Achilles tendon ruptures

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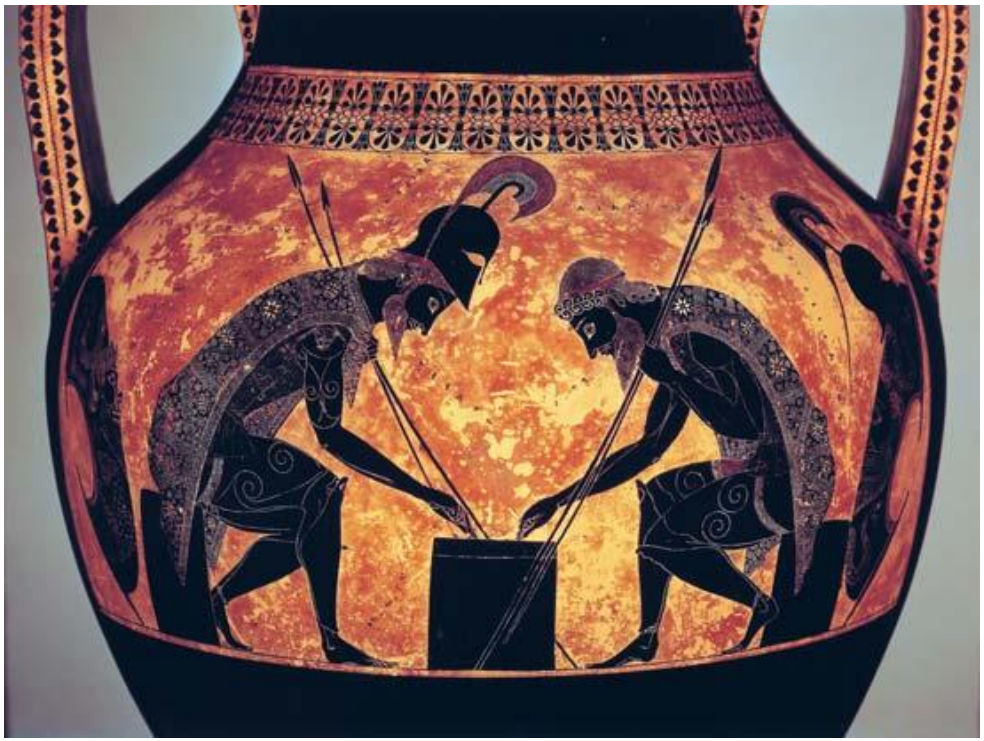
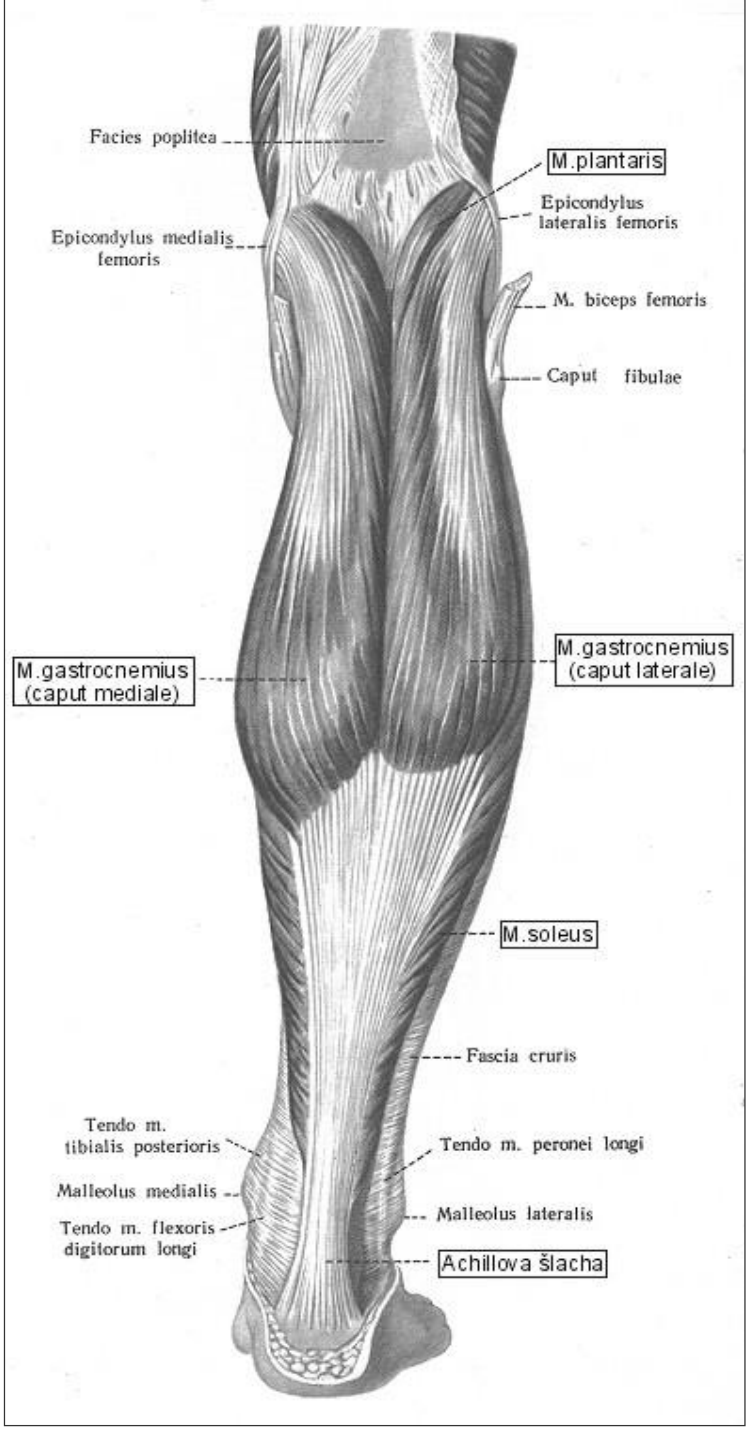


Achilles tendon

- Tendon of m. triceps surae (m. gastrocnemius, m. soleus)
- Proximal part of tuber calcanei
- Subcutaneous, visible


Gastrocnemius muscle
Soleus muscle
Achilles tendon


Facies poplitea
M.plantaris
Epicondylus lateralis femoris
Epicondylus medialis femoris
M. biceps femoris
Caput fibulae
M.gastrocnemius (caput mediale)
M.gastrocnemius (caput laterale)
M.soleus
Fascia cruris
Tendo m. tibialis posterioris
Tendo m. peronei longi
Malleolus medialis
Malleolus lateralis
Tendo m. flexoris digitorum longi
Achillova šlacha

Achilles tendon ruptures

- spontaneous x traumatic
- partial x total

Spontaneous rupture

- Rare (incidence 0,7 / 100 000)
- During minimal stress (normal gait)

Spontaneous rupture

- patologically changed tendon
  - local or systemic (p.o.) longtime use of corticosteroids
  - Longtime use of fluorochinolons
  - genetic predispozition (abnormality of collagen)
  - autoimmune diseases
  - repeated microtraumatisation

Traumatic rupture

- More frequent (incidence 7 / 100 000)
- During sports – sudden spring (take-off) or stop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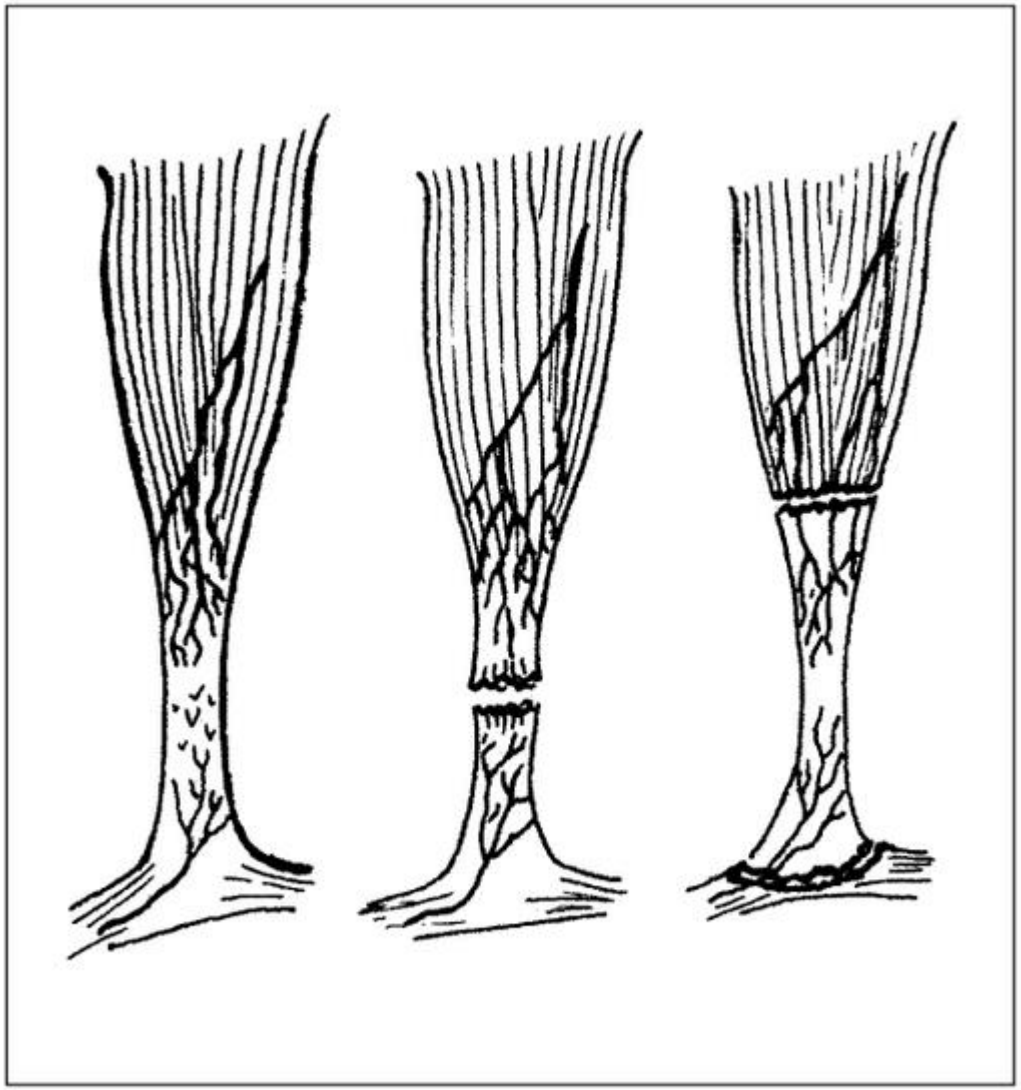
Traumatic rupture

- Higher age – wrong step + rugged ground

Predisposition of rupture

- 90% 2-6 cm above insertion – the worst blood supply of tendon
- Less than 3% up to 2 cm above insertion
- Other cases - musculo-tendineous junction or tear at insertion

Predisposition of rupture



Diagnostics - anamnesis

- risk factors, mechanism of injury

- Typical symptoms:
  - Sudden pain
  - Weakness of affected extremity, in some cases with fall
  - Feeling of sudden tendon rupture
  - Sometimes hearable phenomenon

Diagnostics – clinical picture

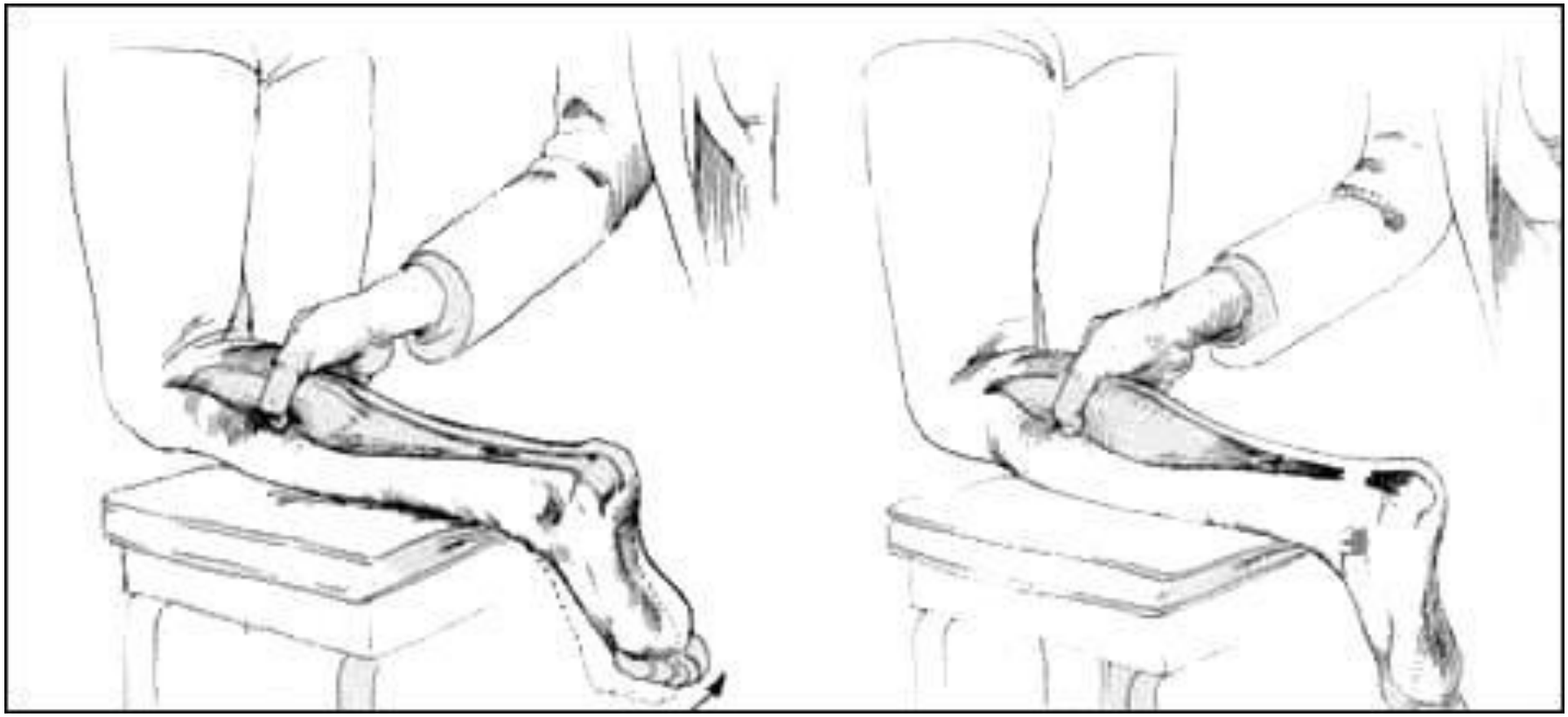
- pain
- swelling
- Palpable defect of tendon
- Visible hematoma around malleoli
- Weakness and limited plantiflexion

Diagnostics

Tests

- Thompson test
  - Prone position (or on knees)
  - Legs hanging over bed margin
  - Compression of m. gastrocnemius causes plantiflexion in normal tendon
  - In case of rupture of Achilles tendon plantiflexion is not possible – positive test

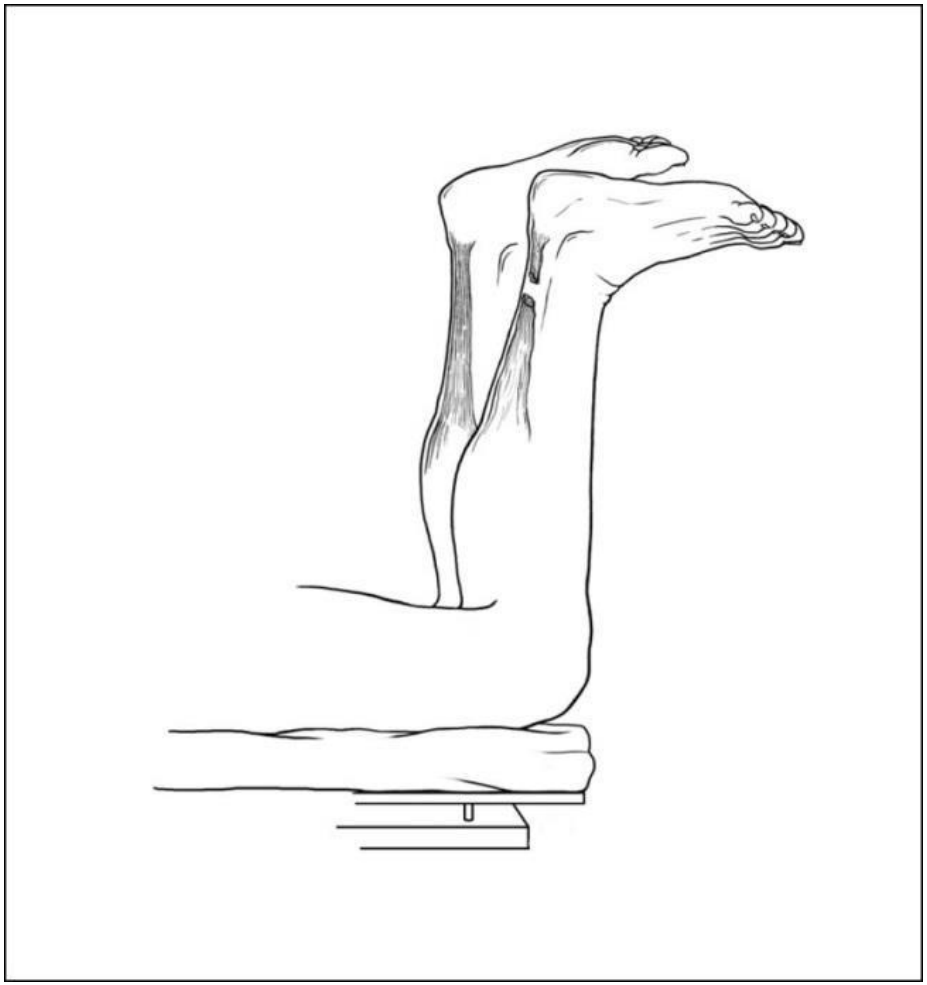
Thompson test



Clinical tests

- Matles test
  - Prone position
  - Call to active knee flexion up to 90°
  - Normal tendon –shortening of m. gastrocnemius causes leg plantiflexion
  - In case of rupture – no motion or slight dorsiflexion

Matles test



Imaging methods

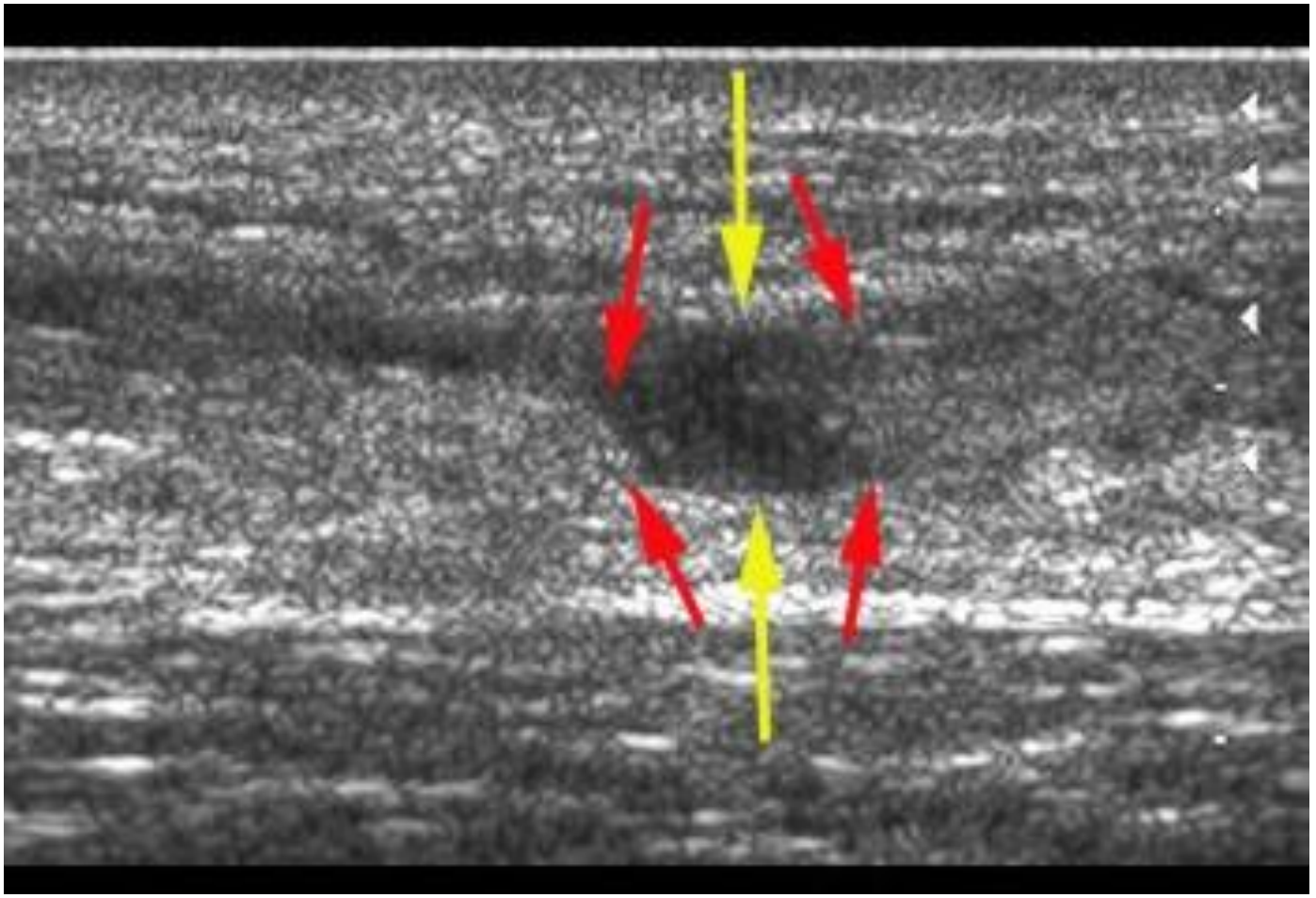
- Exclusion of bone defect
- Confirmation of unclear cases
- Standard – lateral X-ray + sonography, in unclear cases MRI

Imaging methods – X-ray

physiological

rupture

ultrasonography



MRI

Tx

Conservative X Surgical

Conservative x surgical tx

- partial rupture – conservative tx
- complete rupture – preference of surgery

- existence of conservative schools

- conservative tx in pts with contraindication of surgery

conservative x surgical tx

- Recurrent ruptures (Khan a spol.)
  - 13% in conservative tx
  - 3,5% in surgical tx
- Complications with wound healing, up to20% (Arner a Lindholm, Inglis)
- Pts satisfaction (Kellam a spol.)
  - 66% in conservative tx
  - 93% in surgical tx

Conservative tx

- classic method
  - High plaster of Paris bandage - ankle plantiflexion + knee semiflexion for 6-8 weeks (Lea a Smith, Inglis, Jacobs, Garden et al.)
  - Risk of ankle contractures due to long term fixation in maximum plantiflexion

Conservative tx

- Fowler protocol with early functional tx – for 2 weeks fix in plantiflexion, then 4 weeks splin with adding of 10 deg. of dorsiflexion per week, after 8 weeks loading (McComis a spol.)

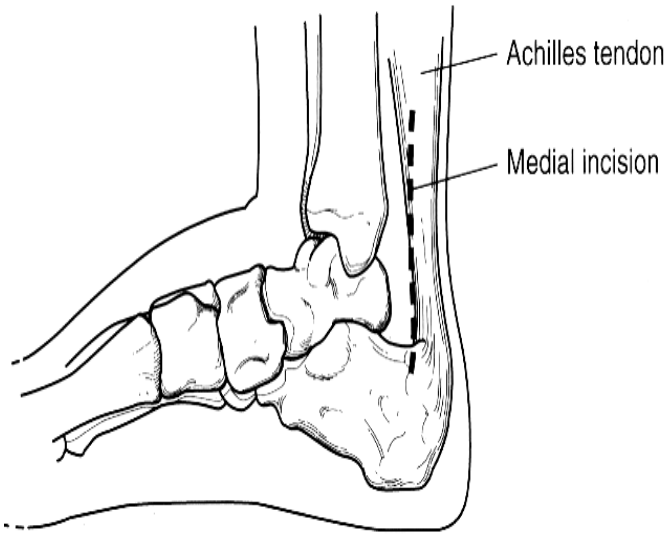
Surgery

- Acute rupture
  - open suture
  - miniinvasive suture
  - endoscopically assisted percutanneous suture

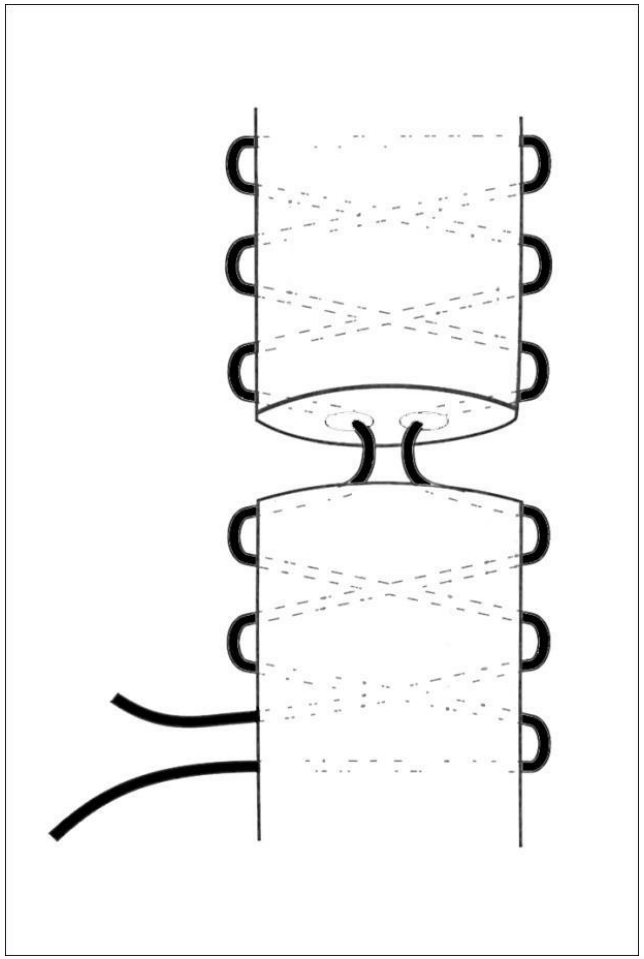
- Extensive or old, chronic rupture
  - static plasty
  - dynamic plasty

Open suture

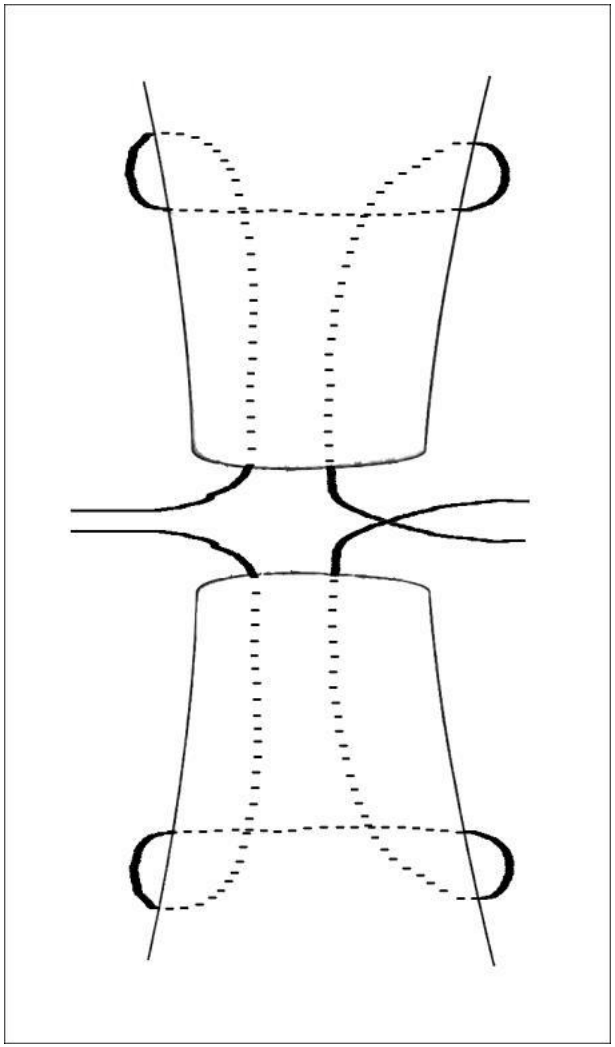
- Posteromedial approach – direct visualisation of rupture
- Many different techniques
- of suture



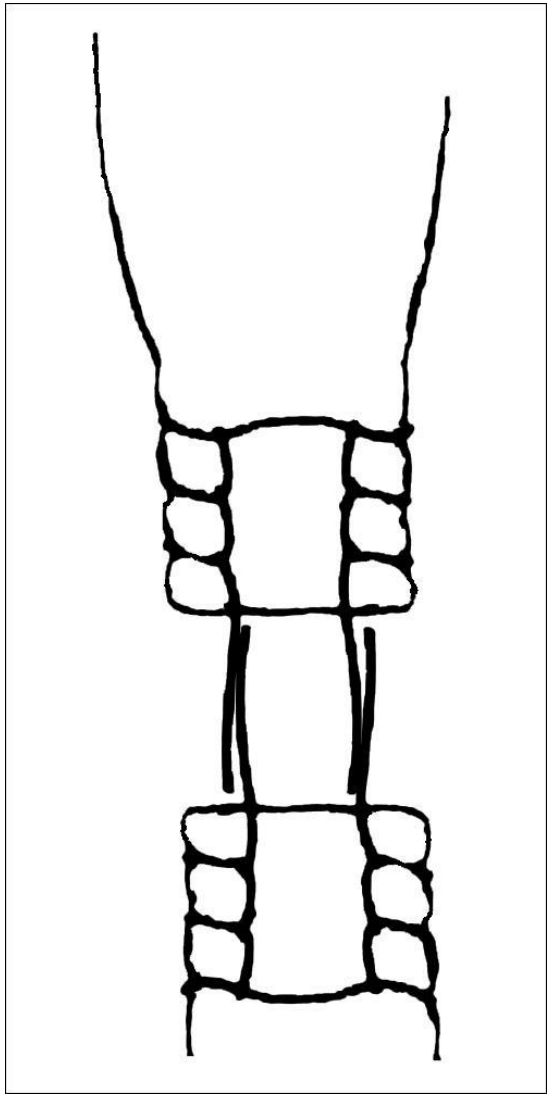
Bunnell



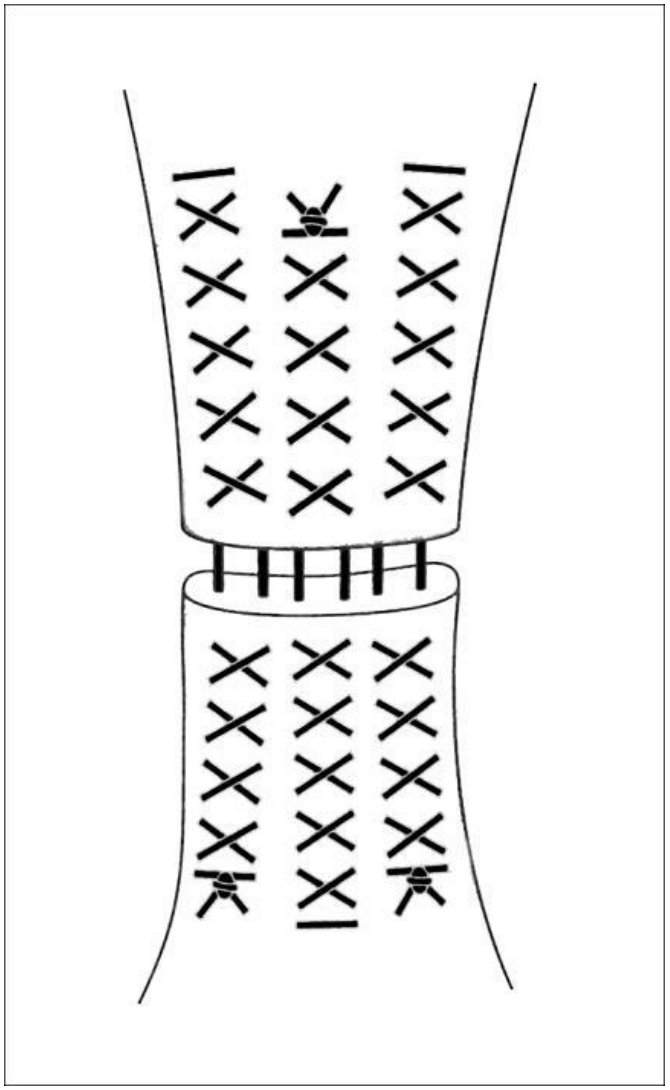
Kessler



Krackow



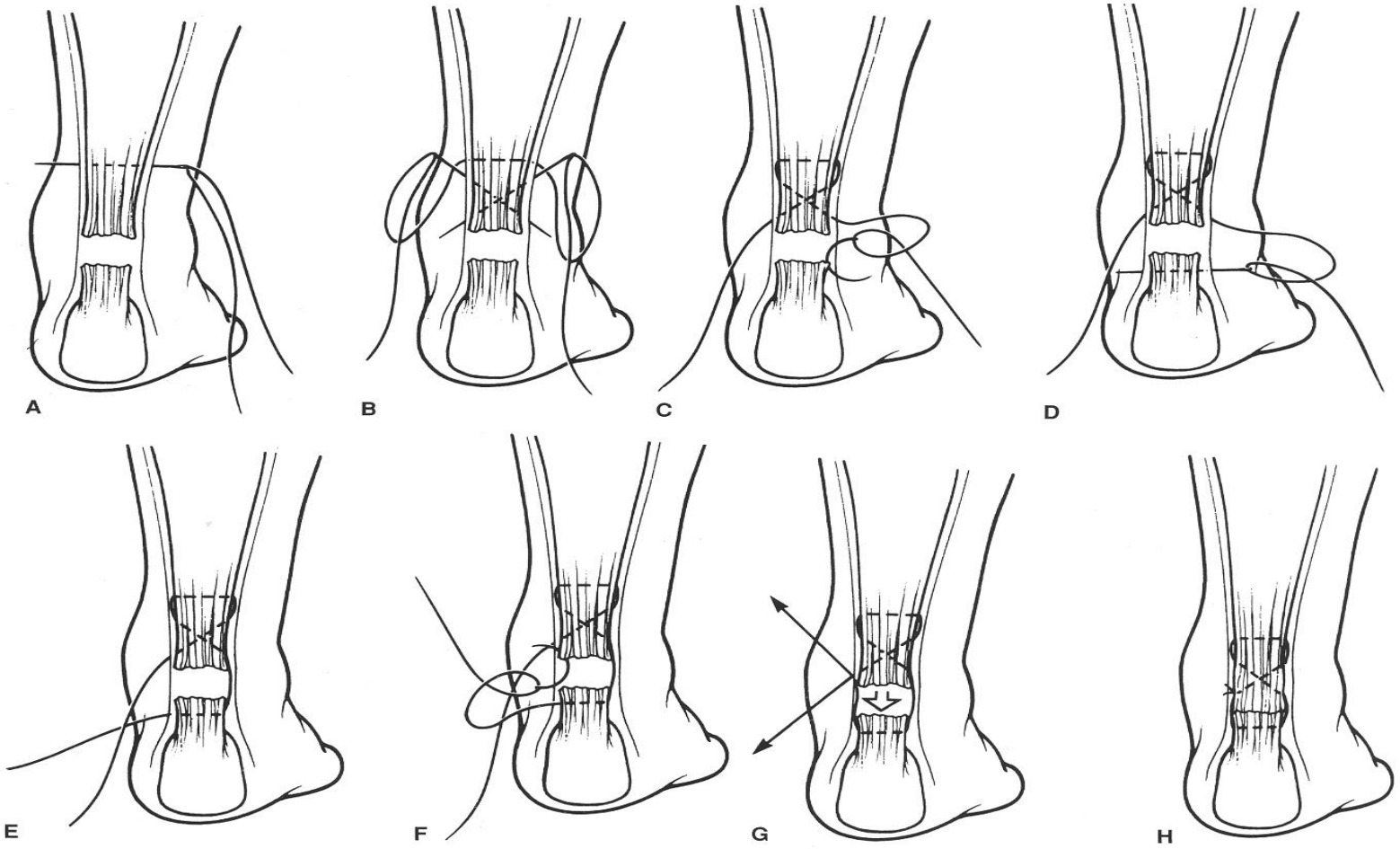
Tripple bundle



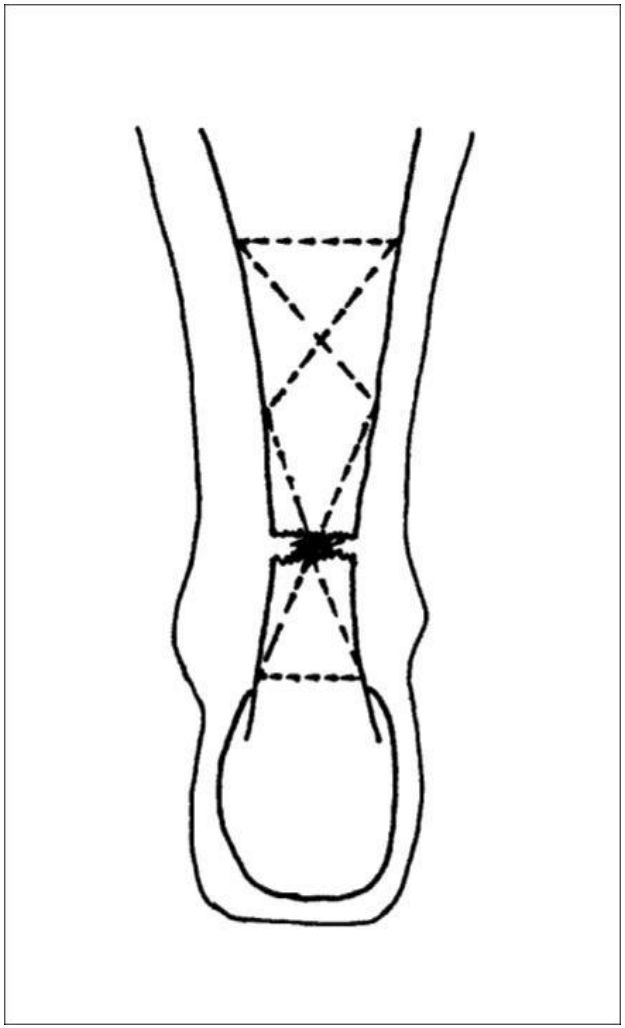
Miniinvasive suture

- To decrease complications
- Percutaneous

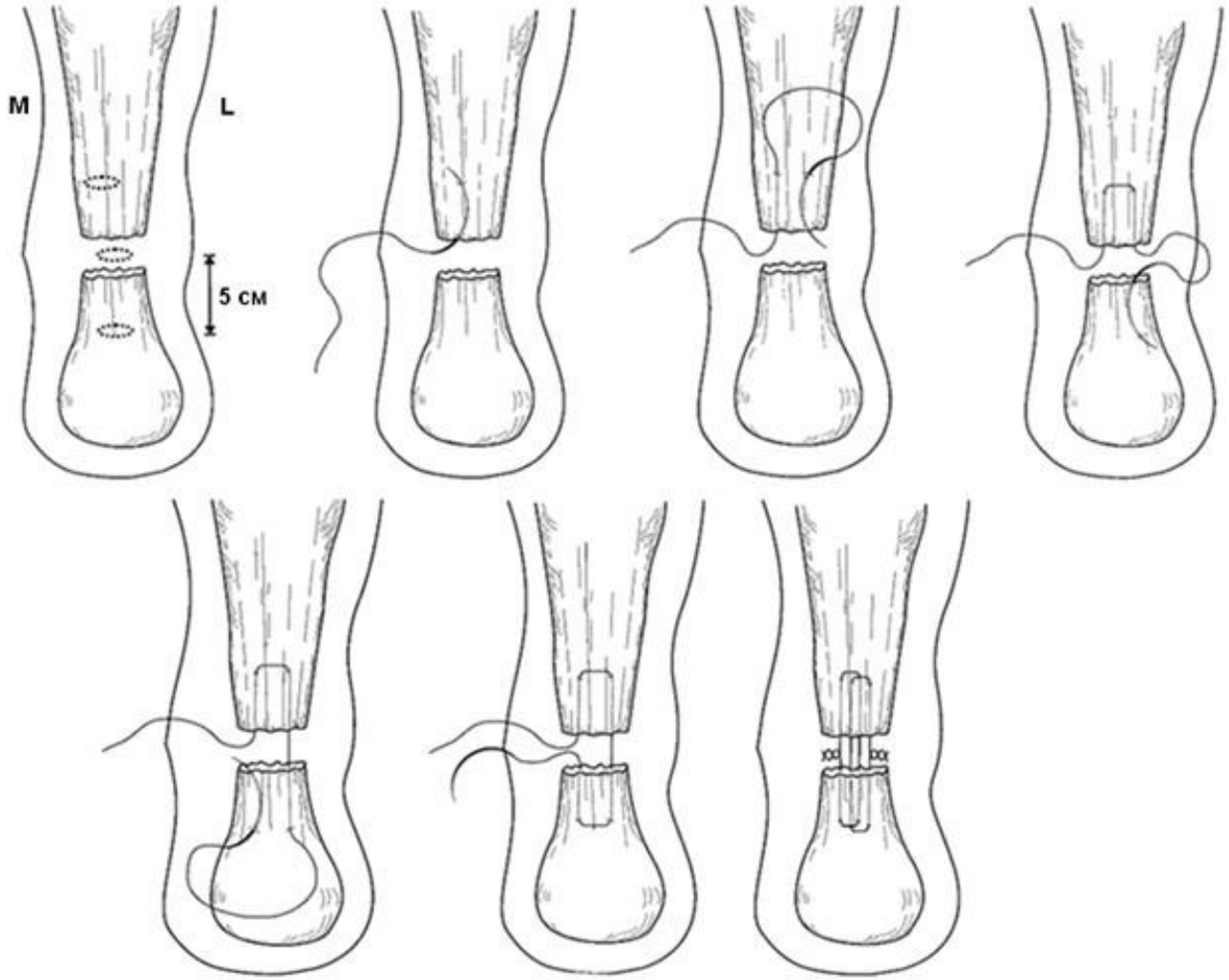
Ma a Griffith



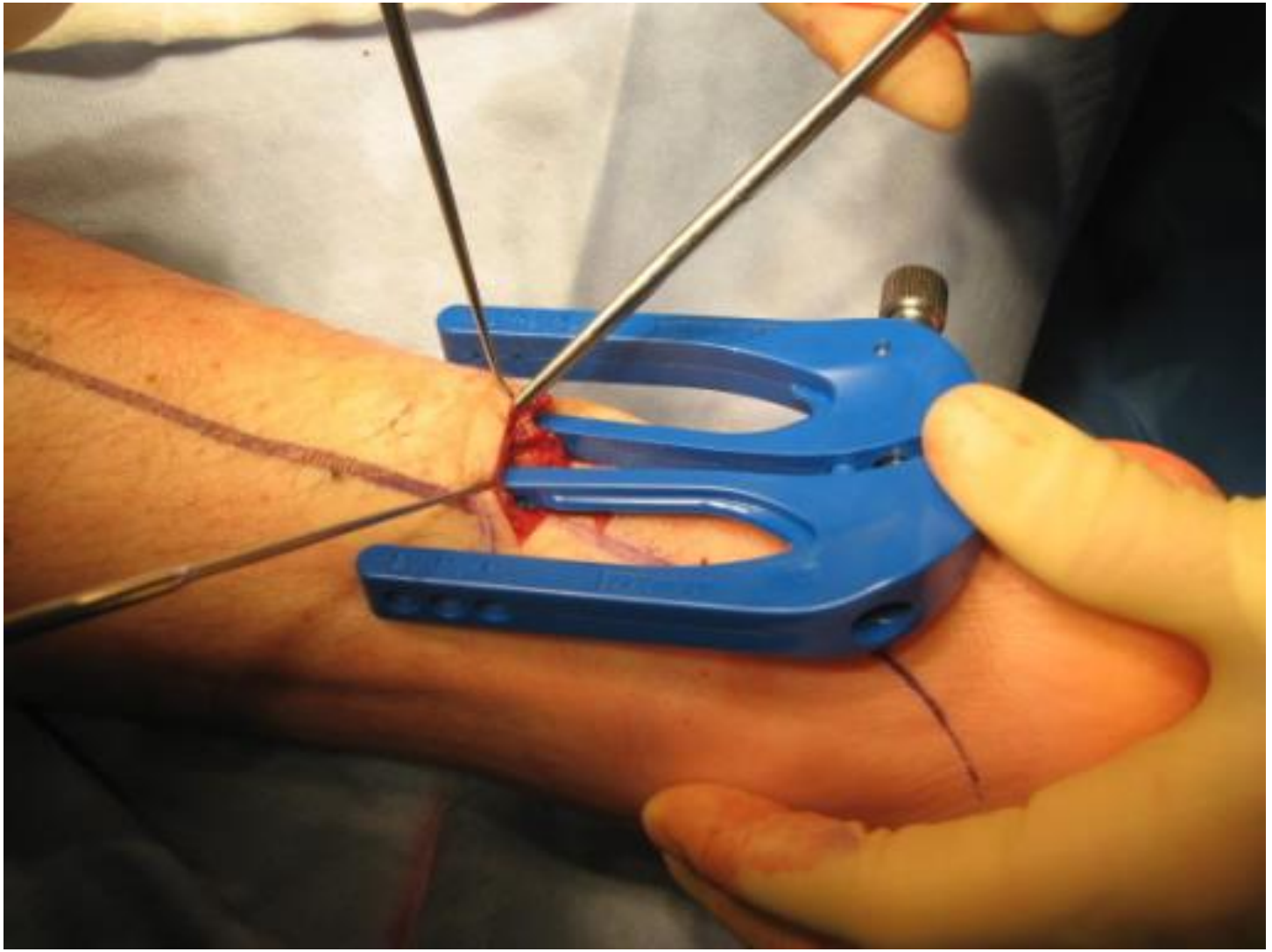
Carmont a Maffulli



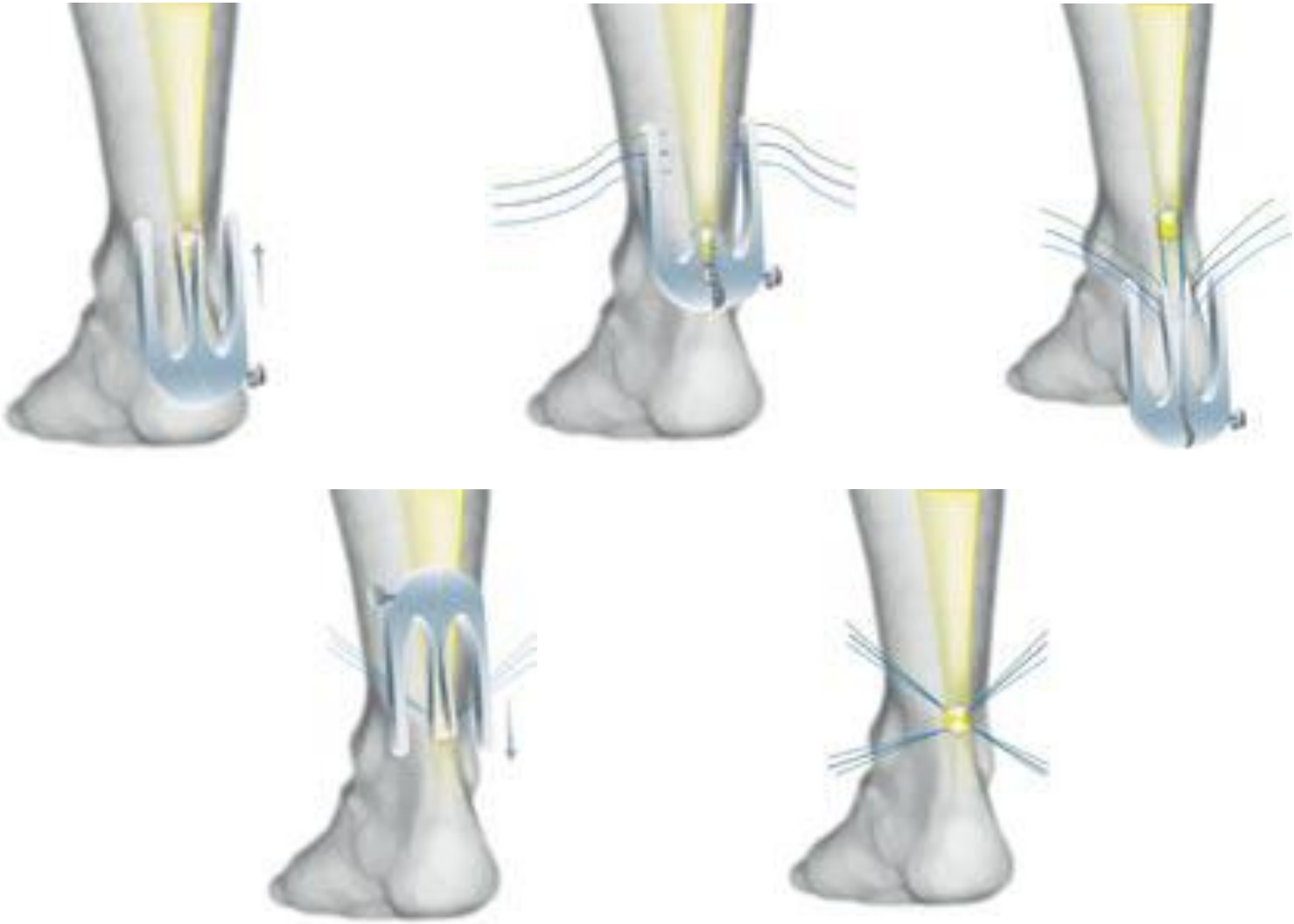
Webb a Bannister



Achillon system



Achillon system



Endoscopically assisted percutanneous suture

- enables
  - Evaluation of tendon ends
  - debridement + mobilisation of tendon
  - Check of needle insertion
  - Check of approximation of tendon ends during tightening

Plasties of Achilles tendon

- Tendon strengthening in injuries with significant tendon defect or old injuries with retraction of tendon ends

Plasties of Achilles tendon

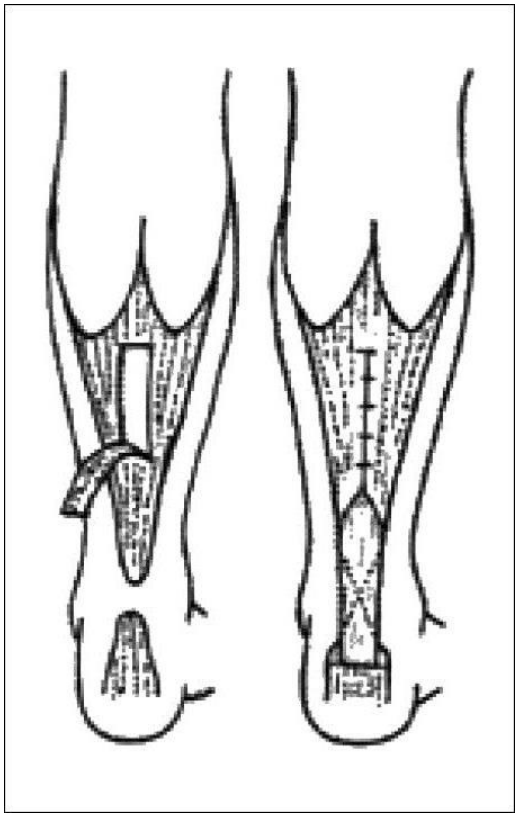
- static – without support of other muscles (fascia m. gastrocnemius, tendon or fascial graft)

- dynamic – muscle transfer with muscle function and blood supply

Static plasties

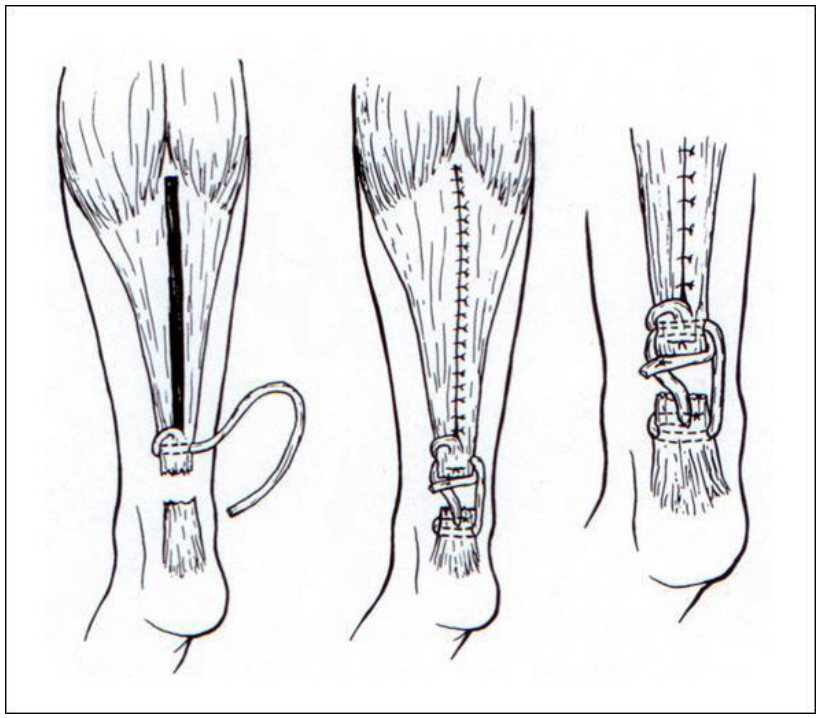
Silfverskiöld

- Turn over of strip of central part fascia m. gastrocnemius



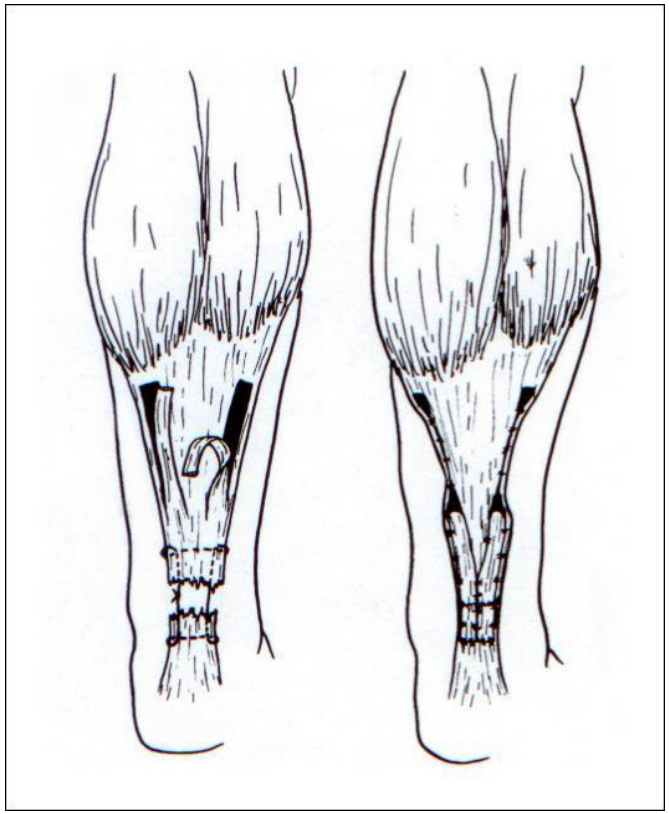
Bosworth

- Long thin strip from central part of fascia m. gastrocnemius with specific anchoring of graft to distal tendon and calcaneus

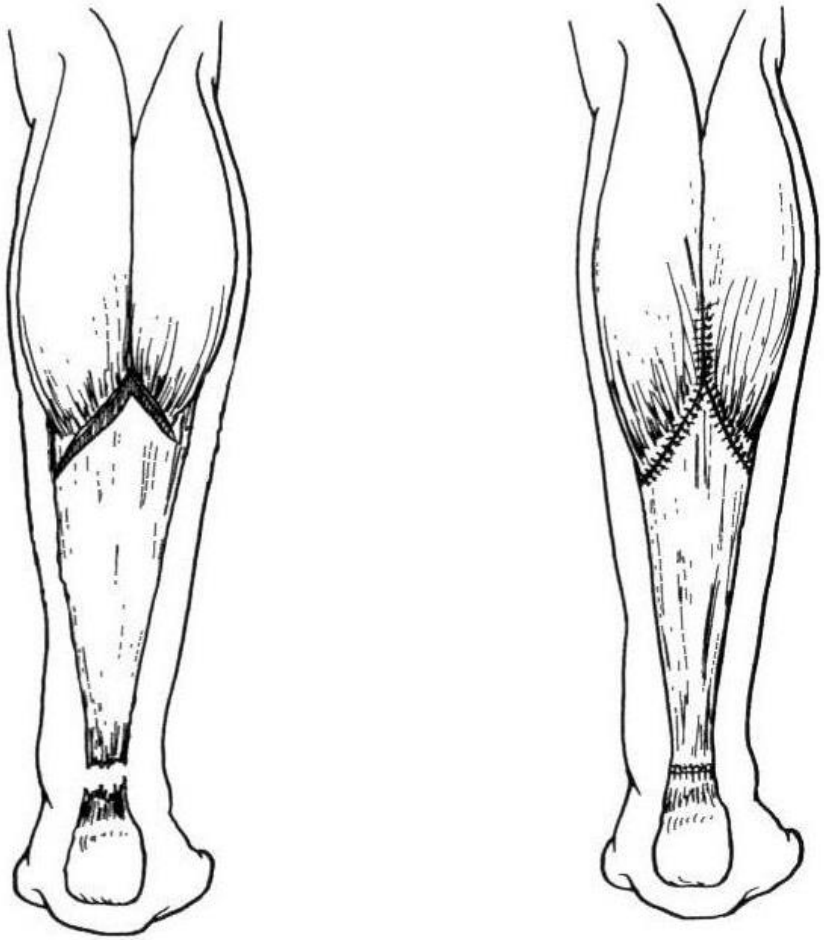


Lindholm

- Two strips from medial and lateral part of fascia of m. gastrocnemius

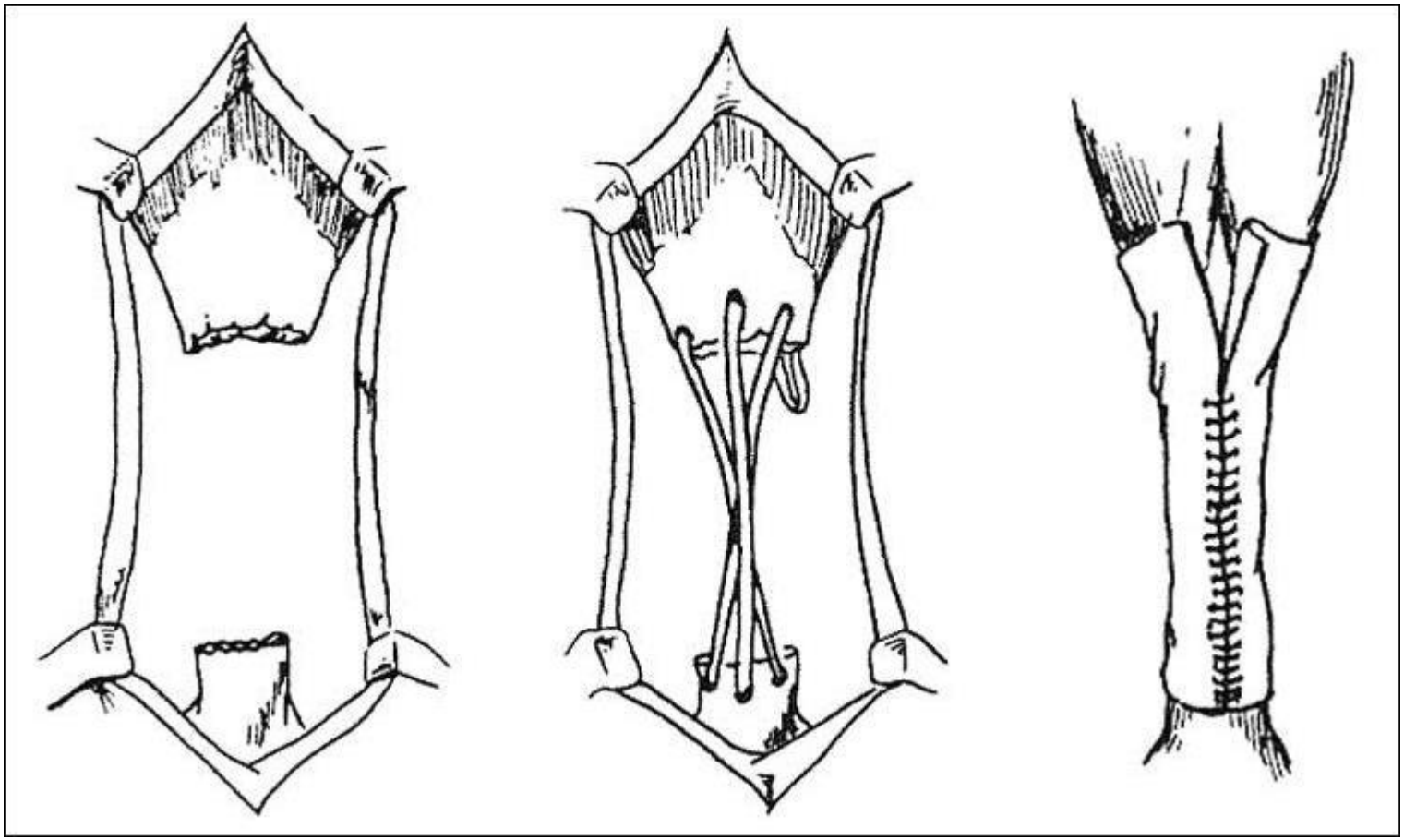


VY plasty (Abraham a Pankovich)



Bugg a Boyd

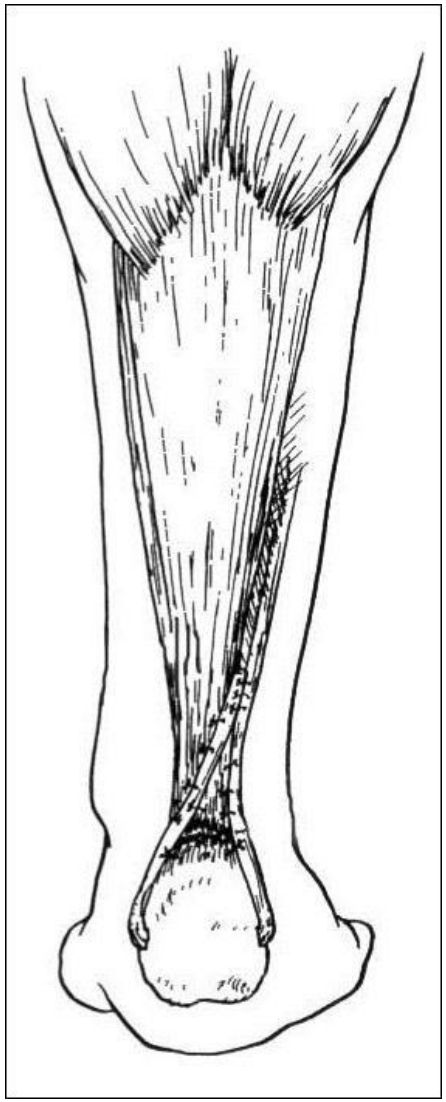
- Strips of fascia lata



Dynamic plasties

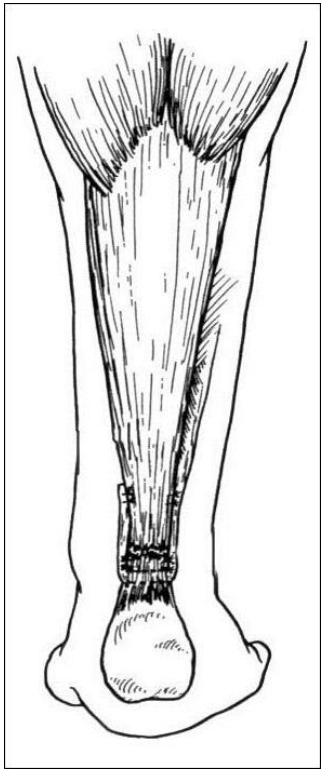
Teuffer

- transfer of musculus peroneus brevis tendon, která se po uvolnění od úponu na bazi V. MTT provleče tunelem do calcanea a fixuje proximálně



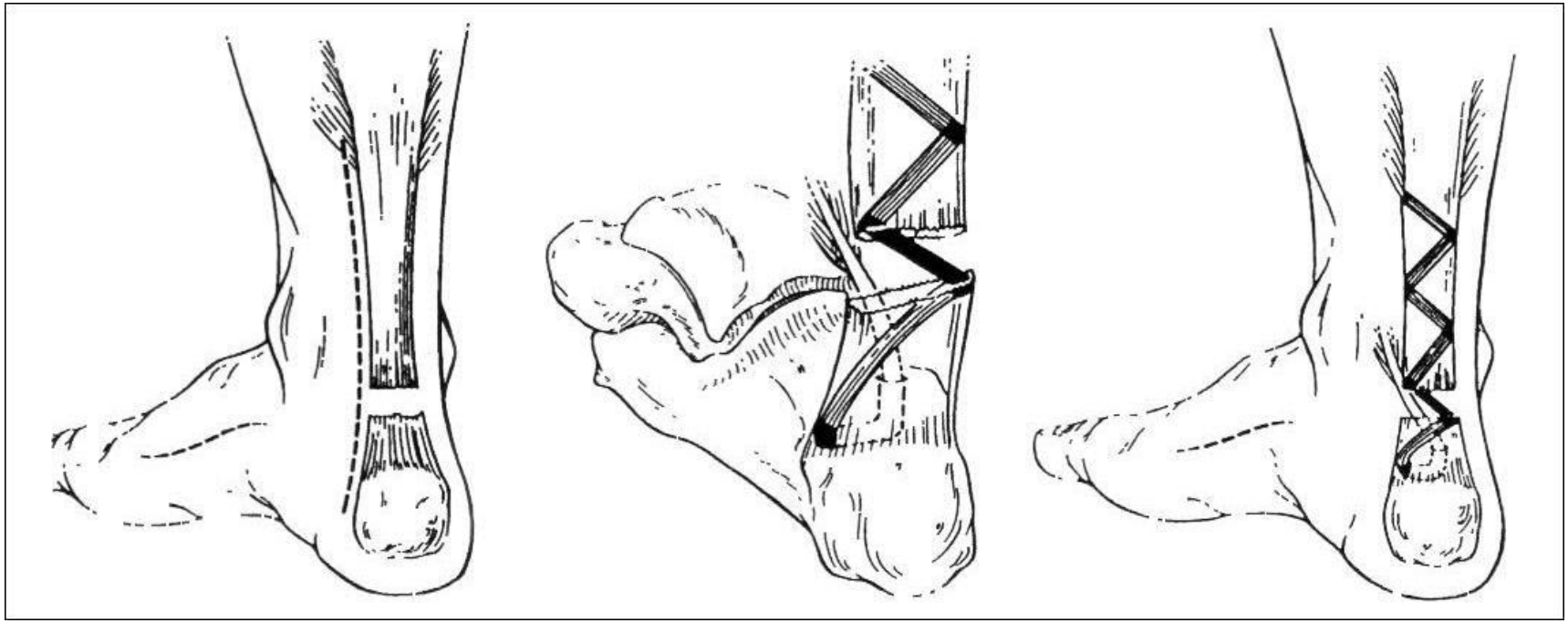
Modification after Turco a Spinella

- Different anchoring – provlečení přes tunel v distálním pahýlu bez vrtání kanálu do calcanea



Wapner

- transfer of flexor hallucis longus (FHL) tendon k přemostění defektu, fixace přes kostní kanál do calcanea a distálního pahýlu



Aftertreatment

Indication of techniques

- Many different schemes

Indication scheme Kuwada

- Defekt parciální : konzervativní terapie fixací
- Defekt do 3 cm : end to end sutura
- Defekt 3 – 6 cm : překlopení části fascie „flap“ musculus gastrocnemius, případně syntetická náhrada
- Defekt víc než 6 cm : „VY“ plastika fascie musculus gastrocnemius, doplnění o volný šlachový štěp, nebo syntetickou náhradu

Indication scheme Myerson

- Defekt 1 – 2 cm : end to end sutura, fasciotomie zadního kompartmentu
- Defekt 2 – 5 cm : „VY“ plastika fascie musculus gastrocnemius, příležitostně šlachový transfer
- Defekt víc než 5 cm : šlachový transfer, případně kombinace s překlopením části fascie „flap“ musculus gastrocnemius

Indication scheme Den Hartog

- Defekt méně než 2 cm : end to end sutura
- Defekt 2 - 5 cm : transfer šlachy FHL a „VY“ plastika fascie musculus gastrocnemius
- Defekt víc než 5 cm : transfer šlachy FHL a překlopení části fascie „flap“ musculus gastrocnemius
- Defekt víc 10 cm : transfer šlachy FHL, allograft Achillovy šlachy

Komplikace operační terapie

Aftertreatment

- In early postoperative period – wound care, positioning, elevation, ice, prevention of TED

Aftertreatment

- classic:
  - fixace sádrovou dlahou z dorzální strany v plantiflexi hlezna a semiflexi kolena na 3 týdny
  - po 3 týdnech zkrácení sádry pod koleno a zmenšení plantiflexe v hleznu
  - celková doba fixace dle perioperačního nálezu 6-8 týdnů
- alternative
  - mezi 2.-6. týdnem naložení CAM Walker boot

Aftertreatment

- 1.-6. week – analgetics, wound massage, kryotherapy
- 6.-12. week – early mobilisation - USG check, isometric a isotonic exercises, gradual loading, gait with crutches
- 12.-20. week – early strengthening – physiotherapy, extent of motion, balance training, heel lifting

Shrnutí

Zdroje


Dang! He found my
Achilles heel.
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