

REALIGNMENT OF THE HINDFOOT

ORTHOPAEDICA BELGICA
2010

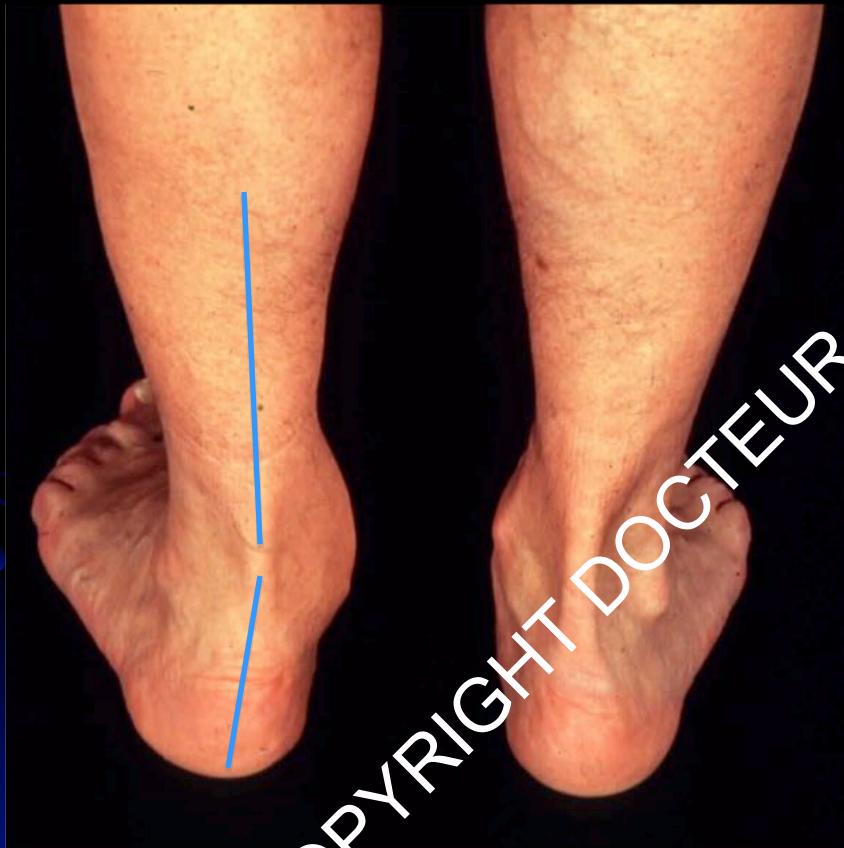
COPYRIGHT DOCTEUR JACQUES DE HALLEUX

Dr J de Halleux

RBSR-BFAS, 19-05-2010

MALALIGNMENT OF THE HINDEFOOT

VALGUS



VARUS



COPYRIGHT DOCTEUR JACQUES DE HALLEUX

VALGUS

- Supple painfree PPV (*idiopathic*)
- Rigid painful PPV (*synostosis*)
- Acquired PPV

*malunion after calcaneum fracture
tibialis posterior insuffisency*

COPYRIGHT DR. J. P. QUESDE HALLEUX

PES PLANO VALGUS

Calcaneum
Subtalar joint
Talus
T-N and N-C
Midtarsal joints

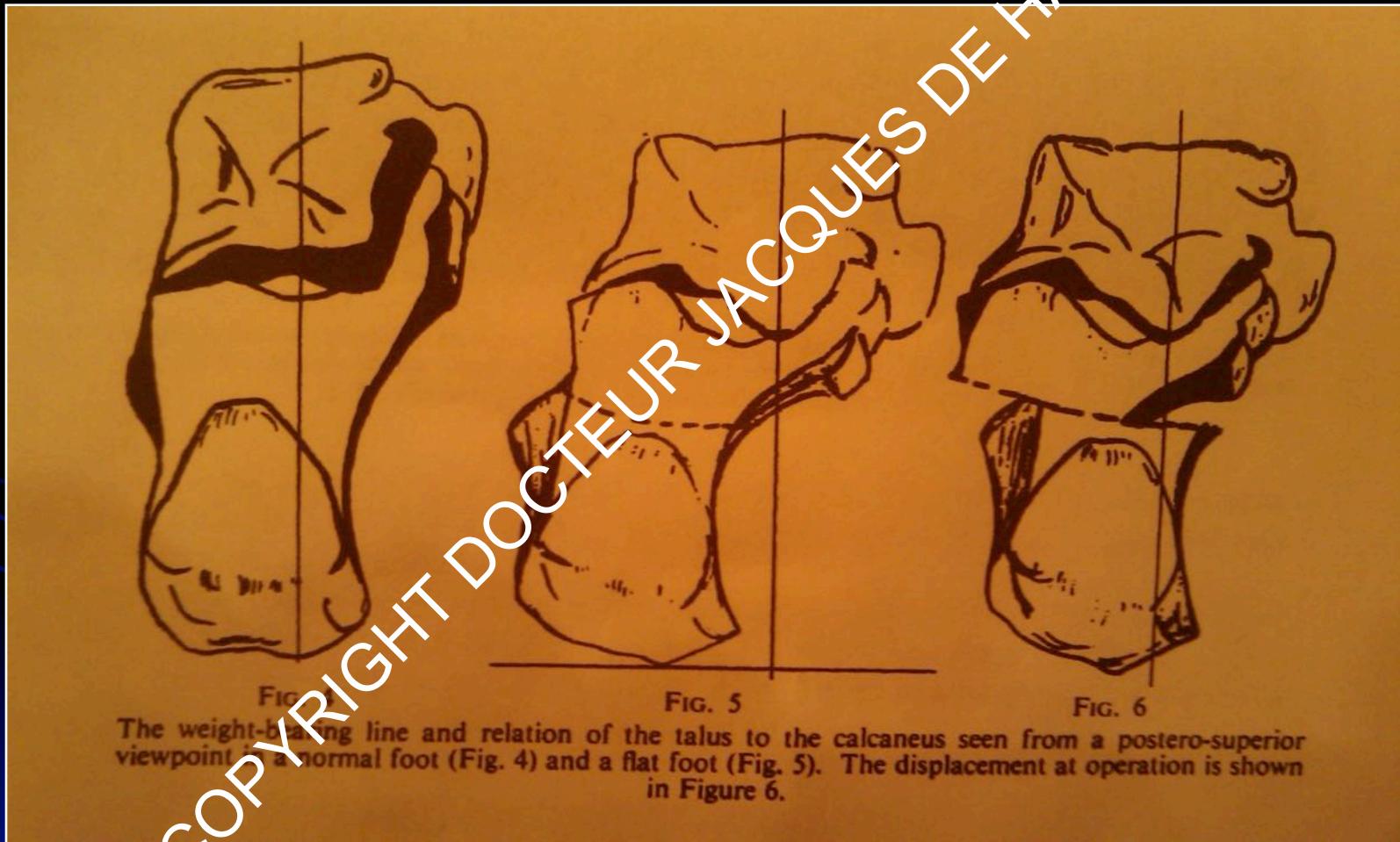
valgus
tilted medially
medialy and down
subluxation
Abduction

valgus hindfoot

Achilles tendon = evertor

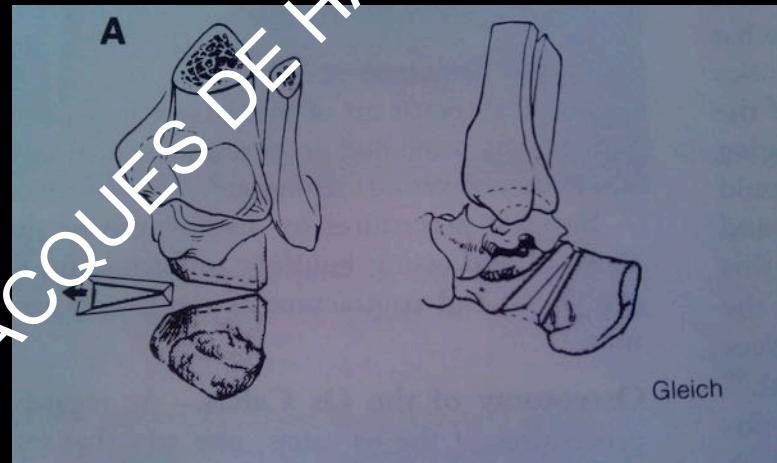
COPYRIGHT DOCTEUR JACQUES DE HALLEUX

Line of weight-bearing transmitted through the talus = medial to the calcaneus



CALCANEAL OSTEOTOMY FOR FLAT FOOT

- Medial closing wedge
(1893 Gleich)
- Lateral opening wedge
(1923 Lord; 1967 Silver)



CALCANEAL OSTEOTOMY FOR FLAT FOOT

- 1971 : medial translation of the posterior fragment
(Koutsogiannis, JSS, febr 1971)



COPYRIGHT DOCTEUR JACQUES DE HALLEUX

Surgical technique Koutsogiannis osteotomy

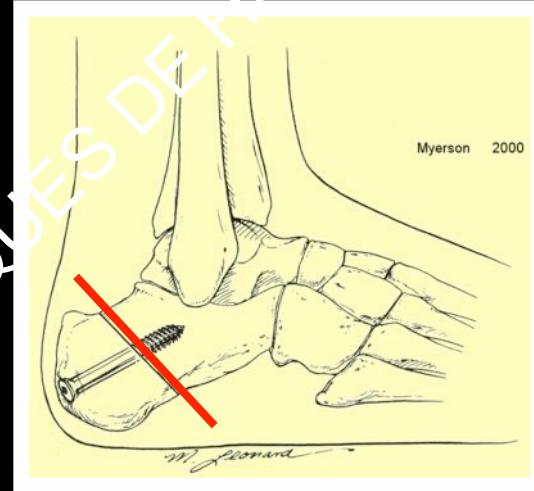
- Lateral incision (*parallel and behind peroneal tendon*)
sural nerve!



COPYRIGHT DOCTEUR JACQUES DE HALLEUX

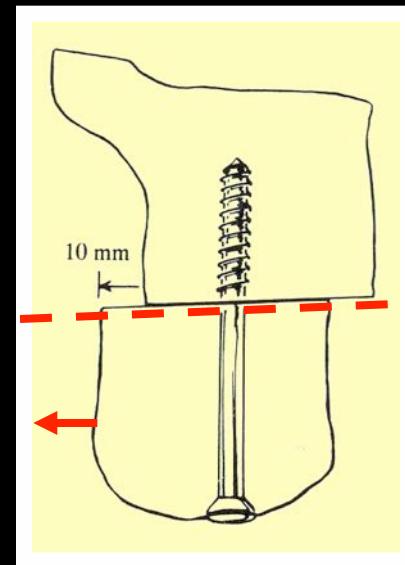
Surgical technique Koutsogiannis osteotomy

- Incision periostum parallel to the incision

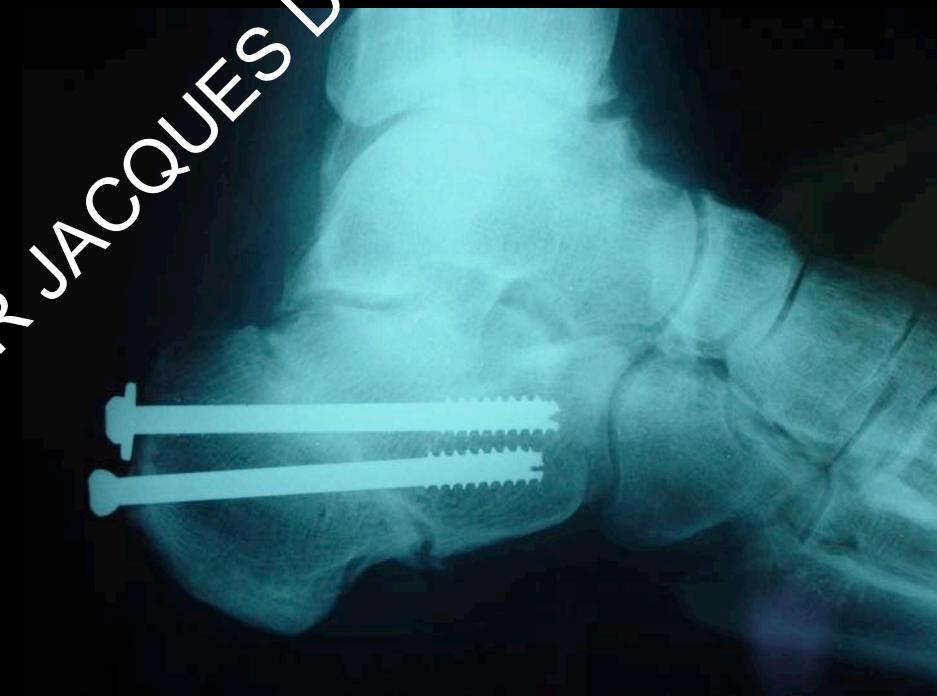
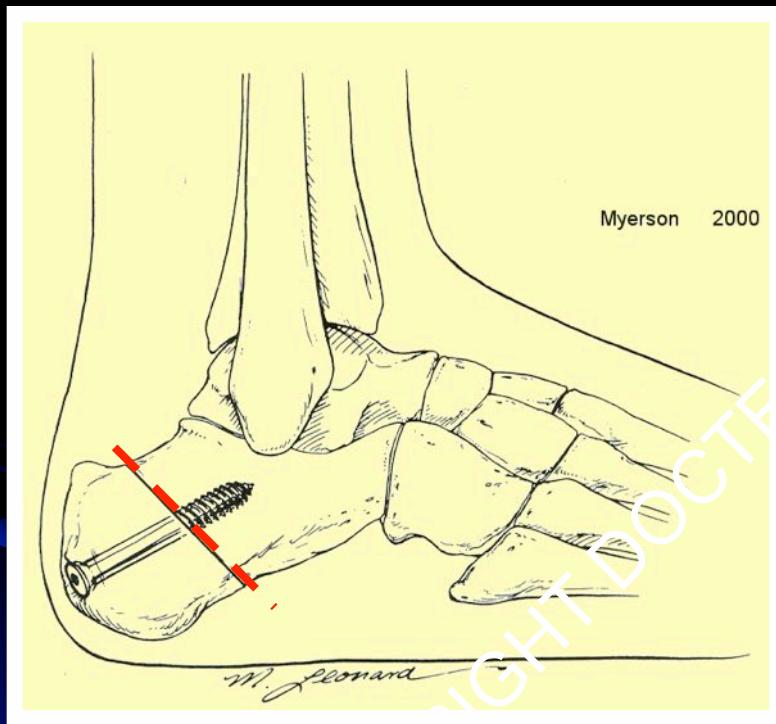


Surgical technique Koutsogiannis osteotomy

- MEDIAL
TRANSLATION
POSTERIOR PART
CALCANEUM ($\frac{1}{3}$ to $\frac{1}{2}$
of the width of the calcaneus, 1 cm)

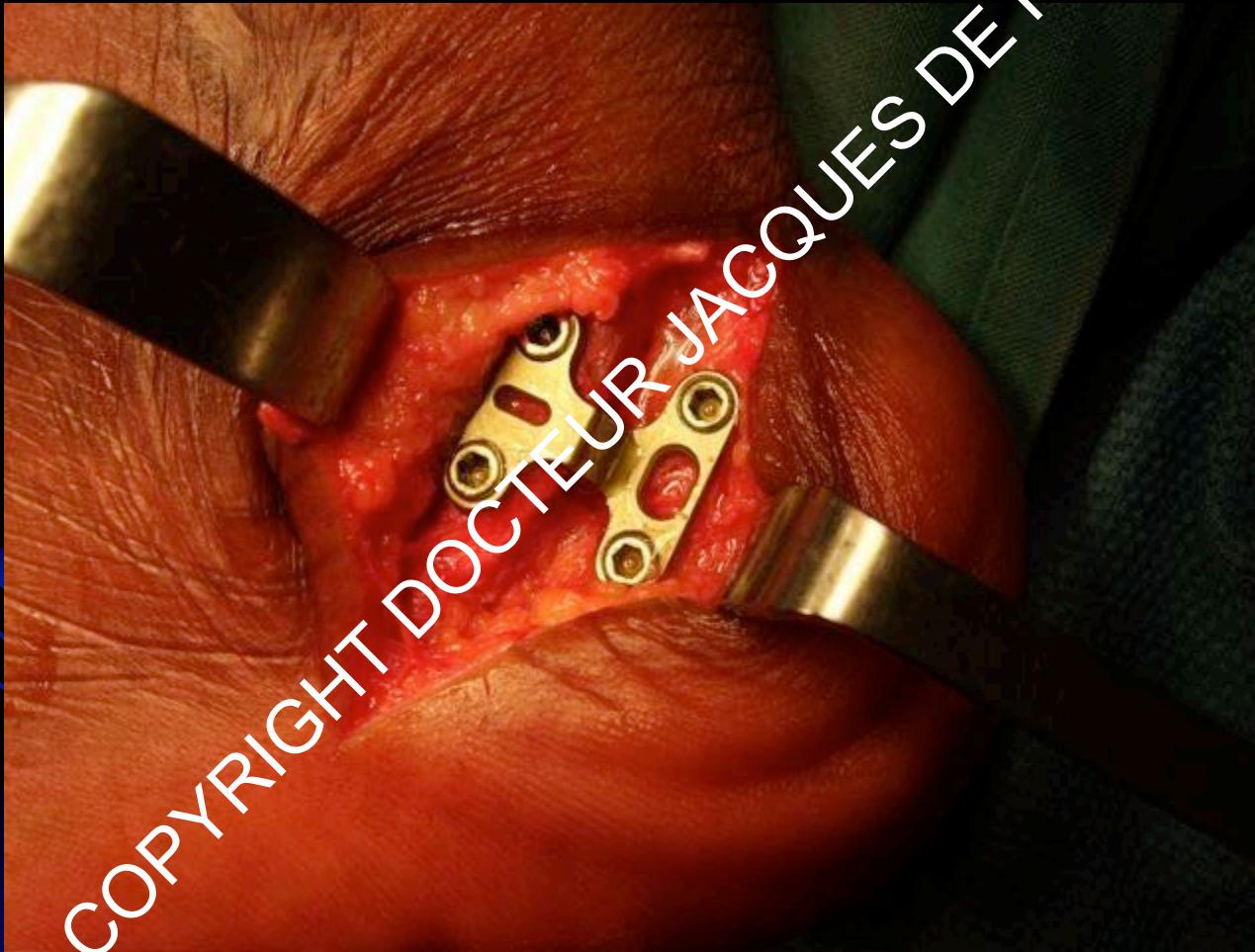


Surgical technique Koutsogiannis osteotomy



COPYRIGHT DOCTEUR JACQUES DE HALLEUX

Surgical technique Koutsogiannis osteotomy



Postoperative care Koutsogiannis osteotomy

- Cast below-knee

- non weight-bearing 4 w
- *weight-bearing* 4 w

COPYRIGHT DOCTEUR JACQUES DE HALLEUX

Results Koutsogiannis osteotomy

- Correction of the valgus and the eversion force of the Achilles tendon
- Medial arch + forefoot abduction: deformation corrected only if no severe flatfoot

Koutsogiannis alone not enough!

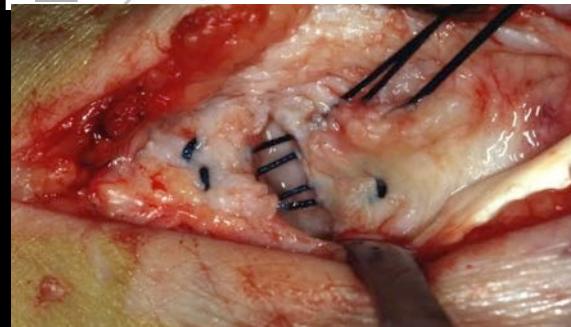
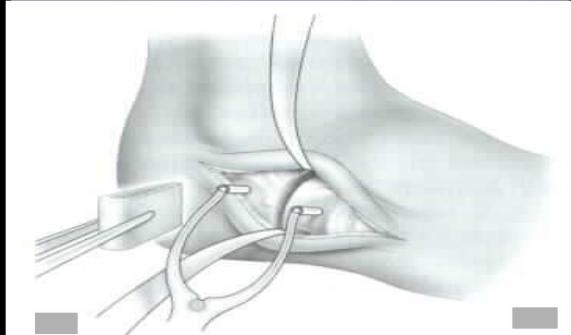
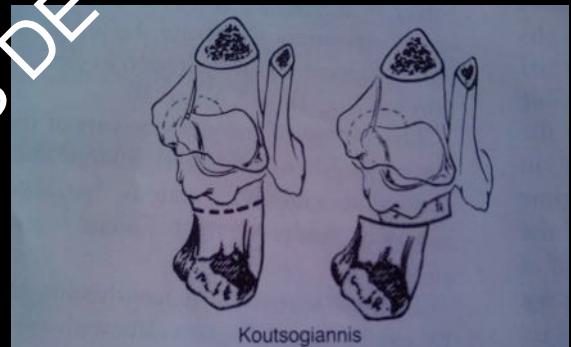


COPYRIGHT © JAKOSS DE HALLEUX

What to do more?

- Valgus hindfoot?
- Forefoot abduction?
- Deltoid Ligament?
- Spring ligament?
- Tibialis posterior?

COPYRIGHT DOCTEUR JACQUES DE HALLEUX



STAGES PPV tibialis posterior dysfunction

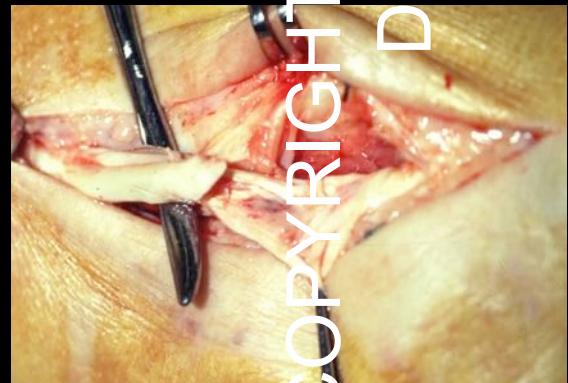
	stage 1	stage 2	stage 3	stage 4
➤ retromalleolar pain	+	++	++	++
➤ hindfoot valgus	(+/-)	++	++	++
➤ arch flattening	(+/-)	++	++	++
➤ forefoot supination	(+/-)	(+)	++	++
➤ forefoot abduction	(+/-)	++	++	++
➤ deformity		supple	rigid	rigid
➤ Ankle pain	-	-	-	++

Posterior Tibial Tendon Dysfunction

Stage 2

- **Supple pes plano valgus**

→ elongation
→ (partial) rupture

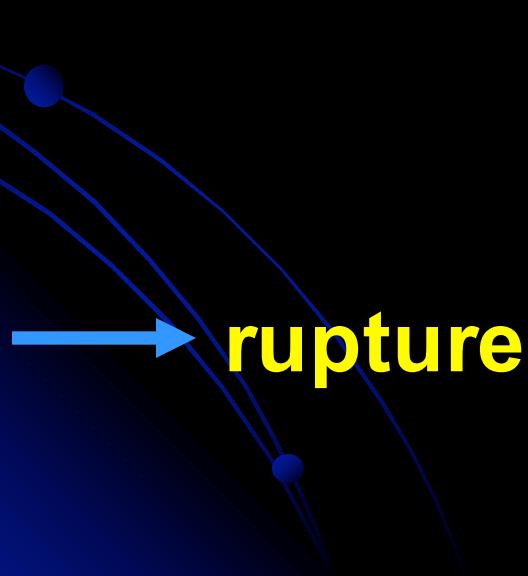


COPYRIGHT DOCTEUR JACQUES DE HALLEUX

Posterior Tibial Tendon Dysfunction

Stage 3

- Rigid pes plano valgus



JACQUES

COPYRIGHT DOCTEUR DE HALLEUX

DE HALLEUX

Posterior Tibial Tendon Dysfunction

Stage 4

- Rigid pes plano valgus
- Lateral ankle pain

rupture
→
ankle arthrosis



COPYRIGHT DOCTEUR JACQUES DE HALLÉ

Posterior Tibial Tendon Dysfunction Treatment

➤ Stage 1



- physiotherapy
- shoe corrections
- medial support

COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

Posterior Tibial Tendon Dysfunction

Treatment

➤ Stage 2 = surgical

- Calcaneal osteotomy
(Koutsogiannis)



COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

Posterior Tibial Tendon Dysfunction

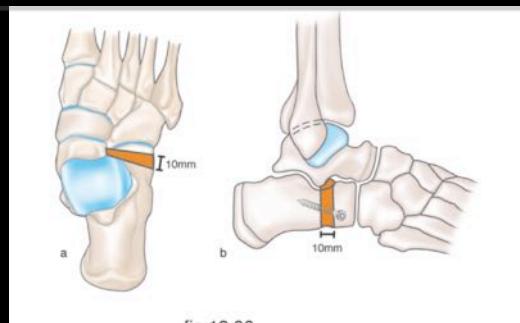
Treatment

➤ Stage 2 = surgical

- **Calcaneal osteotomy**
(Koutsogiannis)
- **lateral column lenghtening**
(Evans)
- **Tendon reconstruction**
(suture, plasty, transfert FHL or FDC,
Cobb)
- **Ligament reconstruction**

COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

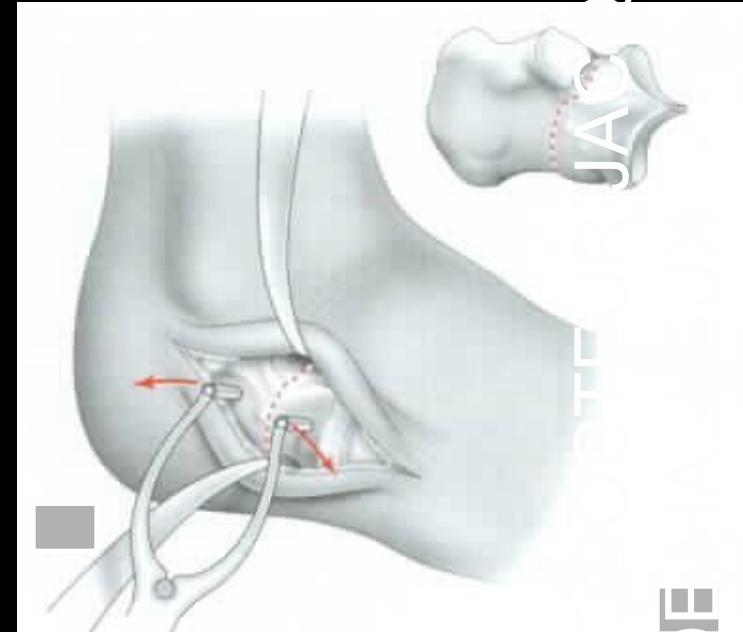
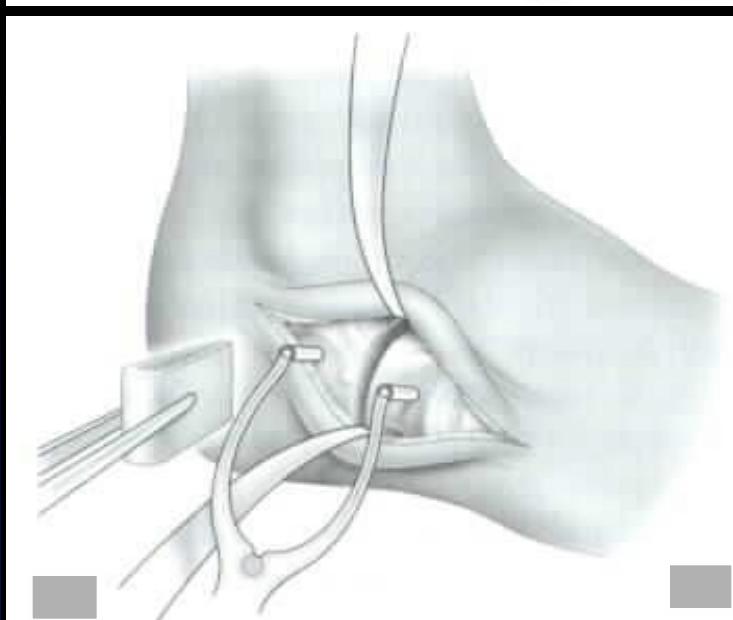
EVANS Osteotomy



picture from: Th Leemrijse, B Valtin, Pathologie du Pied et de la cheville, 2009

COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

Lateral column lengthening calcaneal osteotomy

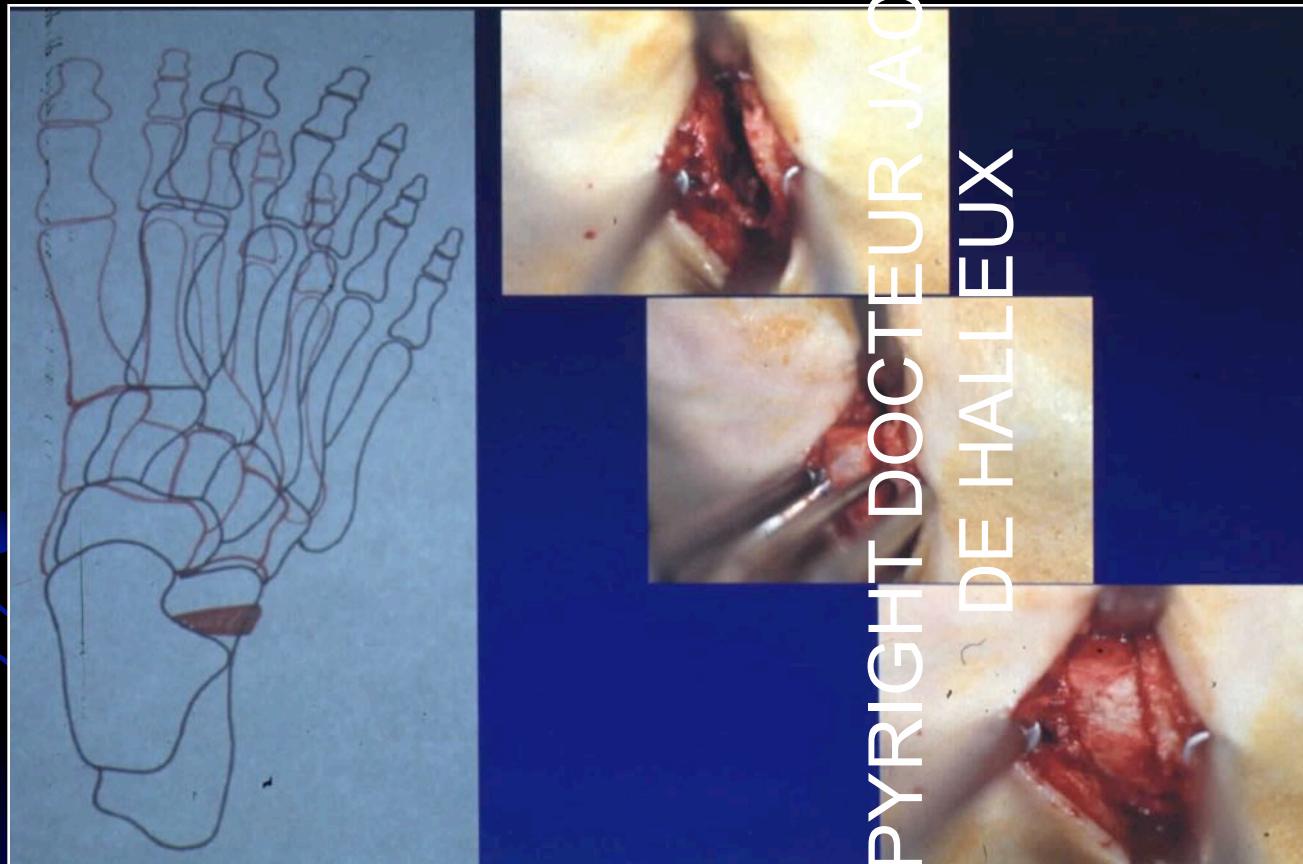


Hintermann B:
*Techniques in Orthopaedics
and Traumatology 2000*

JAMES UES

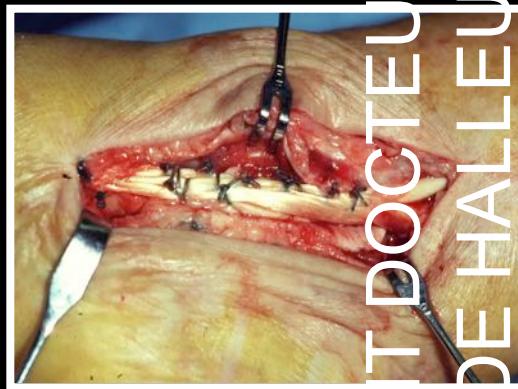
COPYRIGHT DE

Calcaneal osteotomies lateral column lengthening



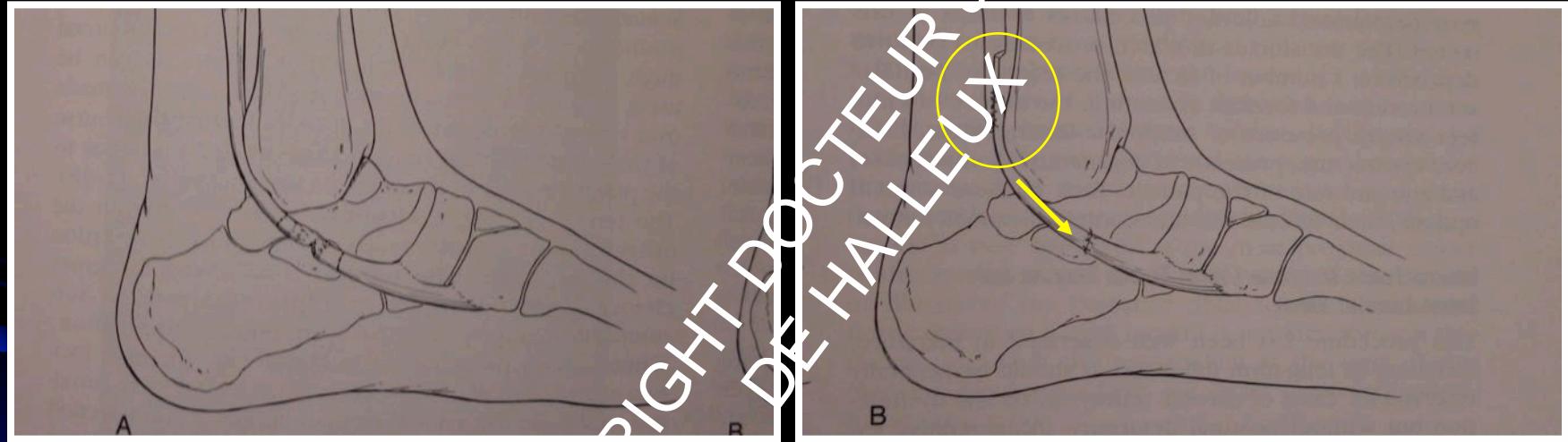
COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

Tendon reconstruction : sutures



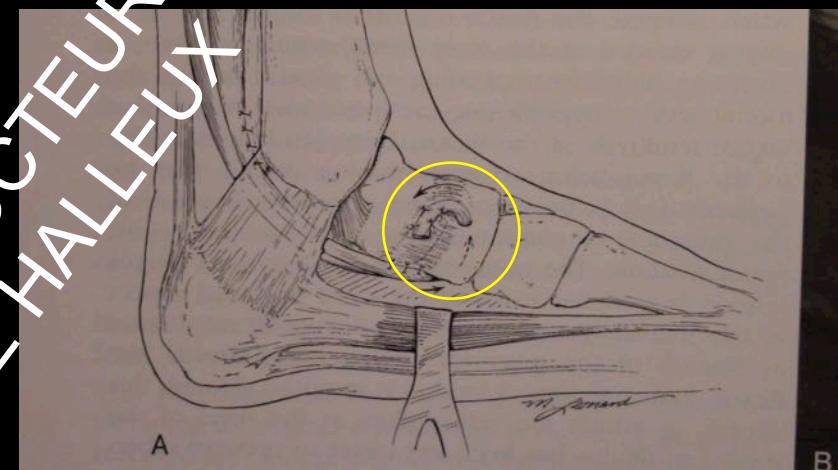
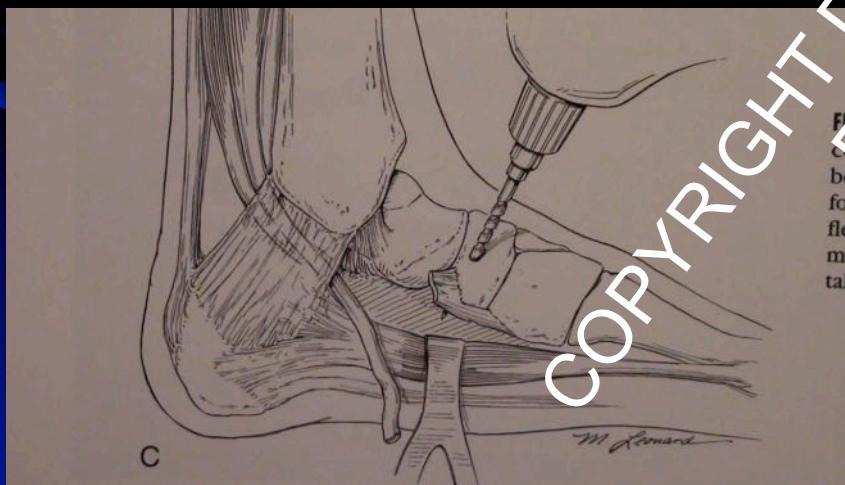
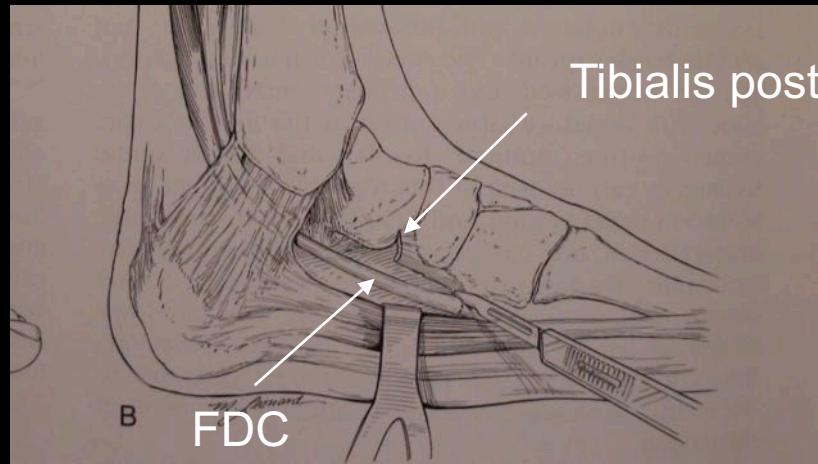
COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

Tendon reconstruction: plasty



COPYRIGHT
DOCTEUR
JACQUES
HALLEUX

Tendon reconstruction : FHL or FDC transfert

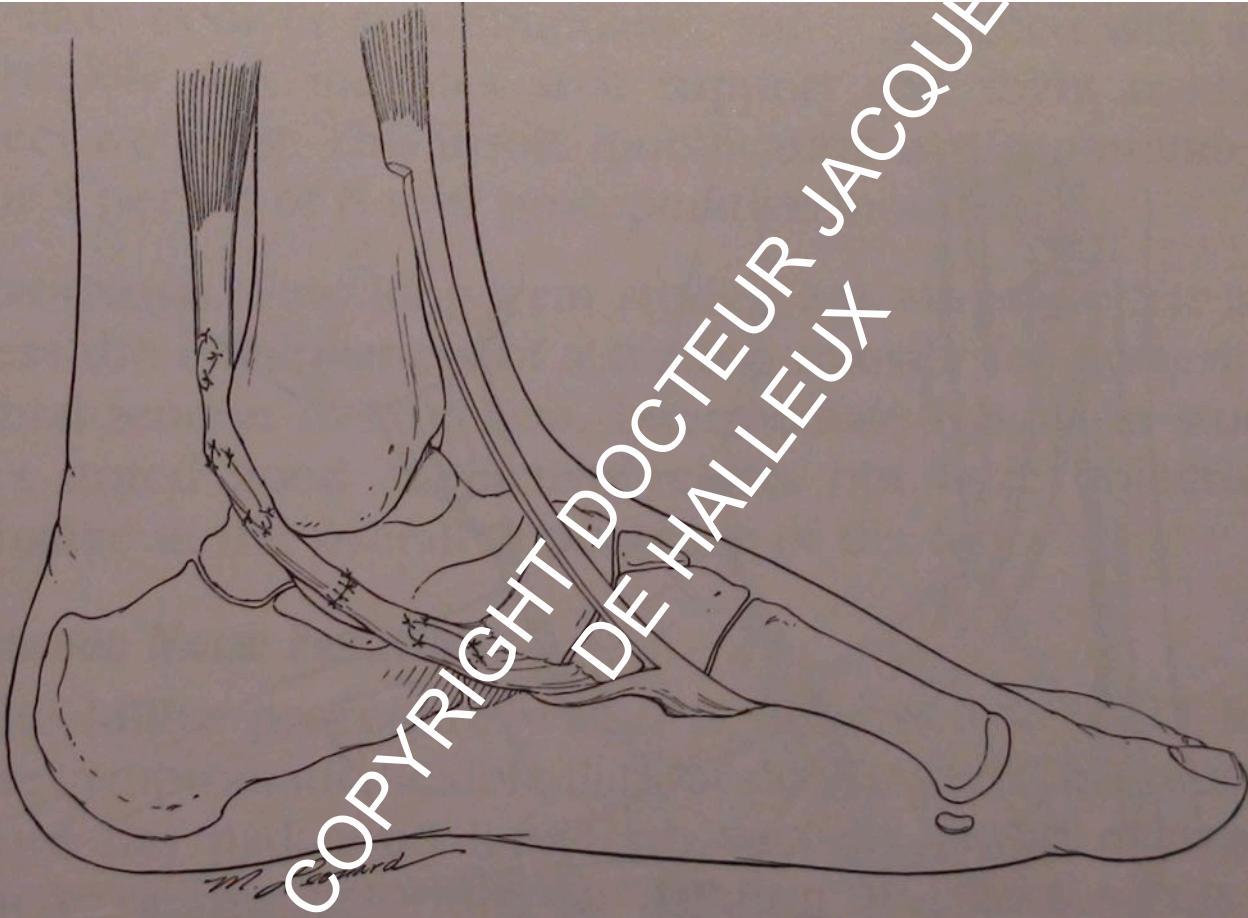


COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

Tendon reconstruction: Transfert Tibialis anterior (Cobb)

by
sion
of a
lon-
ten-
gest
uate
split

ften
gical
the
i-to-
ther
plan-

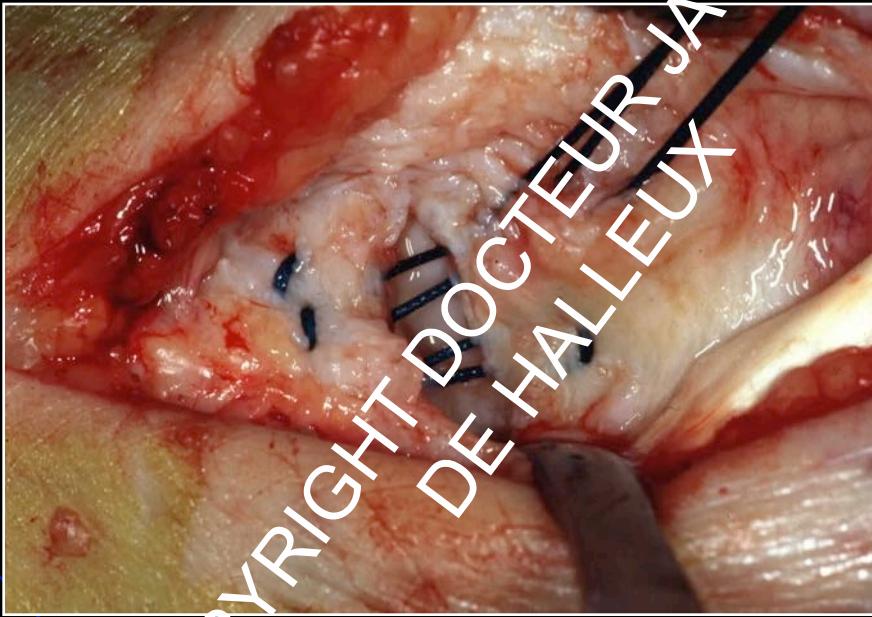


COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

FIGURE 42-17. Diagram of the Cobb technique illustrates its use of the

ligament reconstruction

spring ligament suture

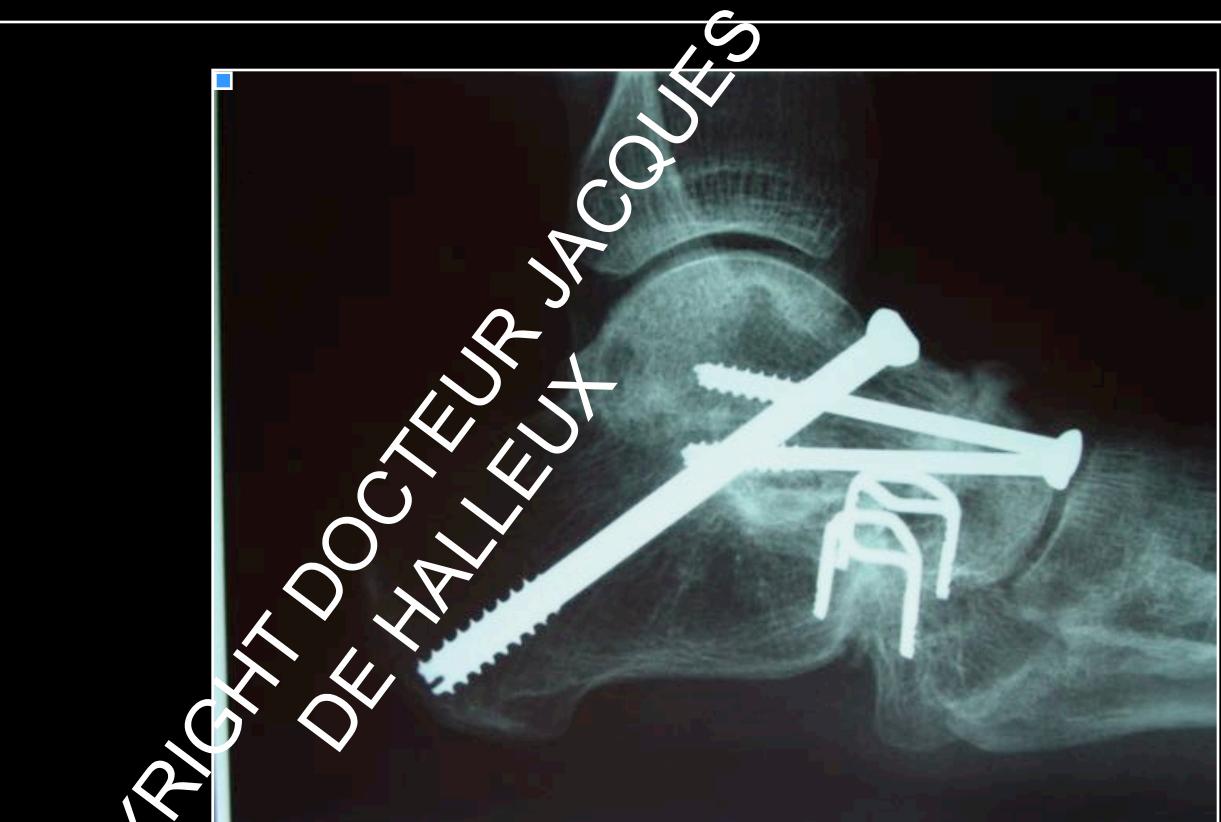
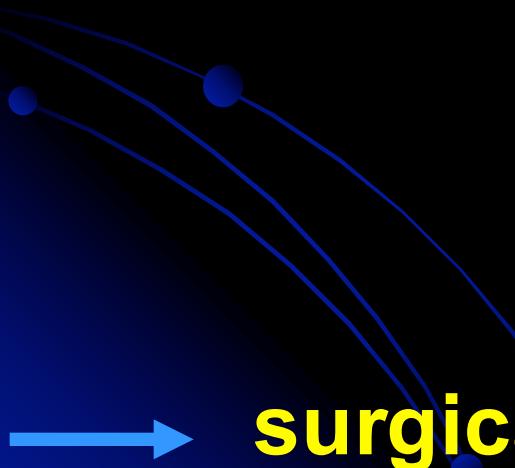


COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

Posterior Tibial Tendon Dysfunction

Treatment

➤ Stage 3



- triple arthrodesis

Posterior Tibial Tendon Dysfunction

Treatment

➤ Stage 4



surgical



COPYRIGHT DOCTEUR
DE HALLEUX JACQUES

- panarthrodesis
- (TAR)

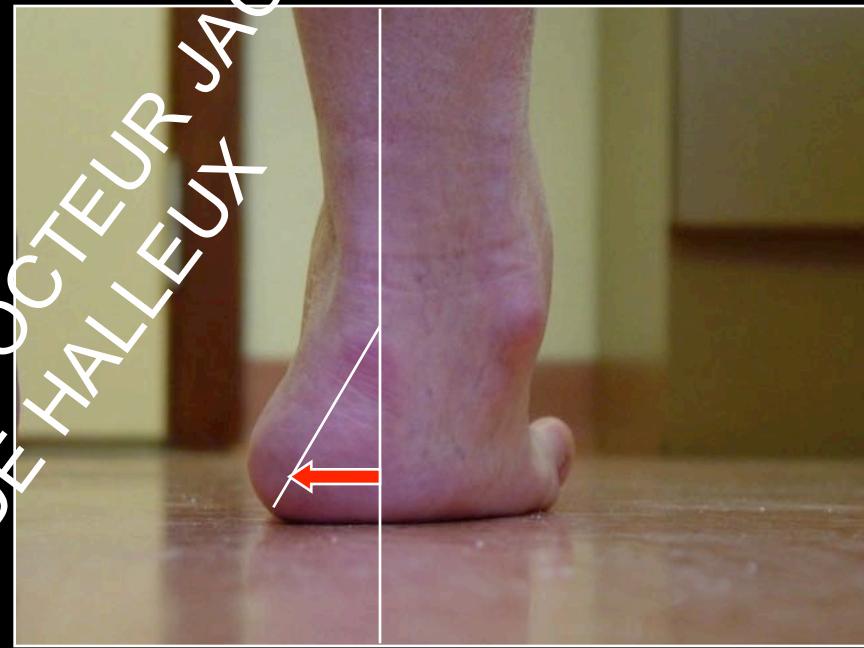
Posterior Tibial Tendon Dysfunction

Prognosis

- early diagnosis
 - early treatment
- better prognosis

COPYRIGHT DOCTEUR HALLEUX JACQUES

CAVO VARUS DEFORMITIES



COPYRIGHT DOCTEUR
DE HALLEUX JACQUES



COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

30°

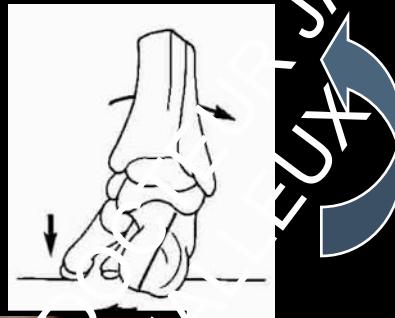
Dorsiflexion pitch of calcaneus ↑

❖ CLINICAL evaluation

REDUCIBILITY ?

➤ Coleman block test

Bringing the first metatarsal head down



Test - : varus remains fixed

(despite discharge of forefoot)

MEDIAL OPENING WEDGE OSTEOTOMY (DWYER 1936)

QUESTS

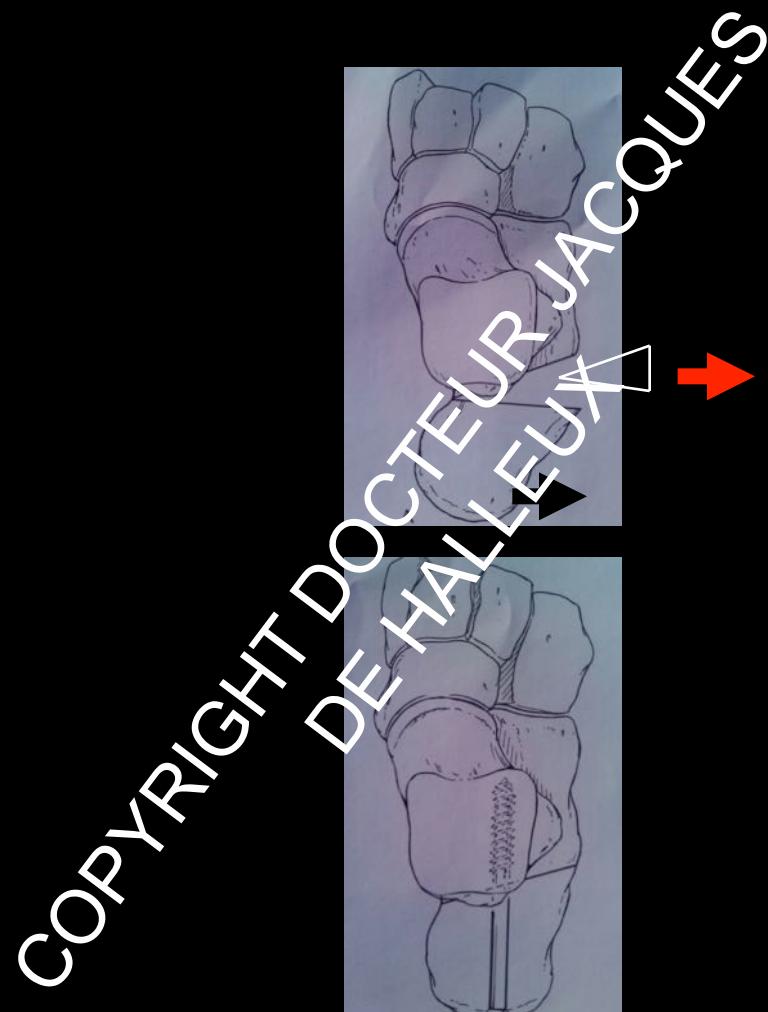


picture from: Th Leemrijse, B Valtin, Pathologie du Pied et de la cheville, 2009

LATERAL CLOSING WEDGE OSTEOTOMY (DWYER 1958)

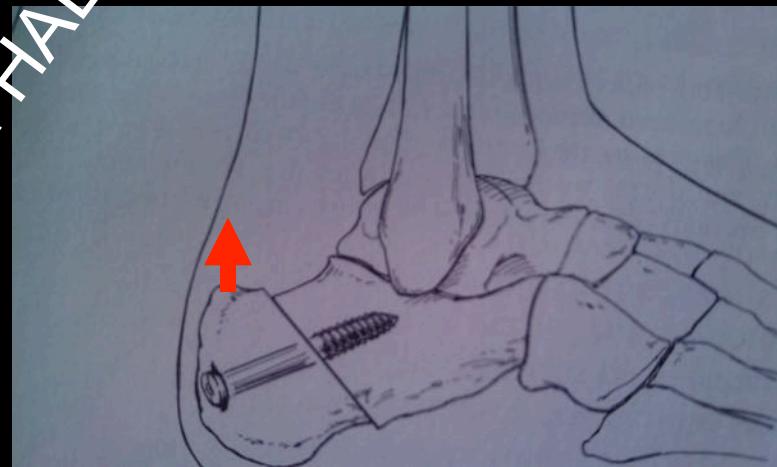
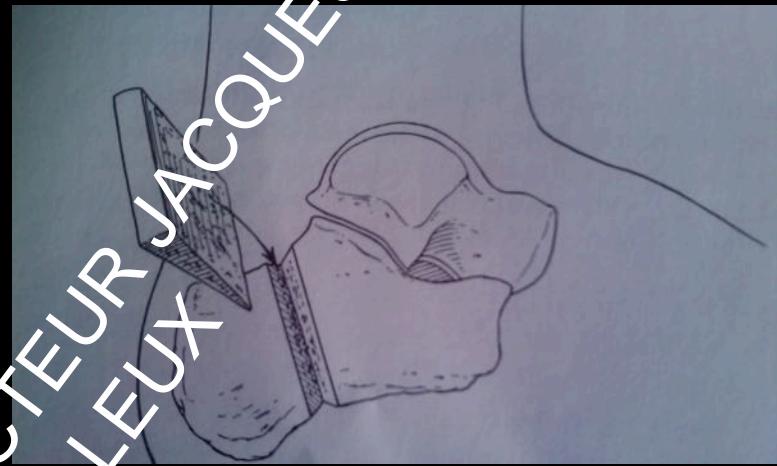
- Shifting posterior fragment laterally

>< varus
hindfoot



LATERAL CLOSING WEDGE OSTEOTOMY (DWYER 1958)

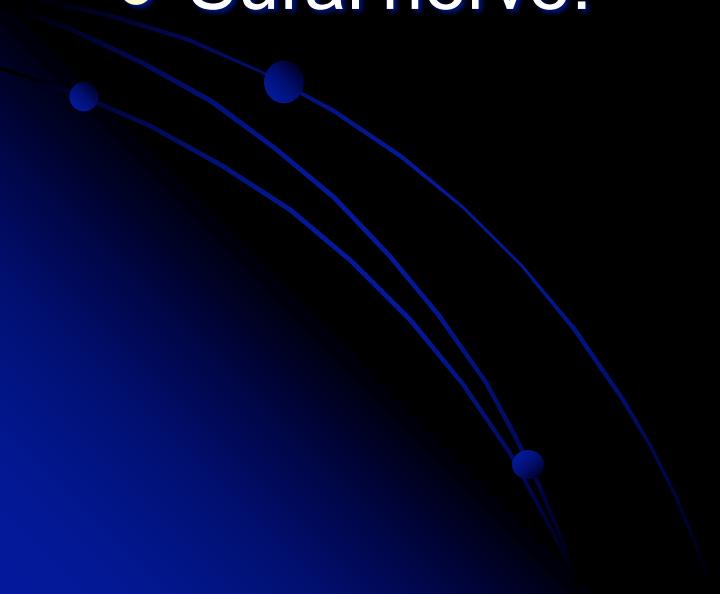
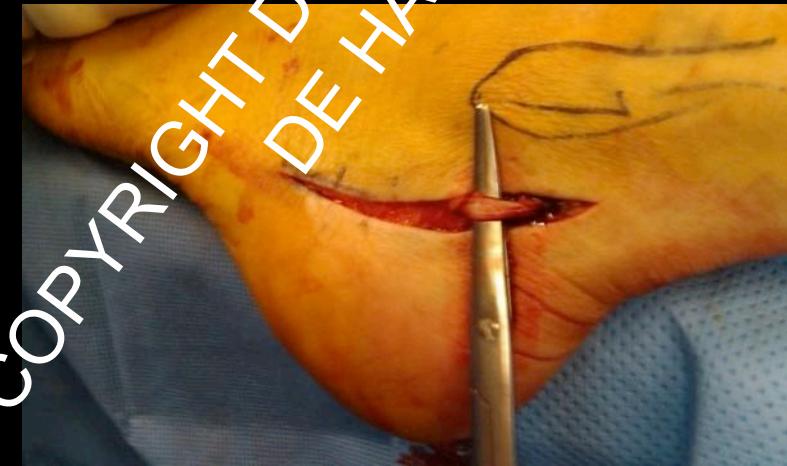
- Translation of the calcaneal tuberosity cephalad
- <> increased calcaneal pitch



Dwyer OSTEOTOMY

surgical technique

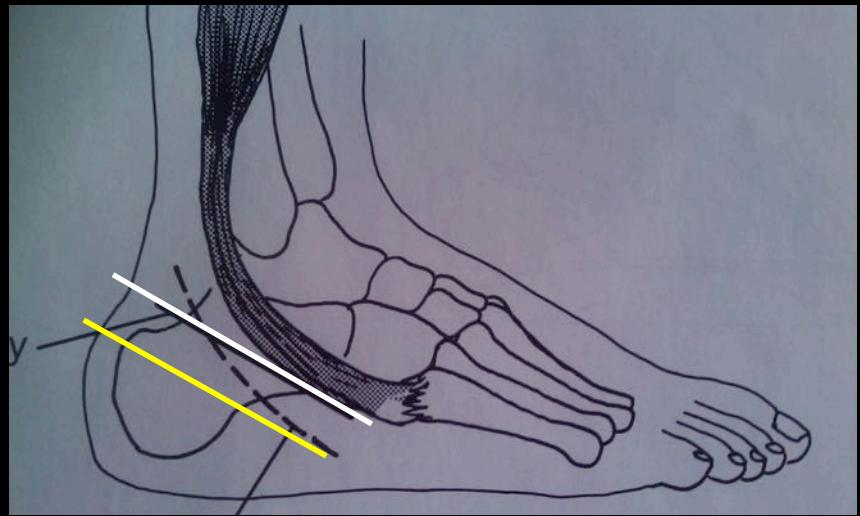
- Skin incision (*from posterior of the tip of the fibula to plantar of the C-C joint*)
- Sural nerve!



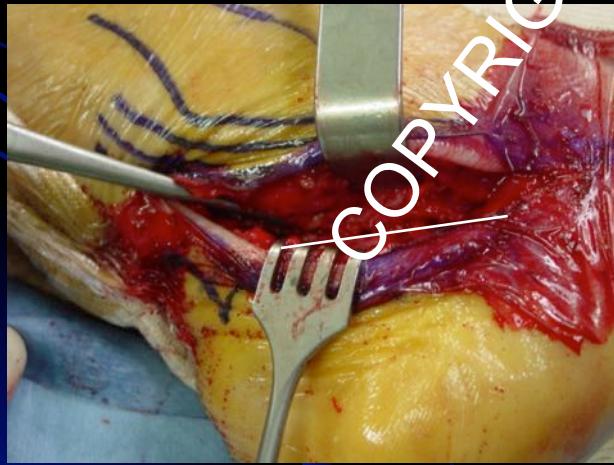
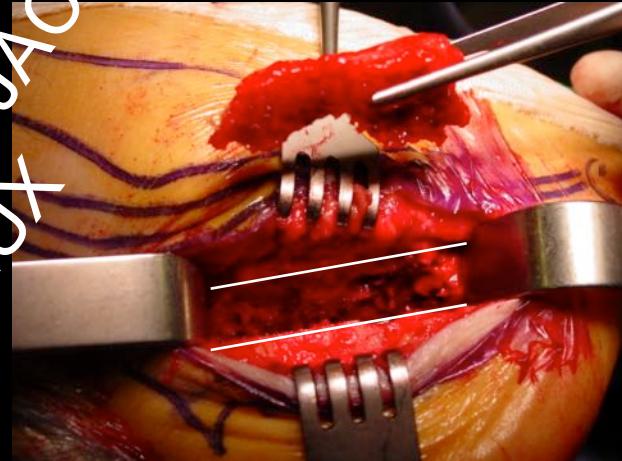
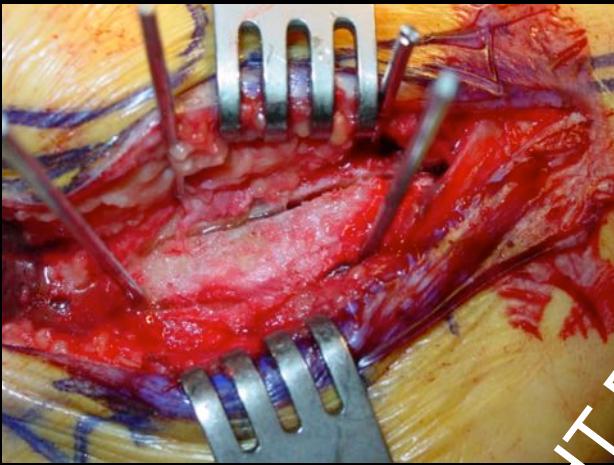
Dwyer OSTEOTOMY

surgical technique

- Osteotomy
 - First cut starting 1 cm post of the subtalar joint ending 1 cm proximal to the C-C joint
 - Second cut parallel and plantar dependent upon the degree of the deformity (4 to 8 mm)



COPYRIGHT DOCTEUR JACQUES
DE HALLEUX



Dwyer OSTEOTOMY

surgical technique

- Stabilisation (screws, staple, pins)



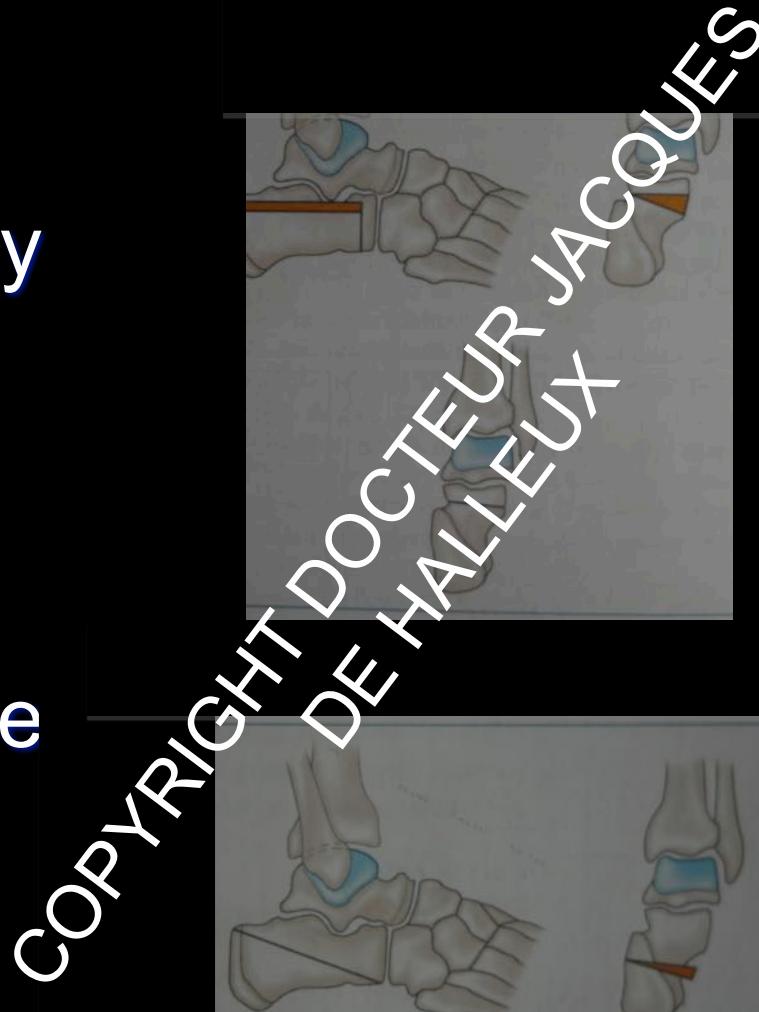
Dwyer OSTEOTOMY

Postoperative care

- Below-knee cast
 - 4 weeks without weight-bearing
 - 4 weeks with weight-bearing

LATERAL CLOSING WEDGE OSTEOTOMY

- 1985 : L osteotomy
(Pisani)
- 1986: great oblique
osteotomy (Garelli)



pictures from: Th Leemrijse, B Valtin, Pathologie du Pied et de la cheville, 2009

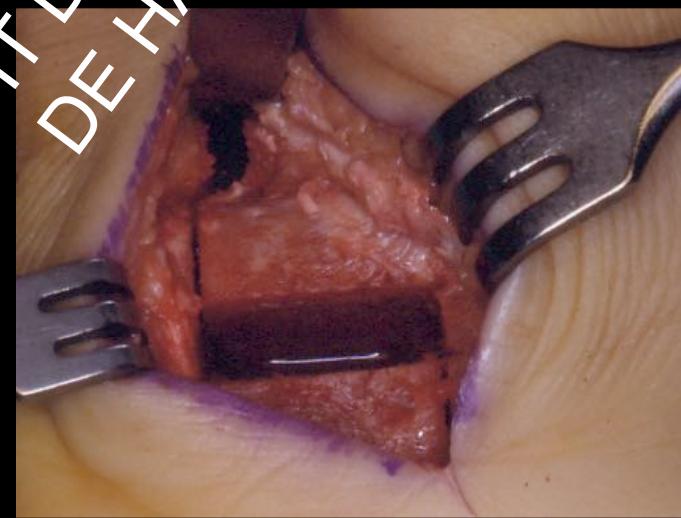
LATERAL CLOSING WEDGE OSTEOTOMY

- 1995 : Z osteotomy
(Mori)
- 2005 : more easy Z
osteotomy *(Malerba)*



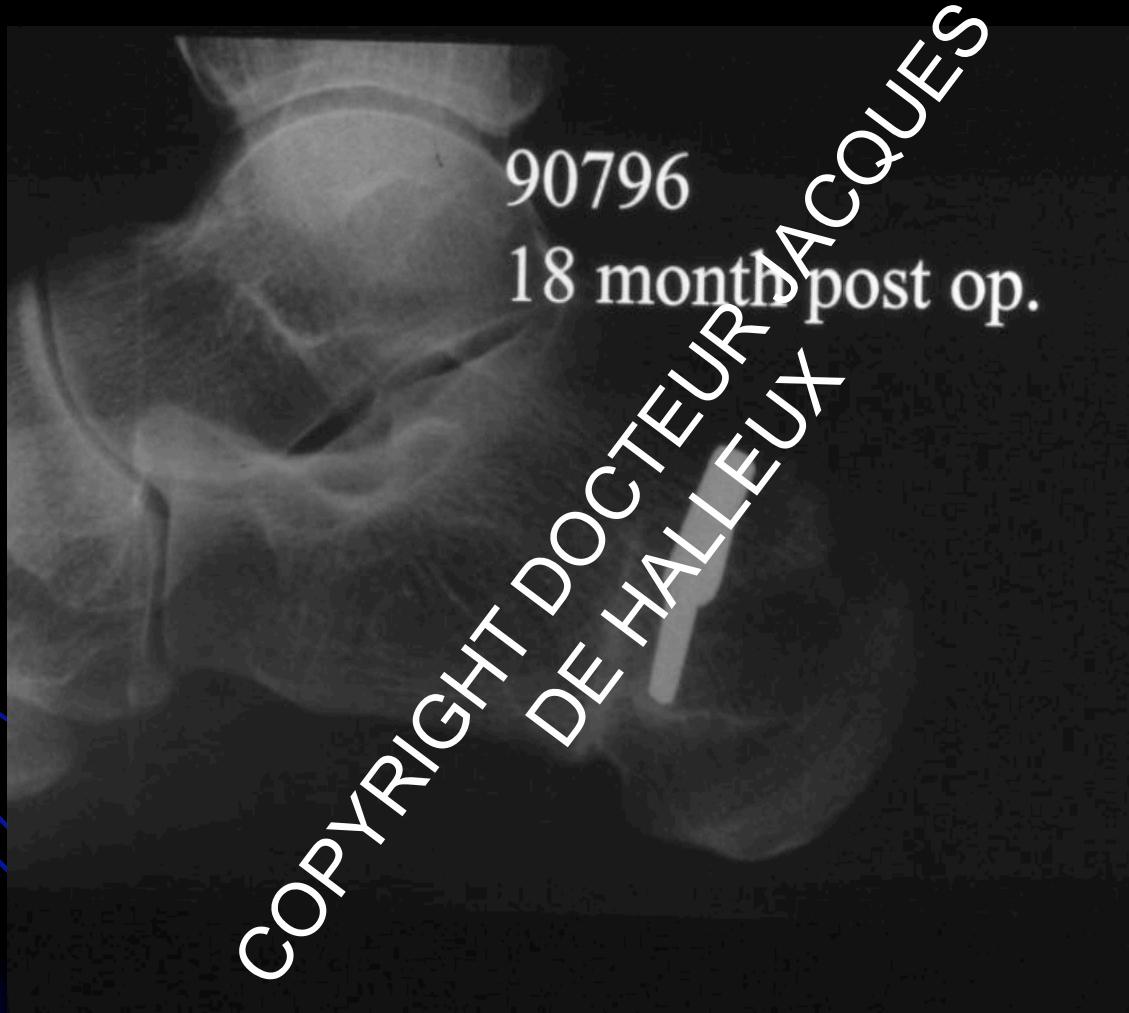
ALERBA OSTEOTOMY (2005)

Lateral closing wedge osteotomy



pictures from: Th Leemrijse, B Valtin, Pathologie du Pied et de la cheville, 2009

MALERBA OSTEOTOMY
Lateral closing wedge osteotomy



Picture from: Th Leemrijse, B Valtin, Pathologie du Pied et de la cheville, 2009

MALERBA OSTEOTOMY
Lateral *opening* wedge osteotomy



picture from: Th Leemrijse, B Valtin, Pathologie du Pied et de la cheville, 2009

Cavo-varus deformities goal of surgical management

Produce plantigrade and stable foot

- **Supple :**

- soft tissue procedure (*fascia plantaris release; tendon transfer*)

- **Supple + deformity that prevents plantigrade foot** (*plantarflexed 1st ray, excessive dorsiflexion calcaneus, varus calcaneus*):

- soft tissue procedure (*fascia plantaris release; tendon transfer*)
- Osteotomy (*calcaneus, 1st MT, midtarsal*)

- **Rigid :**

- arthrodesis

COPYRIGHT DOCTEUR JACQUELINE DE HALLEUX

VARUS + ARTHRITIS



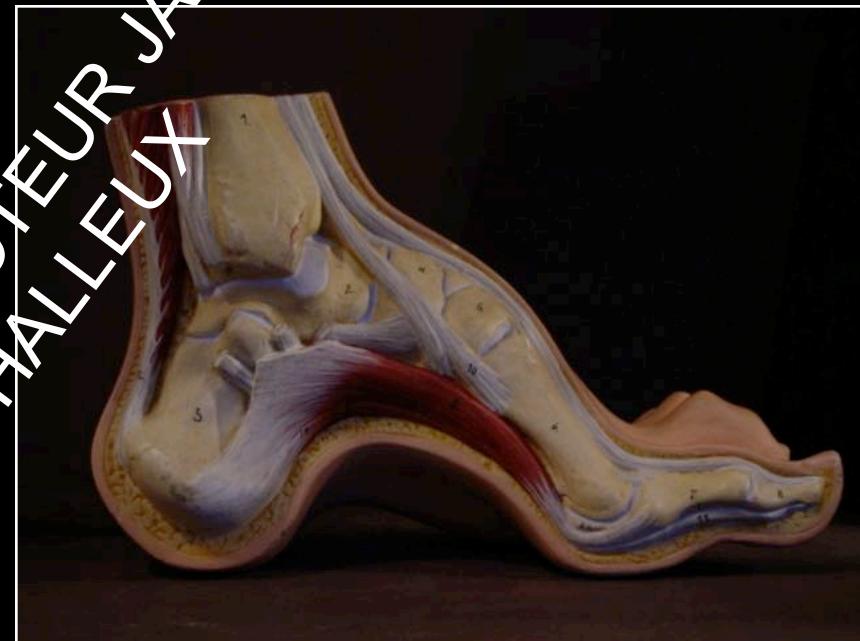
- subtalar or triple arthrodesis

CONCLUSION

Pes plano valgus



Koutsogiannis osteotomy
=
Hindfoot valgus correction

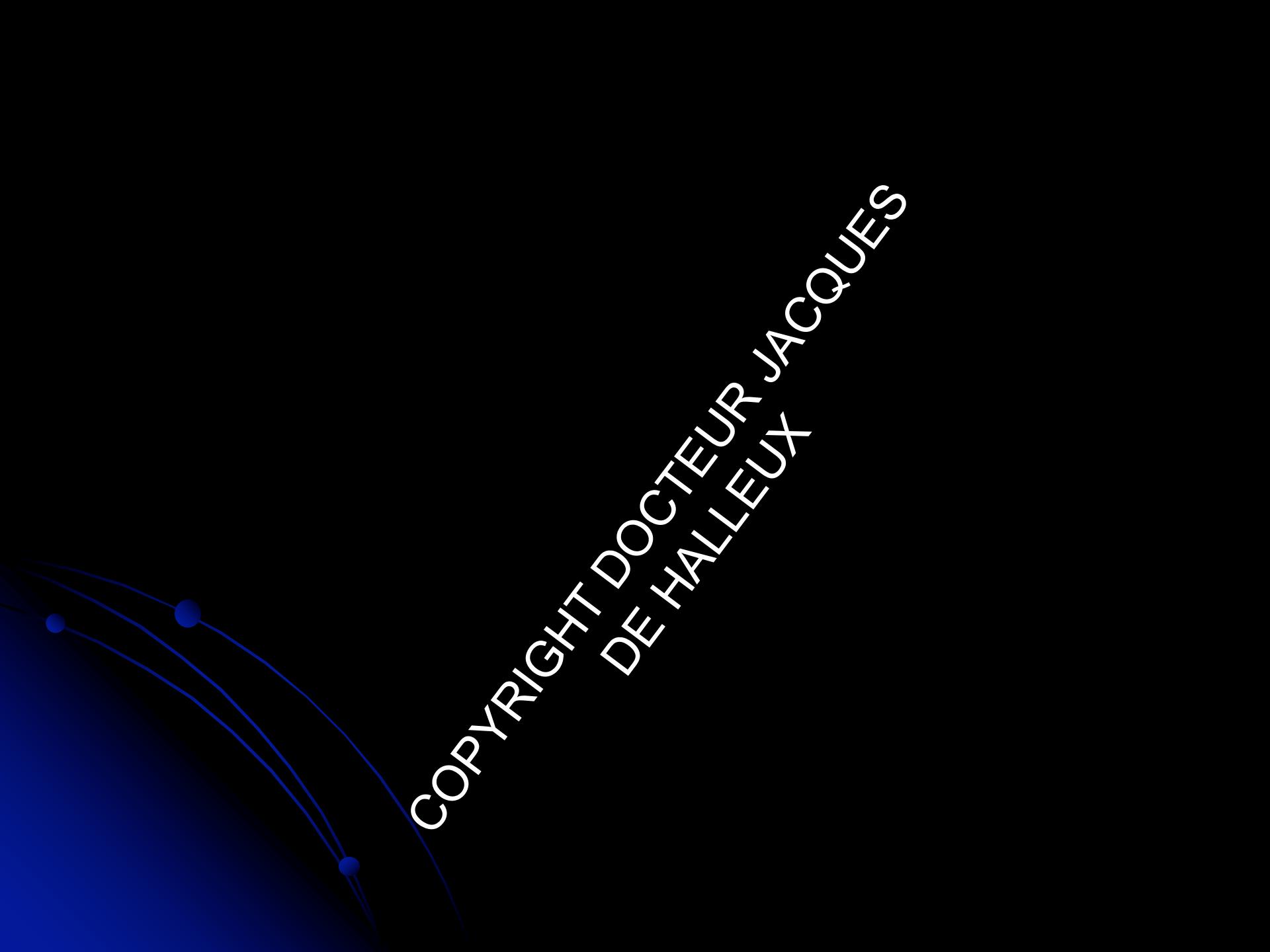


Dwyer/ Malerba osteotomy
=
Hindfoot varus correction

Osteotomy alone not enough!

COPYRIGHT DOCTEUR DE HALLEUX JACQUES

Pes cavo varus



A dark blue background featuring three curved, glowing blue lines that intersect at several small white circular points. The lines curve from the bottom left towards the top right.

COPYRIGHT DOCTEUR JACQUES
DE HALLEUX

Cavo-varus deformities

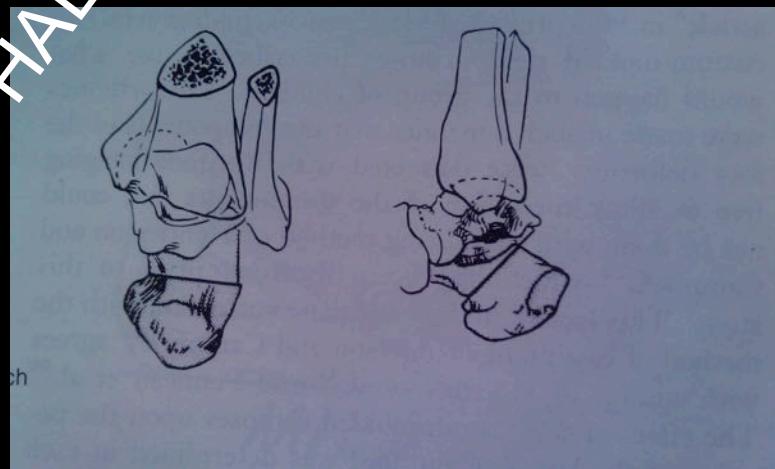
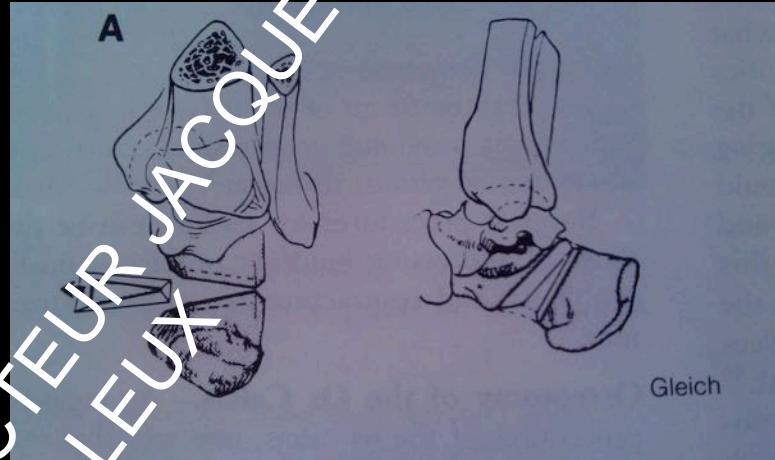
Treatment

- Calcaneus osteotomies to correct
 - varus hindfoot
 - increased calcaneal pitch
- Tarso / metatarsal osteotomy to correct
 - Cavus deformity
- Plantar fascia release
- Tendon transfer

CALCANEAL OSTEOTOMY FOR FLAT FOOT

- 1893 : posterior fragment forwards, medially and downwards (Gleich)

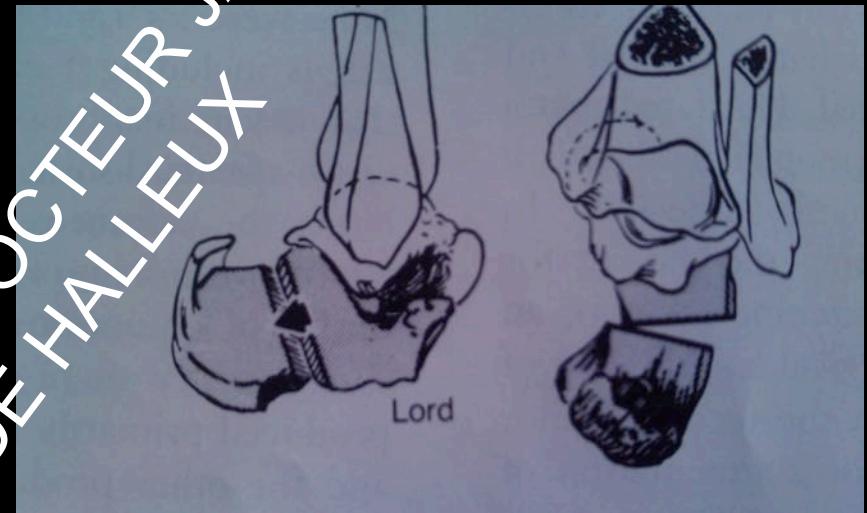
COPYRIGHT DOCTEUR JACQUES DE HALLEUX

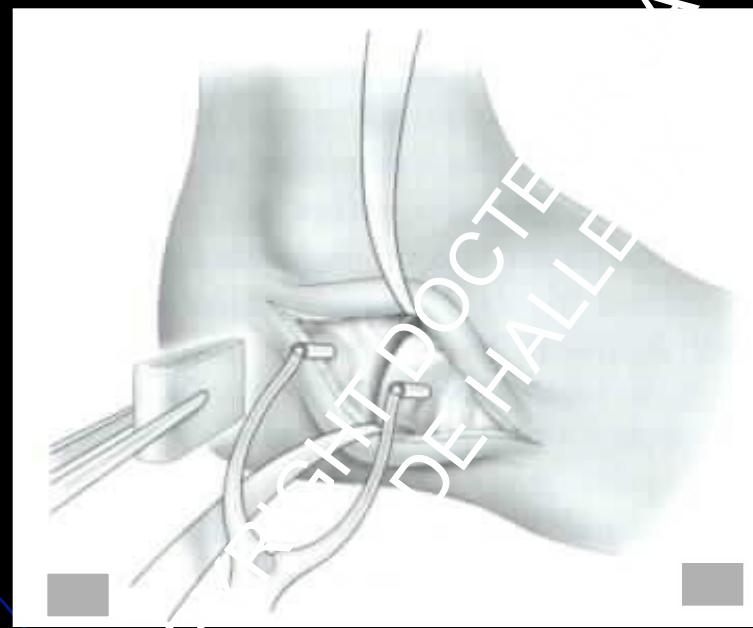


CALCANEAL OSTEOTOMY FOR FLAT FOOT

- 1923 : 13 cases calcaneal osteotomy for severe flat foot (Lord)

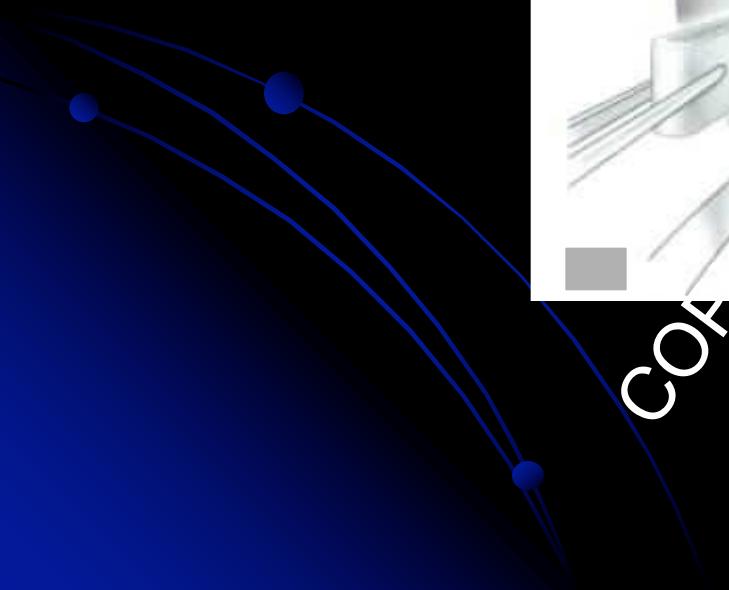
COPYRIGHT DOCTEUR JACQUES DE HALLEUX





JACQUES
DOCTEUR DE HALLE

COPRIS



Pes plano valgus stage 2

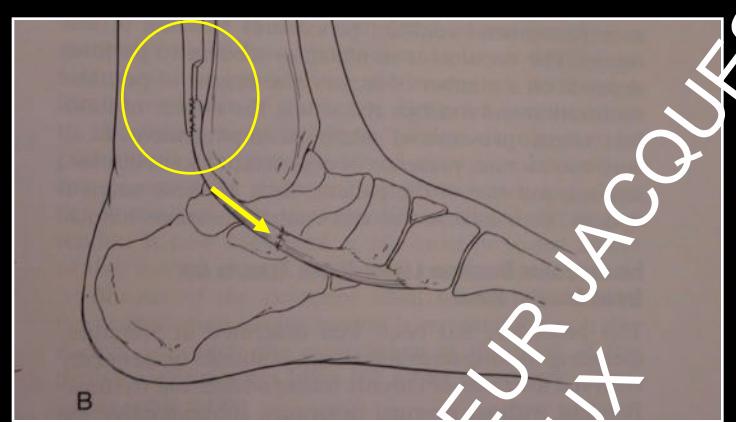
Posterior Tibial Tendon Dysfunction

- Calcaneal osteotomies
 - (Koutsogiannis)
 - (lateral column lengthening)
- Ligament reconstruction
 - (LLI, spring ligament)
- Tendon reconstruction
 - (suture, plasty, transfert FHL or FDL, Cobb)

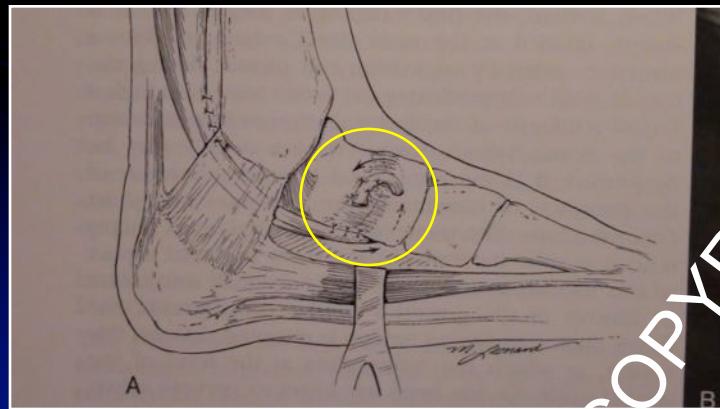
© DR. JACQUES HALLEGUY DOCTEUR HYPERDYNAMIC

What to do if tibialis posterior tendon rupture?

suture



Z lengthening



FHL/FDC transfert

TA transfert

COPYRIGHT DOCTEUR DE HALLEUX JACQUES

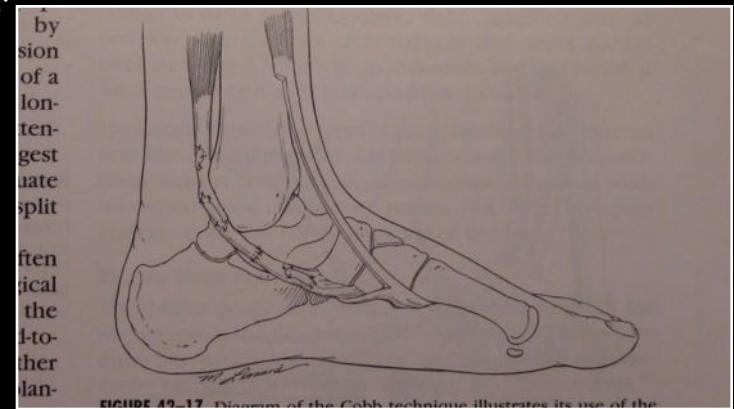
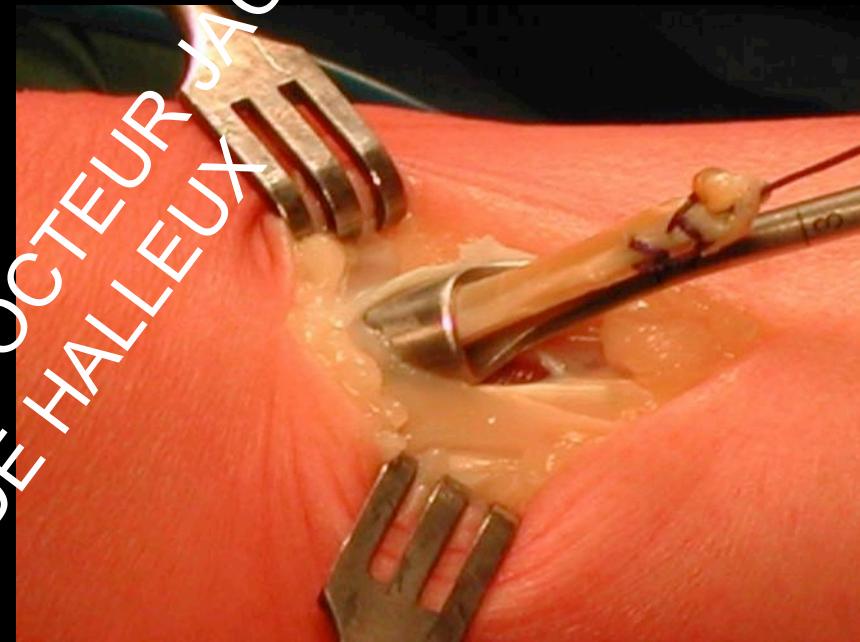
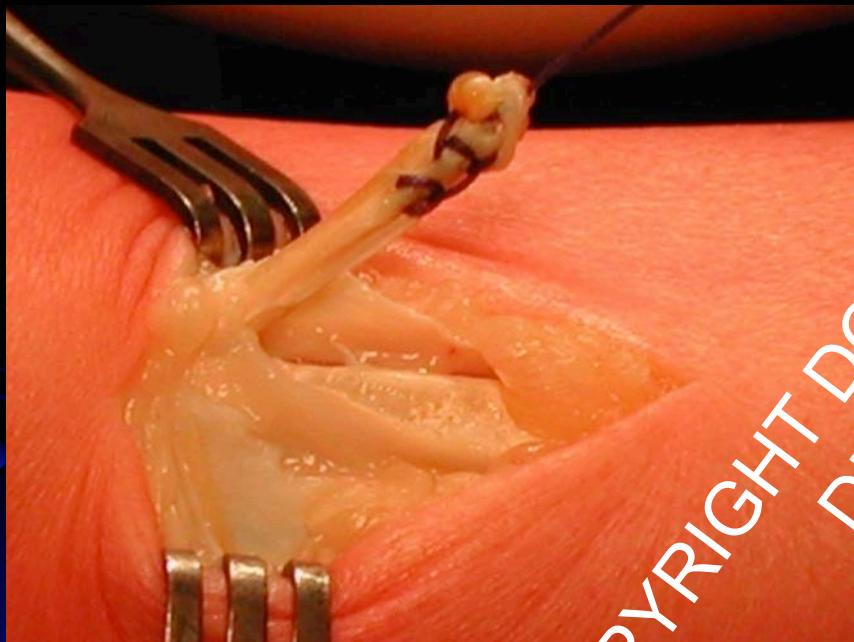


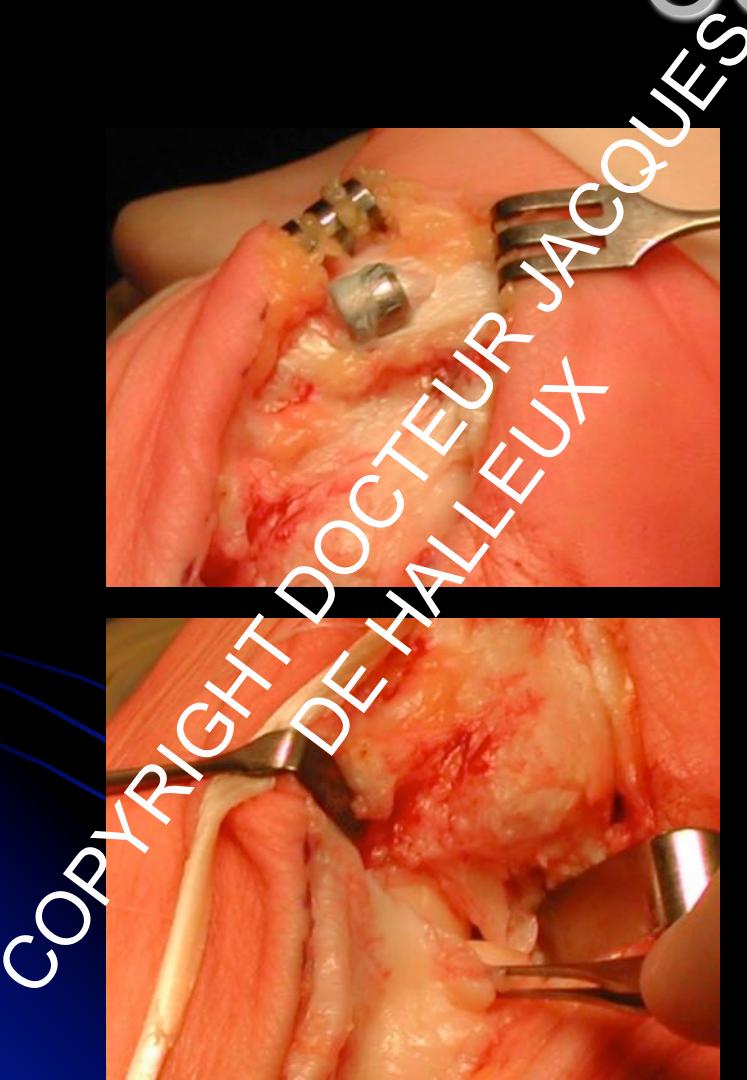
FIGURE 42-17. Diagram of the Cobb technique illustrates its use of the

COBB 1

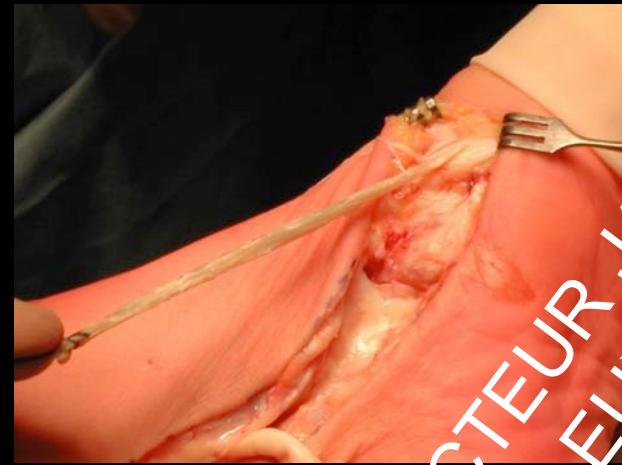
COPYRIGHT DOCTEUR JACQUES
DE HALLEUX



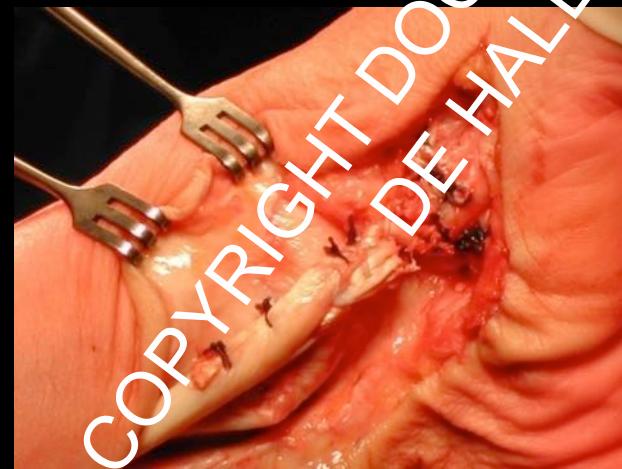
COBB 2



COPYRIGHT DOCTEUR JACQUES DE HALLEUX

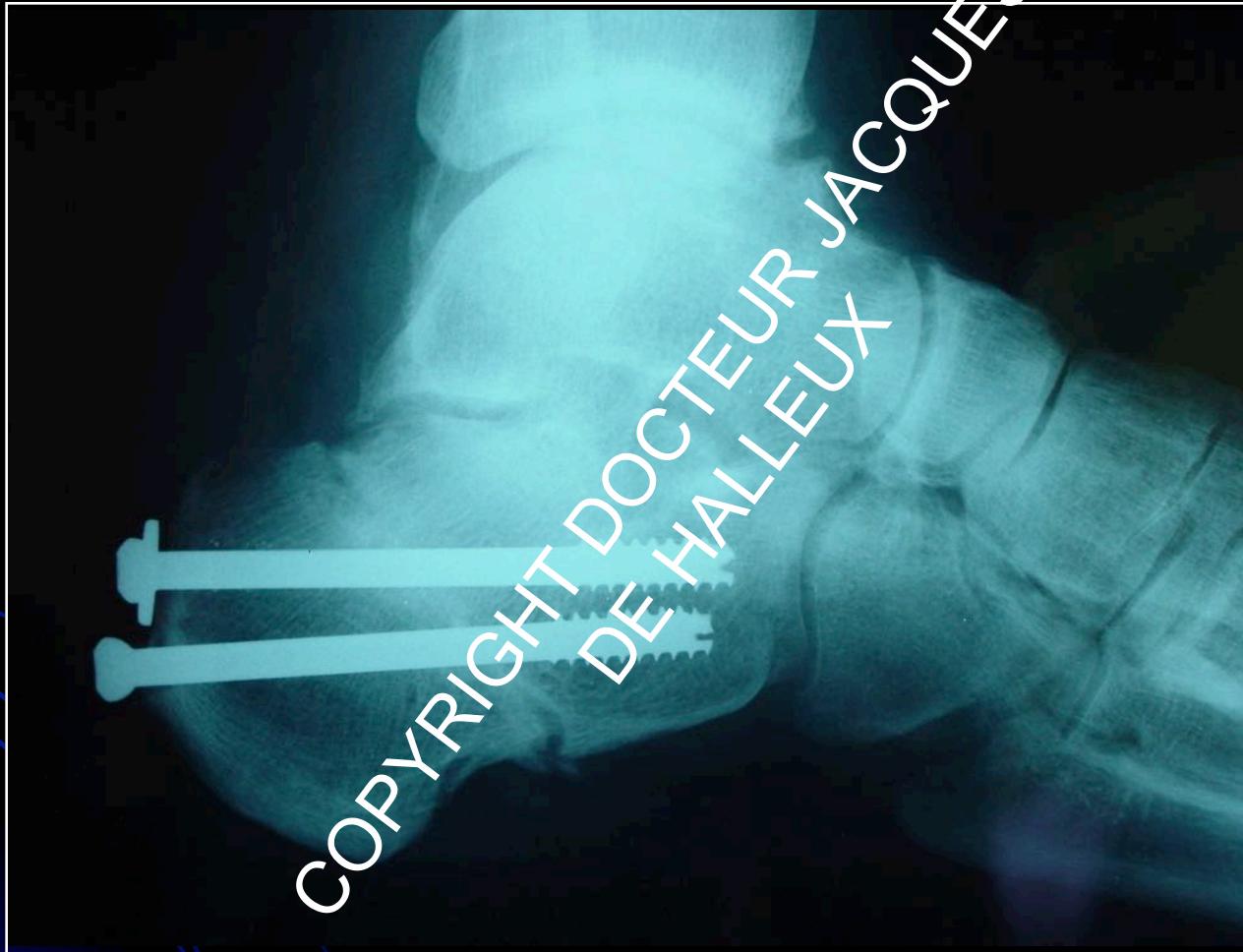


COPYRIGHT DOCTEUR JACQUES DE HALLEUX



COPYRIGHT DOCTEUR JACQUES DE HALLEUX

Koutsogiannis osteotomy



KOUTSOGIANNIS OSTEOTOMY (medial shift)

