movement of the upper ankle joint via corresponding physiotherapy and independent exercise. This method has proven itself effective since at this time mobility in the upper ankle joint would otherwise be extremely limited and due to the high degree of stiffness of the healed Achilles tendon the risk of rerupture from a misstep would have increased. A viscoelastic Achilles tendon wedge can partly compensate the loss in elasticity and should be worn under the insole up to the 12th week in ankle-high footwear once the Vario-Stabil® shoe is taken off (Dresden ve-Achilles tendon wedge, Thanner, Höhstädt). A viscoelastic heel wedge should be used later only for heavier strains or for prophylaxis of rerupture during sports such as volleyball.
- Physiotherapy in the Vario-Stabil® shoe can start in the 2nd postoperative week.
- Elements of the physiotherapy program in the first phase are coordination training, gait training with the special shoe (small steps) and ergometer bike, with the heel being pressed down when the pedals are pushed against minimal resistance.
- From the 4th week movement exercises begin, up to the neutral position, therapeutic ultrasound on the rupture zone and massage of the scar region.
- From the 6th week active movement exercises in the full scope of movement of the upper ankle joint are necessary.
- Removal of the Vario-Stabil® shoe after the 8th week is followed by a phase of intensive physiotherapy with movement exercises, gait training and physiotherapy for muscle development. The forefoot is increasingly stressed during exercising on the ergometer bike.
- Therapeutic ultrasound on the rupture region is prescribed up to the 10th week.
- From the 8th week biking and swimming are possible. Running training can start from the 12th week. Ve-wedges should be worn in sports shoes at this point. Full sports-playing ability, in particular for ball sports, returns ca. 6 months after operation.
- Oedemas can occur up to 4 months after rupture even with properly healed Achilles tendon and should be treated after exclusion of deep vein thrombosis by lymphatic drainage.
- Work ability returns in the 2nd to 10th week, according to the respective type of work.

Dresdner instrument,
for treating percutaneous ruptures of the Achilles tendon

	Code N°
I1	750.109601-I1
I2	750.109601-I2

278 mm	Length
28 mm	Handle width
17 mm	Handle height

to be used in pairs

General information

When using all our products, please follow the Instructions for the use of medical devices made by INTERCUS GmbH. This is available on our website www.intercus.de or can be requested from us in paper form.

Literature

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Personal notes

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