



Convegno

G.A.M.O.T.

ATTUALITA' DI  
CHIRURGIA  
ORTOPEDICA

esperienze a confronto

V Congresso G.A.M.O.T

X Incontro di Chirurgia del Piede

Presidente A. De Carolis



L'ALLUNGAMENTO  
DEL TENDINE DI ACHILLE.  
QUALE TECNICA E  
CON QUALE INDICAZIONE

*M. Guelfi, E. Abello, F. Priano*



AZIENDA SANITARIA GENOVESE



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# Retrazione del tendine di Achille



Alterazione anatomica  
frequentemente presente  
nel piede piatto valgo



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# Retrazione del tendine di Achille

- Età evolutiva



- Età adulta



# Retrazione del tendine di Achille

## Primitiva o Secondaria ?

Nostro orientamento  
sull'allungamento  
del tendine di Achille  
nel piede piatto

S. GIANNINI - M. GIRI  
F. CATANI - V. INNAO  
*Università di Bologna  
Istituto Ortopedico Rizzoli  
2<sup>a</sup> Clinica Ortopedica  
Direttore: Prof. P. G. M.*

*Our trend about lengthening  
of tendo Achillis in flat foot*

**SUMMARY.** — A report is made of 220 flat feet operated to lengthen the tendo Achillis. After evaluation of clinical pre-operative features represented by Achille's tendon-triceps system and of the results obtained by different techniques, the conclusion is drawn that in flat feet there is always a retraction of Achille's tendon. This retraction is primitive in «genetic» flat feet and in spastic ones, secondary in flat feet. Influencing retraction are represented by the etiology of the deformity and the patient's age. It is believed that the tendo Achillis should be lengthened, as first surgical stage, only in flat foot with

**S. Giannini, 1986**

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# Retrazione del tendine di Achille

Impedisce la  
correzione del  
valgismo calcaneare

*L. De Palma, 1993*

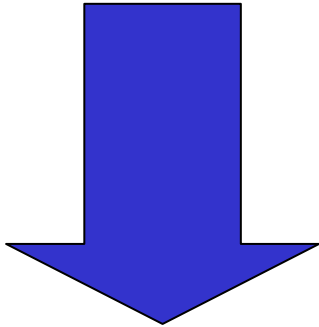
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# Retrazione del tendine di Achille

- **Mantiene il calcagno in equinismo**



- **Caduta volta plantare**

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# Retrazione del tendine di Achille

## Diagnosi clinica

- **Aspetto**
- **Motilità T.T.**
- **Correggibilità Retrop.**



# T. Achille

## Aspetto

- Teso
- Retratto



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# T. Achille

## Motilità T.T.



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# Manovre Correttive



# T. Achille

## No alterazioni



## Inserzionali



# Allungamento t. di Achille

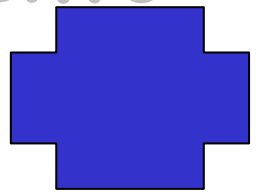
## Quando allungare ?

- Quando la flessione dorsale non raggiunge i 90° dopo aver corretto il retropiede

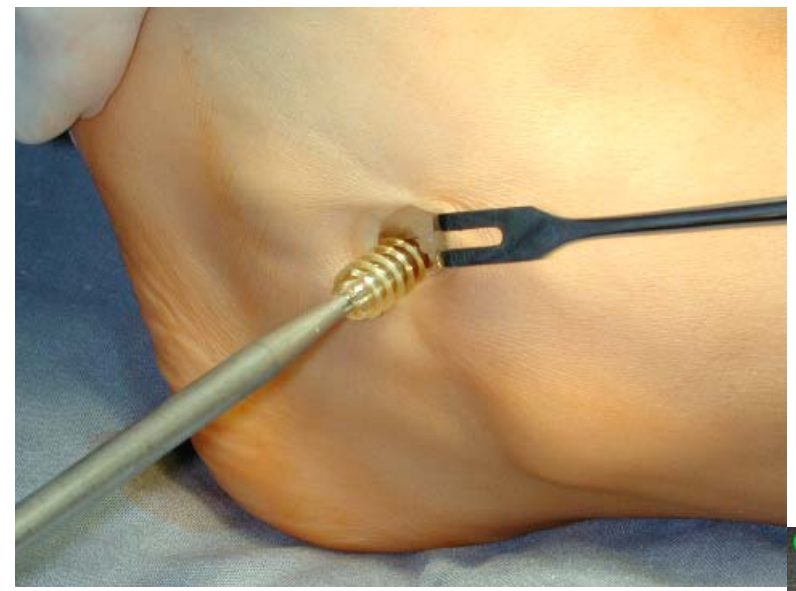
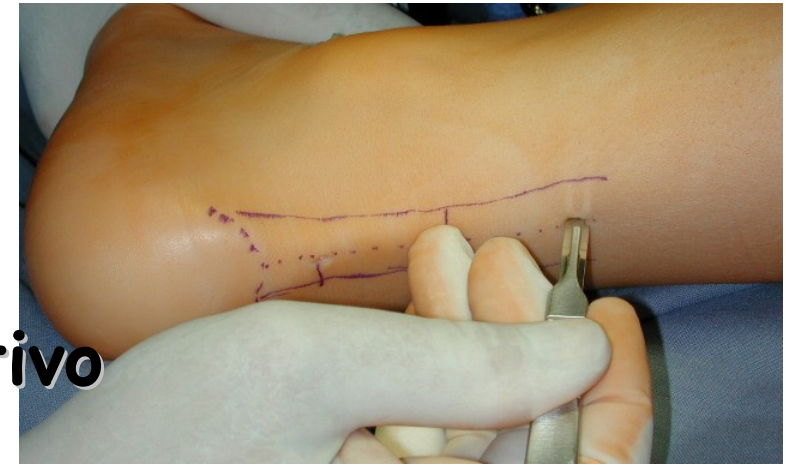


# Brevità t. di Achille

## Allungamento



## Intervento correttivo PPV



# Allungamento t. di Achille

## Quale tecnica ?

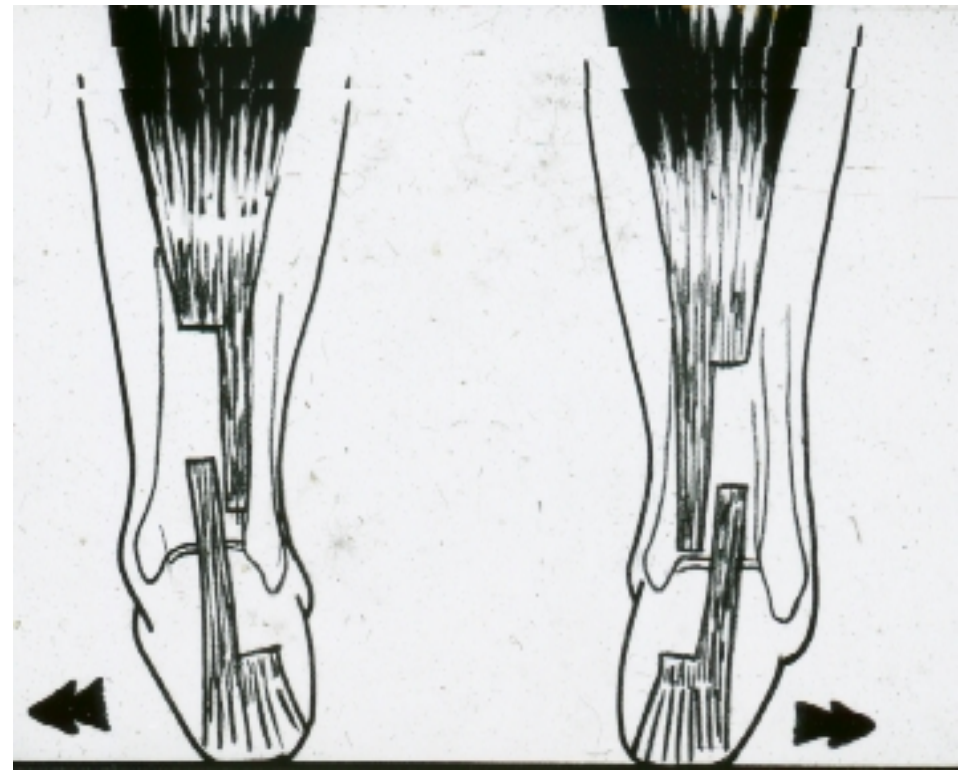
- A cielo aperto
- Percutanea



# Allungamento t. di Achille

## Tecniche tradizionali a cielo aperto

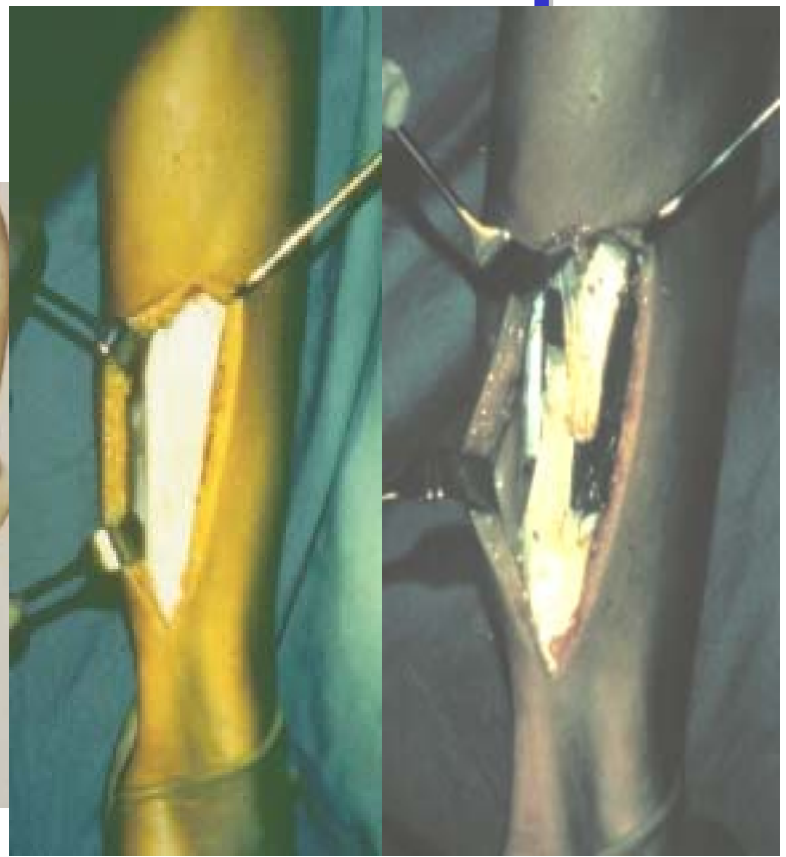
# "Z"



# Allungamento t. di Achille

## Tecniche tradizionali a cielo aperto

Di Baker a  
"U"  
rovesciata





# Allungamento t. di Achille

## Tecniche tradizionali a cielo aperto

Vulpius a  
"V"  
rovesciata

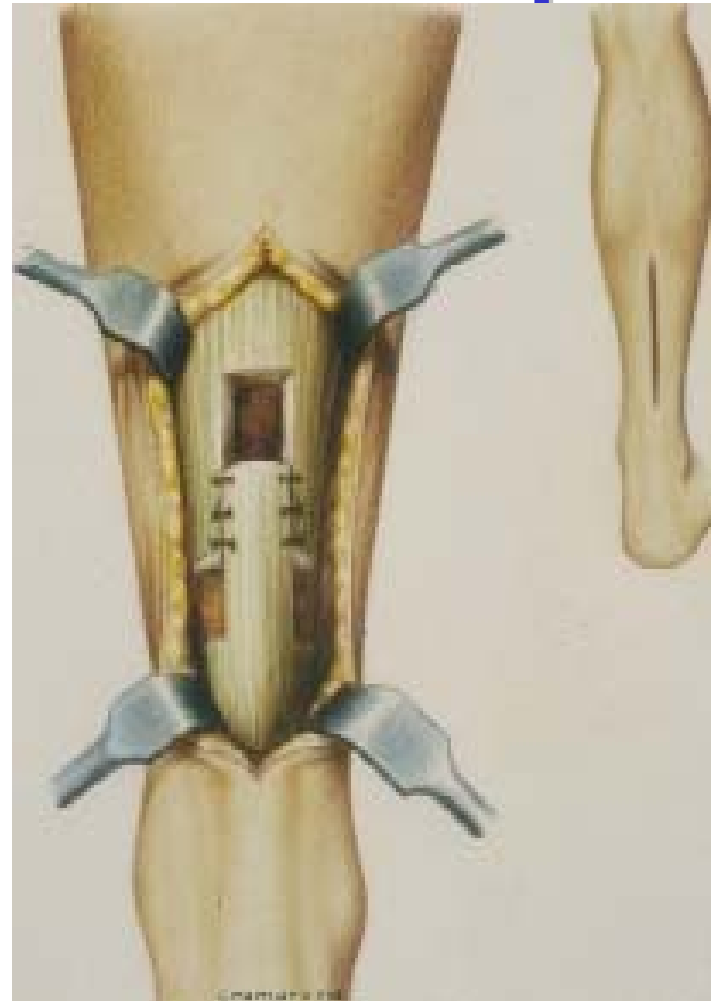


# Allungamento t. di Achille

Tecniche tradizionali a cielo aperto

## PRO

- **Maggior precisione nel dosare l'entità dell'allungamento**  
*(metodo di Garbarino & Clancy)*



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# Allungamento t. di Achille

## Tecniche tradizionali a cielo aperto

### CONTRO

- Grandi incisioni
- Aderenze cicatriziali
- Tempi di guarigione
- Ischemia cutanea

**An Analysis of Skin Perfusion Over the Achilles Tendon in Varying Degrees of Plantarflexion**

Ashley R. Poynton, M.D. FRCS (Tr & Orth); Kieran O'Rourke, MCh FRCSI  
Dublin, Ireland

**OBJECTIVE:**  
Delayed wound healing and, less commonly, wound breakdown are significant complications following open Achilles tendon repair. Skin perfusion over the Achilles tendon also reduces healing time following repair. The aim of this study was to analyse skin perfusion over the Achilles tendon with the ankle in varying degrees of plantarflexion in 20 volunteers. Skin perfusion was determined by measuring the transcutaneous oxygen pressure (tcPO<sub>2</sub>) using the Novametrics TPO 230 monitor. Measurements were taken at the medial edge of the Achilles tendon in 20 volunteers.

Skin perfusion was maximal with the ankle plantarflexed to 20°. With plantarflexion beyond this skin perfusion was reduced. At 40° plantarflexion skin perfusion was reduced by up to 49% (mean 35%, range 27% to 49%). We conclude plantarflexion beyond 20° reduces skin perfusion in the region of the Achilles tendon. Though this study was performed on non-operated cases, and is thus limited, the findings may have clinical implications with regard to post-operative healing following Achilles tendon repair.

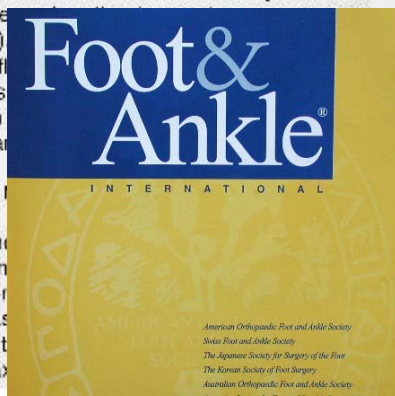
to the skin in that area. This may be clinically important as a similar effect may be induced by the application of an equinus cast.

Skin perfusion can be measured accurately and non-invasively by measuring transcutaneous oxygen pressure (tcPO<sub>2</sub>) directly to blood flow.

The aim of this study was to analyse skin perfusion over the Achilles tendon at varying degrees of plantarflexion.

#### MATERIALS AND METHODS

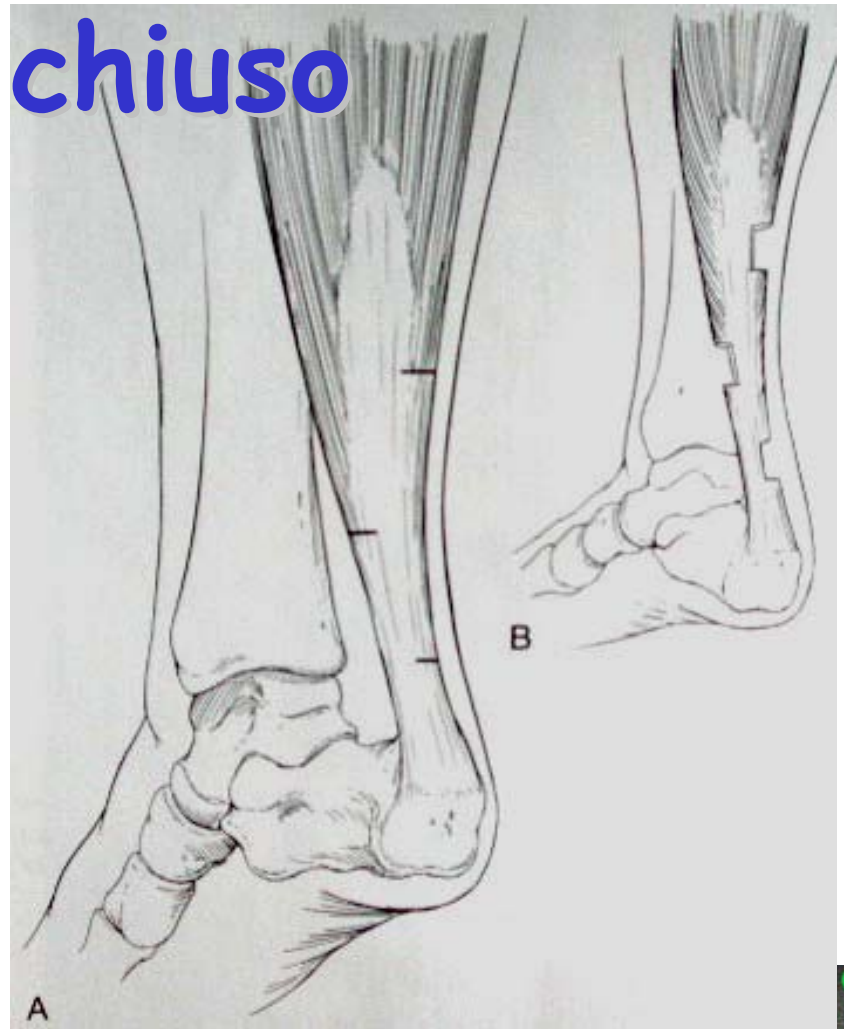
The transcutaneous oxygen pressure was measured using the Novametrics TPO 230 monitor. The measurement was taken using a transcutaneous oxygen electrode that was inserted into the skin. The probe temperature was maintained at 37°C. The probe temperature was maintained at 37°C. The probe temperature was maintained at 37°C.



# Allungamento t. di Achille

Tecnica a cielo chiuso

Tenotomie  
multiple  
percutanee  
alternate



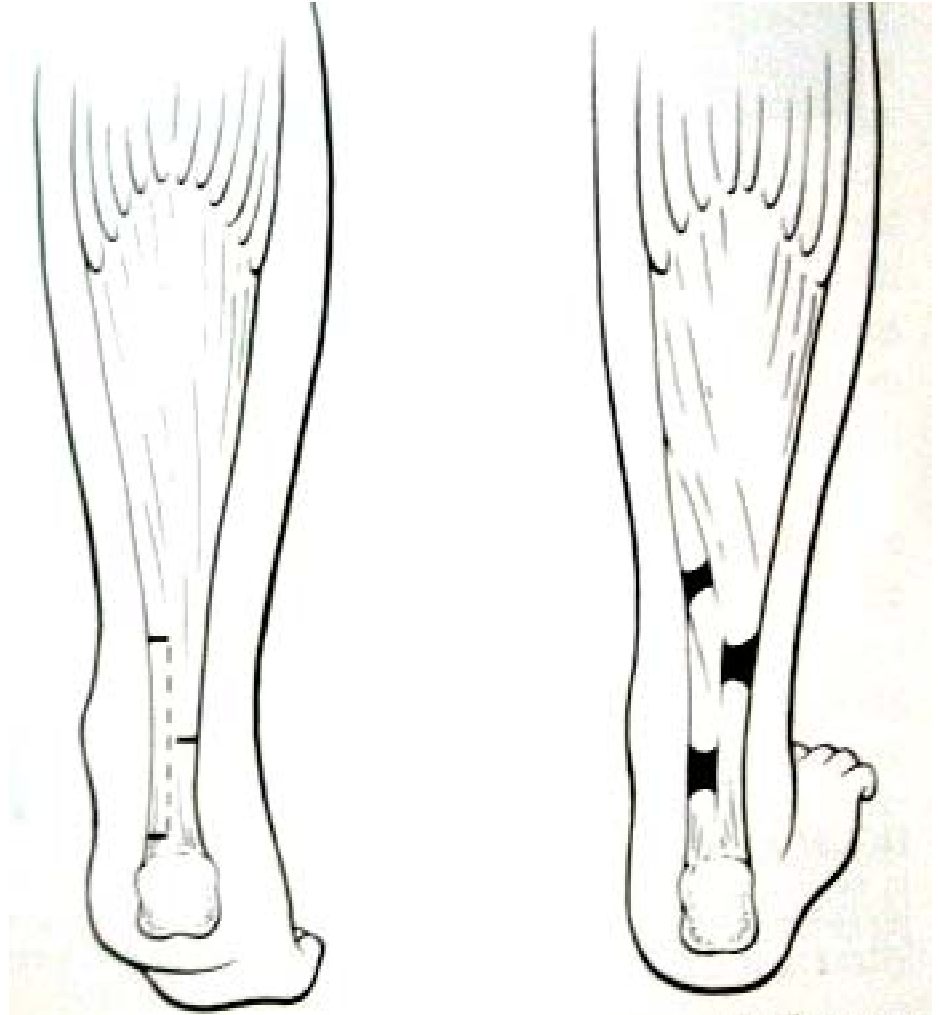
# Tecnica chirurgica

- **Reperi anatomici**
- **Bordo sup. calcagno**
- **Margini t. di Achille**
- **Linea mediana tendine**



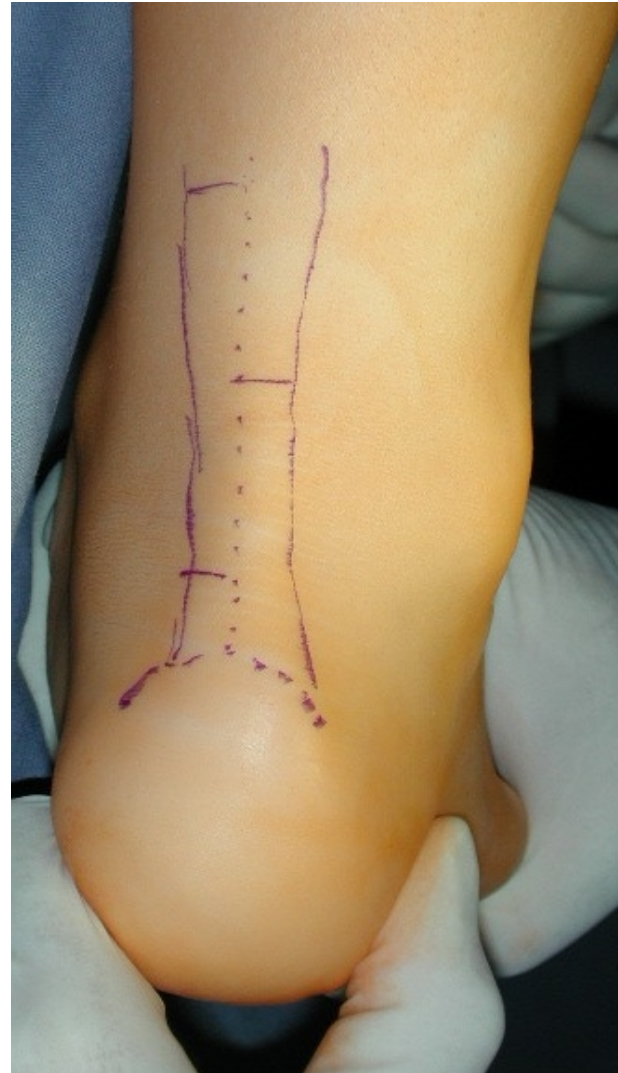
# Tecnica chirurgica

- **Sezione,  
a tutto spessore,  
del 50% in larghezza  
del tendine,  
su due o tre livelli,  
su lati alternati**



# Tecnica chirurgica

- **Sezione,  
a tutto spessore,  
del 50% in larghezza  
del tendine,  
su due o tre livelli,  
su lati alternati**



# Tecnica chirurgica

## • 1° incisione

- 3-4 mm. linea mediana
- 2 cm. pross. calcagno
- incisione t. a tutto spessore

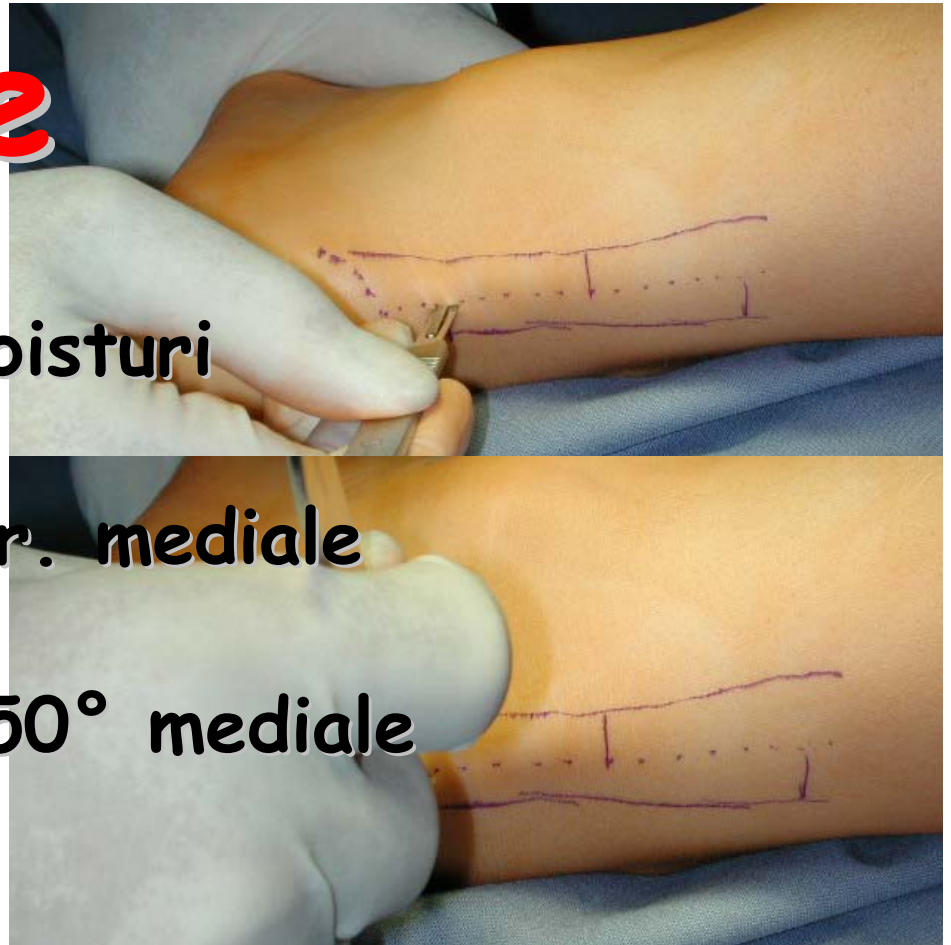




# Tecnica chirurgica

## • 1° incisione

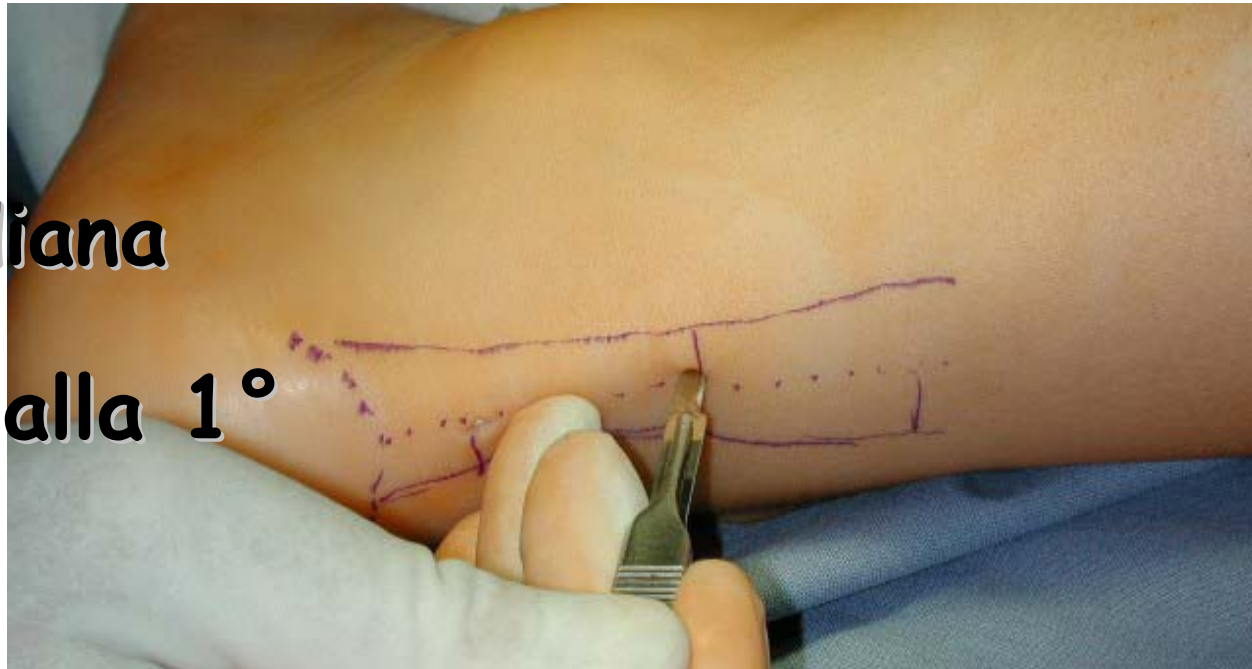
- rotazione di 90° del bisturi
- sezione tendinea in dir. mediale
- a tutto spessore del 50° mediale



# Tecnica chirurgica

## • 2° incisione

- 3-4 mm. mediana
- 4 cm. pross. alla 1°



# Tecnica chirurgica

## • 2° incisione

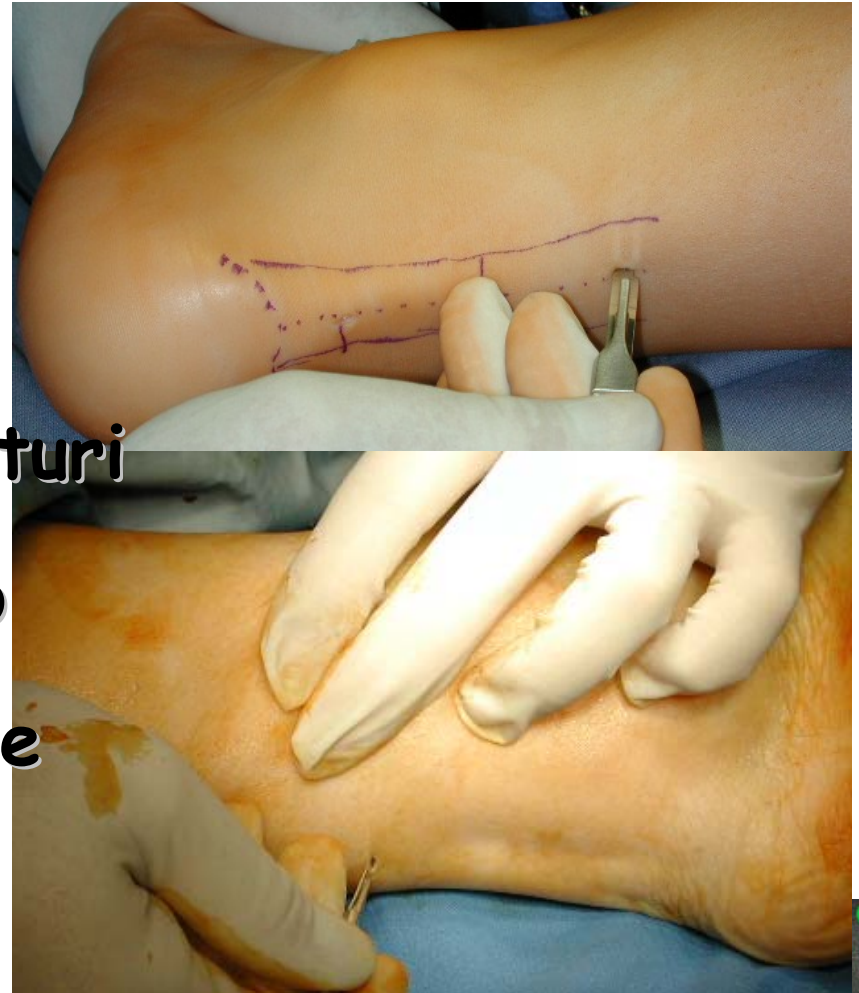
- rotazione di 90° del bisturi
- sezione tendinea in dir. laterale
- a tutto spessore del 50° laterale



# Tecnica chirurgica

## • 3° incisione

- 4 cm. pross. alla 2°
- rotazione di 90° del bisturi
- sezione tendinea a tutto spessore del 50° mediale



# Tecnica chirurgica

Video



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# Tecnica chirurgica

## • **Manovra allungamento**

- Flessione dorsale  $10^{\circ}$  -  $15^{\circ}$
- Senza forzature eccessive
- Fibre tendinee mediane intatte



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# Post-operatorio

Dipende dalla tecnica utilizzata per correggere il piattismo



• **Artrodesi-osteotomie**



• **Artrorisi**

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# Post-operatorio

**Artorisi +**

**Allungamento percutaneo**



- **Immobilizzazione per 3 sett.**



- **1 sett. in scarico**

- **2 sett. in carico**

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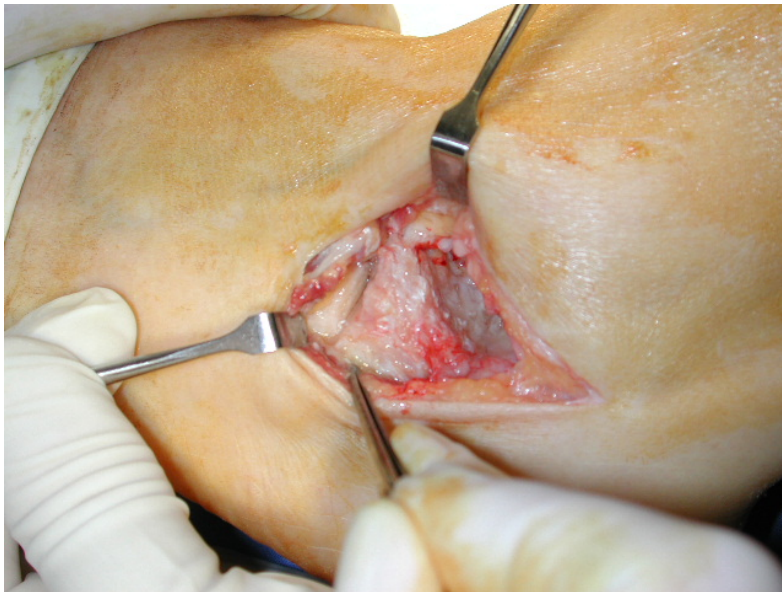


# Post-operatorio

## Artrodesi + Allungamento percutaneo



- Immobilizzazione per 6 sett.
- 3 sett. in scarico
- 3 sett. in carico



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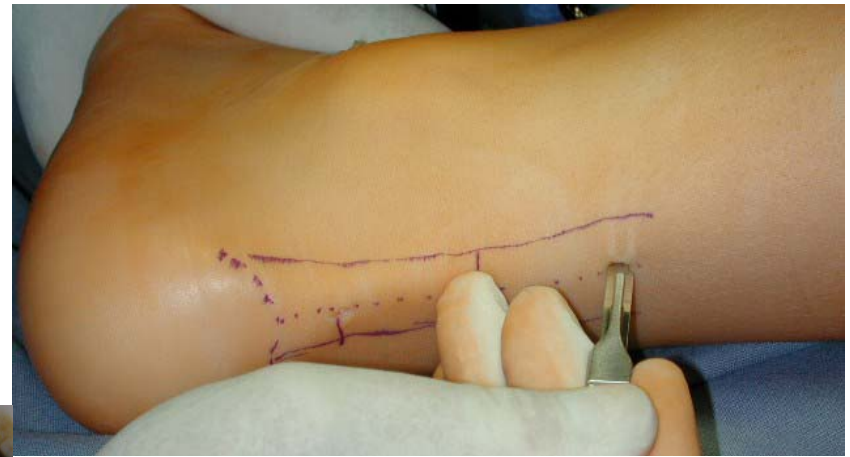


# Allungamento t. di Achille

## Tecnica a cielo chiuso

### "PRO"

- **Piccole incisioni**



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# Allungamento t. di Achille

## Tecnica a cielo chiuso

# "PRO"

- No Ischemia cutanea

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An Analysis of Skin Perfusion Over the Achilles Tendon in Varying Degrees of Plantarflexion

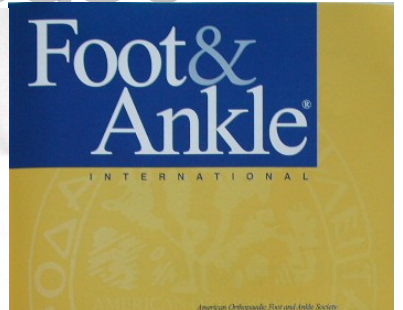
Ashley R. Poynton, M.D. FRCS (Tr & Orth); Kieran O'Rourke, MCh FRCSI  
Dublin, Ireland

**ABSTRACT**

Delayed wound healing and, less commonly, wound breakdowns are significant complications following open Achilles tendon repair. Skin perfusion over the Achilles tendon may be reduced when the ankle is plantarflexed. The aim of the study was to determine the effect of plantarflexion on skin perfusion over the Achilles tendon. Measurements were taken of skin perfusion (tissue oxygen pressure (tO<sub>2</sub>)) over the Achilles tendon in 10 patients. Measurements were taken at 0°, 10°, 20°, and 30° of plantarflexion. Skin perfusion was reduced at 20° and 30° of plantarflexion. At 0° and 10° of plantarflexion, skin perfusion was not significantly reduced. We conclude that skin perfusion over the Achilles tendon is not significantly reduced in the study was performed. However, if limited, the effect of plantarflexion on skin perfusion over the Achilles tendon may be clinically important as a similar effect may be induced by the application of an equinus cast.

Skin perfusion can be measured accurately and non-invasively by measuring the transcutaneous oxygen pressure (tPO<sub>2</sub>). This has been shown to relate to the skin in that area. This may be clinically important as a similar effect may be induced by the application of an equinus cast.

Skin perfusion can be measured accurately and non-invasively by measuring the transcutaneous oxygen pressure (tPO<sub>2</sub>). This has been shown to relate to the skin in that area. This may be clinically important as a similar effect may be induced by the application of an equinus cast.



# Allungamento t. di Achille

## Tecnica a cielo chiuso

# "PRO"

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### Healing of the Achilles Tendon: An Experimental Study

Hajo Thermann M.D., Ph.D.; Onno Frerichs M.D.\*; Achim Biewener M.D.

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**ABSTRACT**

Biomechanical properties of healing ruptures in the Achilles tendon of rabbits were examined after two, four, eight and 12 weeks. Treatment modalities were (n7): a) suture, b) fibrin-glue, c) non-surgical treatment. All animals received a functional aftertreatment consisting of a special orthotic support and free ambulation. For biomechanical testing a fixation-technique was applied that prevented intertendinous rupture.

adhesives and auto Achilles tendon has tion.<sup>1,2,13,14</sup> In most c models.<sup>3,4,5,13,15,20</sup> The ties of the Achilles te McMaster,<sup>8</sup> who four rupture the normal A In a study by Vidik, N. was reported that

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American Orthopaedic Foot and Ankle Society  
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Israeli Orthopaedic Foot and Ankle Society  
South African Foot Surgeons Association  
Spanish Society of Medicine and Surgery of the Foot  
Turkish Society of Orthopaedic Surgery and Traumatology

- **Tempi di guarigione**



# Allungamento t. di Achille

## Tecnica a cielo chiuso

### "PRO"

- **Efficace**



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# Allungamento t. di Achille

## Tecnica a cielo chiuso

### "PRO"

- No aderenze



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# Allungamento t. di Achille

## Tecnica a cielo chiuso

### "CONTRO"

- Difficile dosare l'entità dell'allungamento



# Allungamento t. di Achille

## Tecnica a cielo chiuso

- Età
- Tecnica



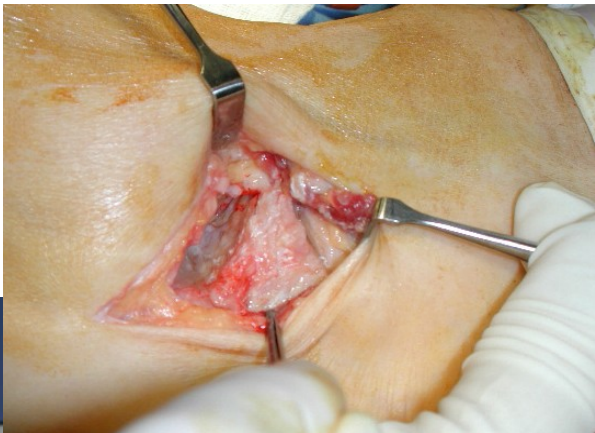


# Allungamento t. di Achille

## Tecnica a cielo chiuso

- Età

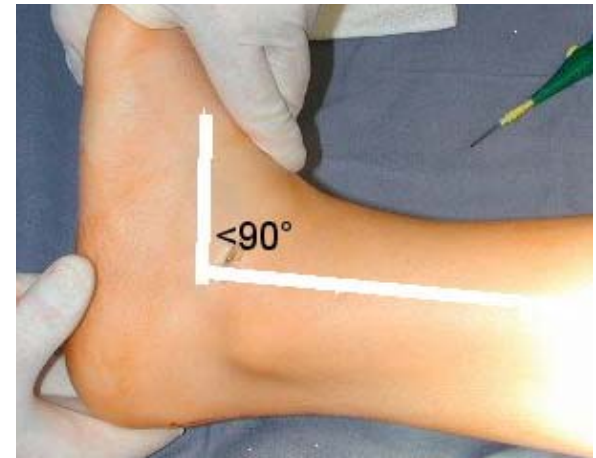
- Tecnica



# Allungamento t. di Achille

## Quando allungare ?

- Quando la flessione dorsale non raggiunge i 90° dopo aver corretto il retropiede



## Quale tecnica ?

- Percutanea





# Grazie per l'attenzione

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**Grazie per  
l'attenzione**

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2 GENOVA  
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6



XXIX Congresso Nazionale

**S.I.M.C.P.**

Società Italiana Medicina  
e Chirurgia del Piede



Genova, 11-13 maggio 2006



**2** **GENOVA**  
**F** **FOOT** **6**