

intercus

Operating technique

Percutaneous suture of the Achilles tendon with  
the Dresdner Instrument





Description	Page
<hr/>	
Material . . . . .	1
Indications. . . . .	1
Contraindications . . . . .	1
Features . . . . .	1
Doctors responsible for the design . . . . .	2
Medical author of operating technique . . . . .	2
References . . . . .	2
Patient explanation . . . . .	3
Instruments . . . . .	3
Operation preparations. . . . .	3
Storage . . . . .	4
Positioning of the instrument . . . . .	4
Operating technique . . . . .	5
Special features . . . . .	7
Risks, errors, complications. . . . .	8
Postoperative treatment . . . . .	9
Literature . . . . .	10
Contact data . . . . .	12



Patent Number: DE 100 15 944

# The Dresdner instrument

The Dresdner instrument was developed for minimally invasive treatment of recent Achilles tendon rupture (pDI suture).

## Material

Instrument steel

## Indications

The pDI suture is indicated for recent Achilles tendon rupture. With recent, distal Achilles tendon rupture there is the indication for 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 impeded with hardened or substantially degenerated tendon stubs and the defect zone cannot be closed with irreversible contracting of the M. triceps surae.

## Features

The pDI suture is characterised by the following principles:

- » Care of the peritendineum via a skin incision at a distance from the rupture
- » Minimising of the risk of suralis lesion by preparation in the layer between lower leg fascia and peritendineum,
- » Optimising of adaption of tendon stubs by parallel thread path to the tendon,
- » Stabilising of the thread anchoring by increasing the distance from the rupture site and use of non-resorbable suture material,
- » Use of a simple, resterilisable instrument.



### Doctors responsible for the design

Prof. Dr. med. Hans Zwipp, OUC, Universitätsklinikum Dresden

Priv.-Doz. Dr. med. Michael H. Amlang, OUC, Universitätsklinikum Dresden

### Medical author of operating technique

Priv.-Doz. Dr. med. Michael H. Amlang, OUC, Universitätsklinikum Dresden

### References

A. Keller, C. Ortiz, E. Wagner, P. Wagner, P. Mococain:  
Mini-Open Tenorrhaphy of Acute Achilles Tendon Ruptures:  
Medium-Term Follow-up of 100 Cases.  
Am J Sports Med 2014 42: 731

H. Henríquez, R. Muñoz, G. Carcuro, C. Bastías:  
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  
J Bone Joint Surg Br 2012;94-B:663–7.

### Patient explanation

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

### Instruments

2 Dresdner instruments (1 x silver & 1 x anthracite)  
1 angled blade

### Operation preparations

An ultrasound examination to assess the rupture location and determine adaptation of the tendon ends in 20° plantar flexion is to be conducted (Amlang et al. 2011).

Timely, single-shot antibiotics prophylaxis with cephalosporin is recommended (30 – 60 minutes prior to the skin incision).

On its own, regional anaesthesia has proven itself via a distal sciatic nerve block. Also, given the recommended total dosage of local anaesthetic, infiltration of the incision area can occur with xylorest 1% with adrenalin 1:200000. Because no tourniquet is used in the procedure, the tendency to bleed in the operation area can be reduced.



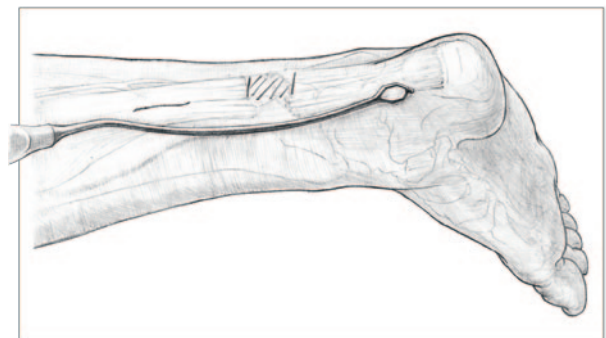
## Storage

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



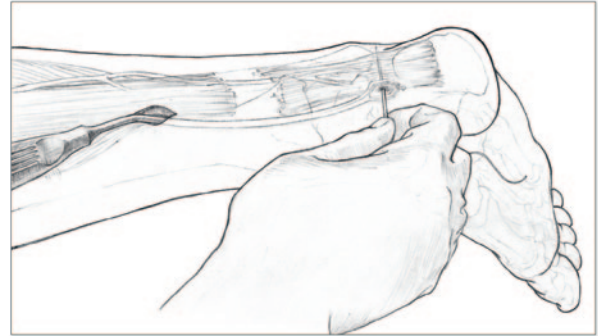
The lower leg fascia is exposed and opened and the peritendineum can be seen deep down. The peritendineum is not opened. The first instrument is inserted into the layer between lower leg fascia and peritendineum.



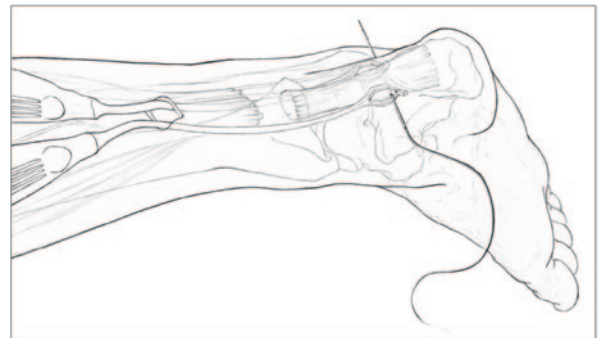


## Operating technique

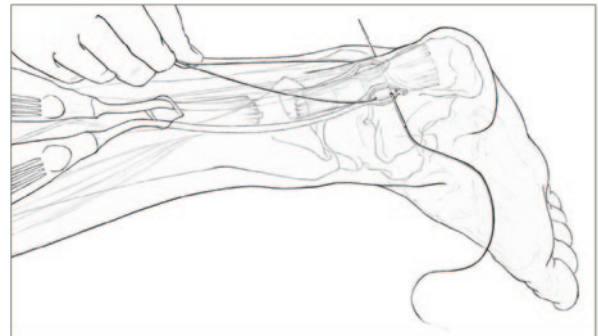
The instrument opening is placed ca. 1 cm proximally to the Achilles tendon insertion. The needle (Ethibond EXCEL®, gauge 0 with straight needle) is inserted percutaneously through the opening of the instrument and through the Achilles tendon. At the same time the maximal cross-section of the Achilles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



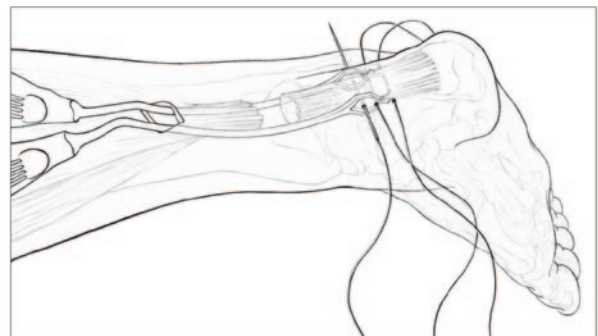
The second instrument is introduced on the opposite side of the tendon as far as the needle. The needle is pulled back into the tendon. The second instrument is further advanced until the opening of the instrument is at the level of the needle. The needle is now inserted in through the opening of the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



The suture ends are secured.

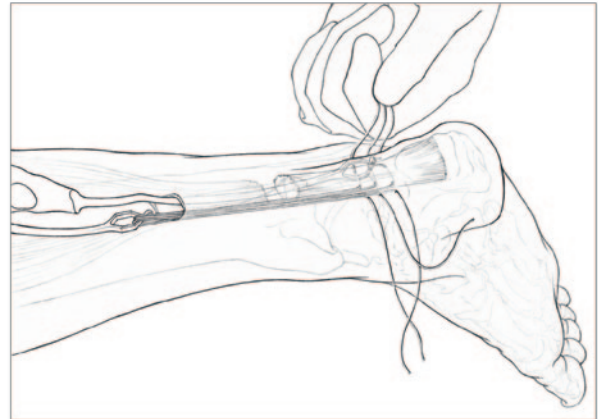


Now a second and third suture are placed at a distance of ca. 0.5 cm or respectively 1 cm from the first suture as described here.

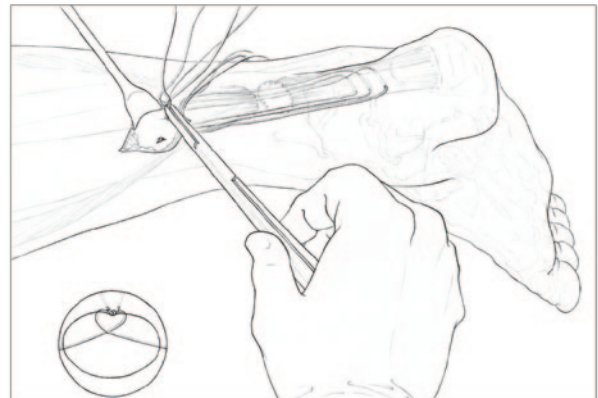




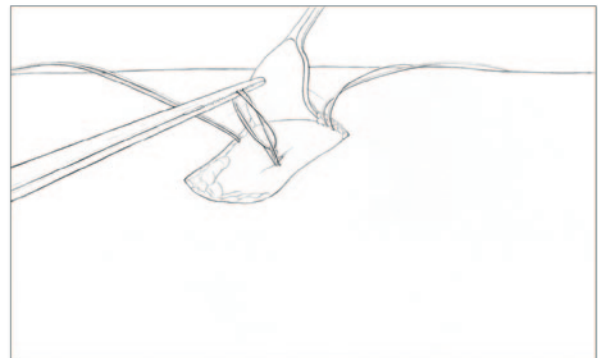
The thread ends of one side are fixed, and the instrument of the opposite side is withdrawn. Then the thread ends already withdrawn are fixed and the second instrument is removed. The secure grip of the threads in the tendon is checked by pulling strongly to the point of maximal plantar flexion of the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



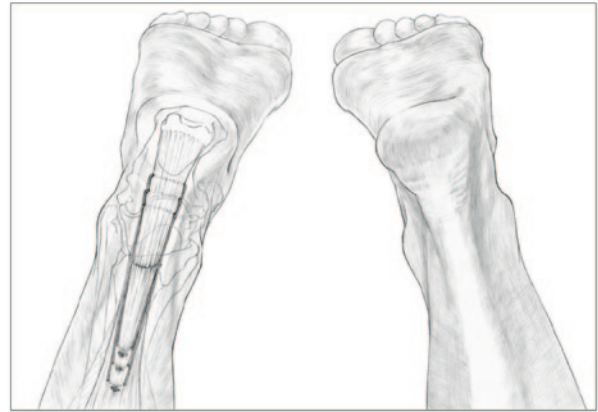
The proximal anchoring of the threads is ensured by a suture with a strong, free needle with a 3/8-curve from lateral or medial to central, where the distance of both thread ends should be ca. 5 mm to 7 mm.



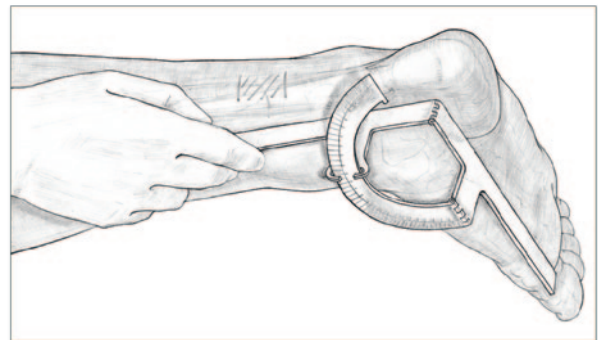
The assistant holds the foot in maximal plantar flexion, a knot is set and pulled tight. The knot is held tensed. The assistant releases the foot, and the plantar flexion angle is measured with the knee bent at 90° (Matles test). Next is setting of the prestress with slight over-correction of 5° and 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, errors, 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), in the ruptured tendon tissue proximal attaching is inadequate: incision widening proximally, with the first suture the proximal stub is pulled distally,
- » Intraoperative injury of the peritendineum: suture with Vicryl® 3x0 USP, and only then continuation of the percutaneous suture
- » Wound infection: operative revision with complete removal of the suture material
- » Fistulation: operative revision with complete removal of the suture material
- » Rerupture: open tendon suture
- » Suralis lesion: operative 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 were gripped with a subcutaneous suture).

## Postoperative treatment

- » Postoperative immobilisation of the foot is carried out with the ventral synthetic languette in 20° plantar flexion up to the 3rd and 4th postoperative day. From then the patient wears a Vario-Stabil® shoe with 4-cm heel height increase and the shoe for the opposite side. The ventral synthetic languette 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 in each case 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). The viscoelastic heel wedge is to be used later only for heavier loads or for prophylaxis of rerupture during sport 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, 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 required. 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 Achilles tendon ruptures

Code N°

Anthracite	750.109601-I1
Silver	750.109601-I2

to be used as a pair



## Literature

- » Amlang MH, Busch T, Zwipp H: Suture instrument for percutaneous Achilles tendon suture containing the peritendineum. German Patent and Trademark Office. Germany: A61B 17/04, 2000.
- » Amlang MH, Christiani P, Heinz P, Zwipp H: Percutaneous Achilles tendon suture with the Dresdner instrument. Technique and results. Unfallchirurg [Accident Surgery] 2005; 108(7): 529-36.
- » Amlang MH, Rammelt S, Haupt C, Friedrich A, Zwipp H: Clinical and sonographic criteria for differentiated therapy of Achilles tendon rupture. Fuss & Sprunggell 2009; 7:230-241.
- » Amlang MH, et al.: Ultrasonographic classification as a Rationale for Individual Treatment Selection. ISRN Orthopedics, 2011; 1-10.
- » Amlang MH, Maffuli N, Longo UG, Stubig T, Imrecke J, Hufner T: Operative treatment of Achilles tendon rupture. Unfallchirurg, 113(9): 712-20, 2010.
- » Amlang MH, Zwipp H: Tendinosis and Achilles tendon rupture. Orthopaedics & accident surgery up2date 2011; 6: 259-282/Z Orth Unfallchir, 2012, (150) 99-118

#### Personal remarks

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



ICPOP04EN 00 2015-07



NATIONAL

INTERCUS Vertriebs GmbH  
In der Flecke 23  
07422 Bad Blankenburg  
GERMANY

Tel.: +49 36741 586265  
Fax: +49 36741 586469  
E-Mail: [info@intercus-vertrieb.de](mailto:info@intercus-vertrieb.de)  
[www.intercus.de](http://www.intercus.de)

INTERNATIONAL

INTERCUS GmbH  
Zu den Pfarreichen 5  
07422 Bad Blankenburg  
GERMANY

Tel.: +49 36741 588-0  
Fax: +49 36741 588-285  
E-Mail: [info@intercus.de](mailto:info@intercus.de)  
[www.intercus.de](http://www.intercus.de)