Pes Planovalgus
Tibialis Posterior Tendon Dysfunction
stadium II

Therapeutic choices

Medializing Calcaneal osteotomy

Versus

Lengthening Calcaneal Osteotomy

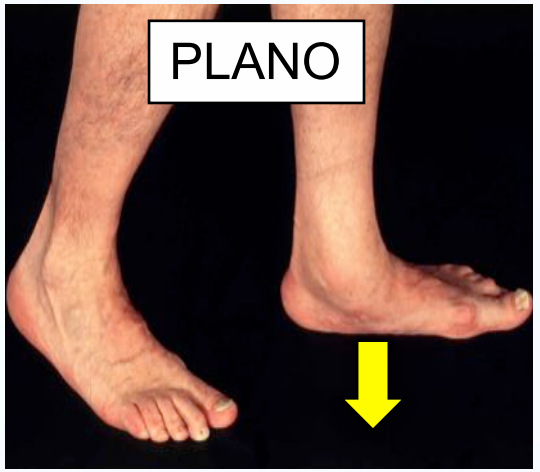
Dr de Halleux Jacques

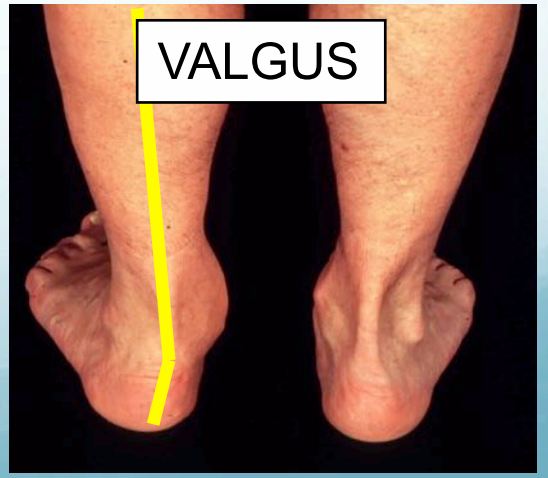
GENOA, december 2th 2015

TIBIALIS POSTERIOR INSUFFICIENCY

Calcaneum	valgus
Subtalar joint	tilted medially
Talus	medialy and down
T-N and N-C	subluxation
Midtarsal joints	Abduct + supination

valgus hindfoot ⇄ Achilles T = Evertor





STAGES
tibialis posterior dysfunction

Stage 1
- *A : inflammation, no deformation*
- *B : partial PTT tear, no deformation*
- *C : partial PTT tear, little hindfoot valgus*

Stage 2 = SUPPLE
- *A : valgus hindfoot ; (<50% uncovering TN)*
- *B : forefoot supination flexible (>50% uncovering TN)*
- *C : A or B with forefoot supination fixed)*
- *D : Forefoot abduction*
- *E : medial column (TN, NC, CMT) instability*

Stage 3 = RIGID
- *A :Hindfoot valgus*
- *B :Forefoot abduction*

Stage 4
- *A : reductible ankle valgus*
- *B : rigid ankle valgus (more common presentation)*

PLANUS
VALGUS
ABDUCTUS
SUPINATION
MEDIAL COLUMN

complex problem that has multiple treatment options *

Myerson, JBJS Am, 1996

* *Hill K, Foot Ankle Clin. 2003. 8(1):91-104*

MENU A LA CARTE

BONE PROCEDURES

MEDIALIZATION CALCANEAL OSTEOTOMY (KOUTSOGIANNIS, MYERSON)
MALERBA CALCANEAL OSTEOTOMY
SILVER CALCANEAL OSTEOTOMY

LATERAL LENGHTENING OSTEOTOMY
LATERAL LENGHTENING CALCANEO-CUBOIDAL ARTHRODESIS

SUBTALAR ARTHRODESIS
SUBTALAR ARTHROERESIS
TALO-NAVICULAR ARTHRODESIS

MEDIAL COLUMN RESTORATION
- COTTON CUNEIFORM 1 OSTEOTOMY
- PLANTAR FLEXION MT1 OSTEOTOMY
- ARTHRODESIS NAVICULO-CUNEIFORM 123
- ARTHRODESIS TARSO-MT1

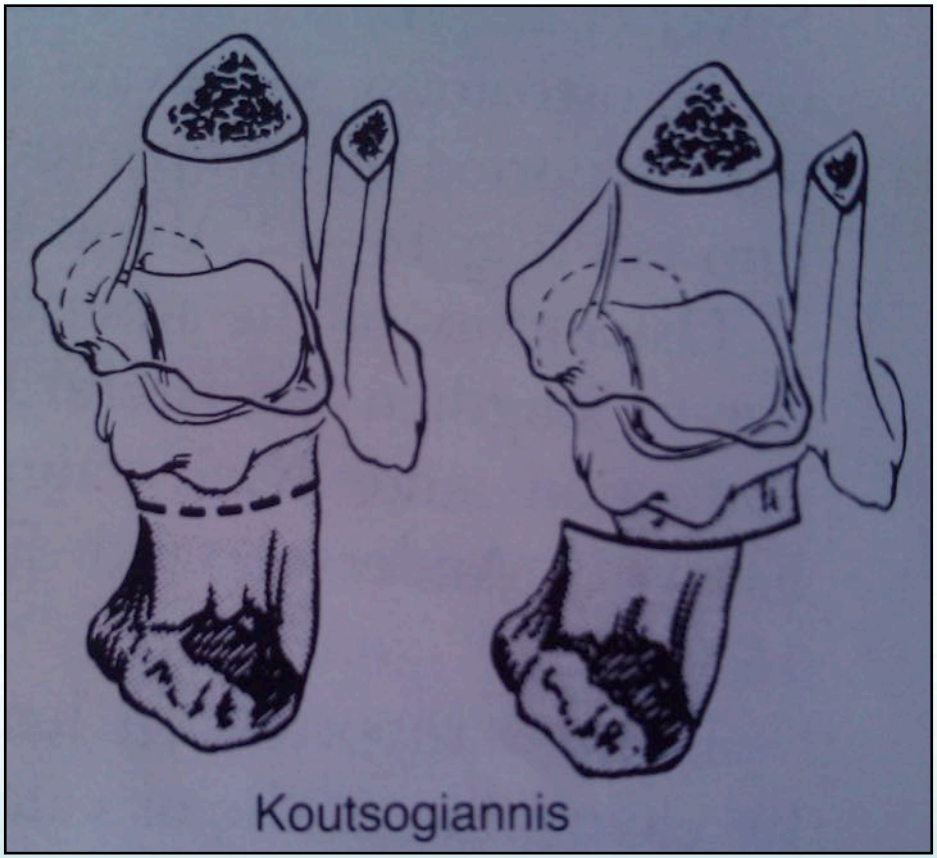
SOFT TISSUE PROCEDURES

TIBIALIS POSTERIOR RECONSTRUCTION
- SUTURE
- TRANSFER(TFDL OR FDC; COB TECHNIQUE)

SPRING LIGAMENT RECONSTRUCTION
ACHILLES TENDON LENGHTENING

MEDIALIZING CALCANEAL OSTEOTOMY
MCO

(valgus correction)



Koutsogiannis. JBJS. Febr 1971

MEDIALIZING CALCANEAL OSTEOTOMY
MCO
(valgus correction)

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

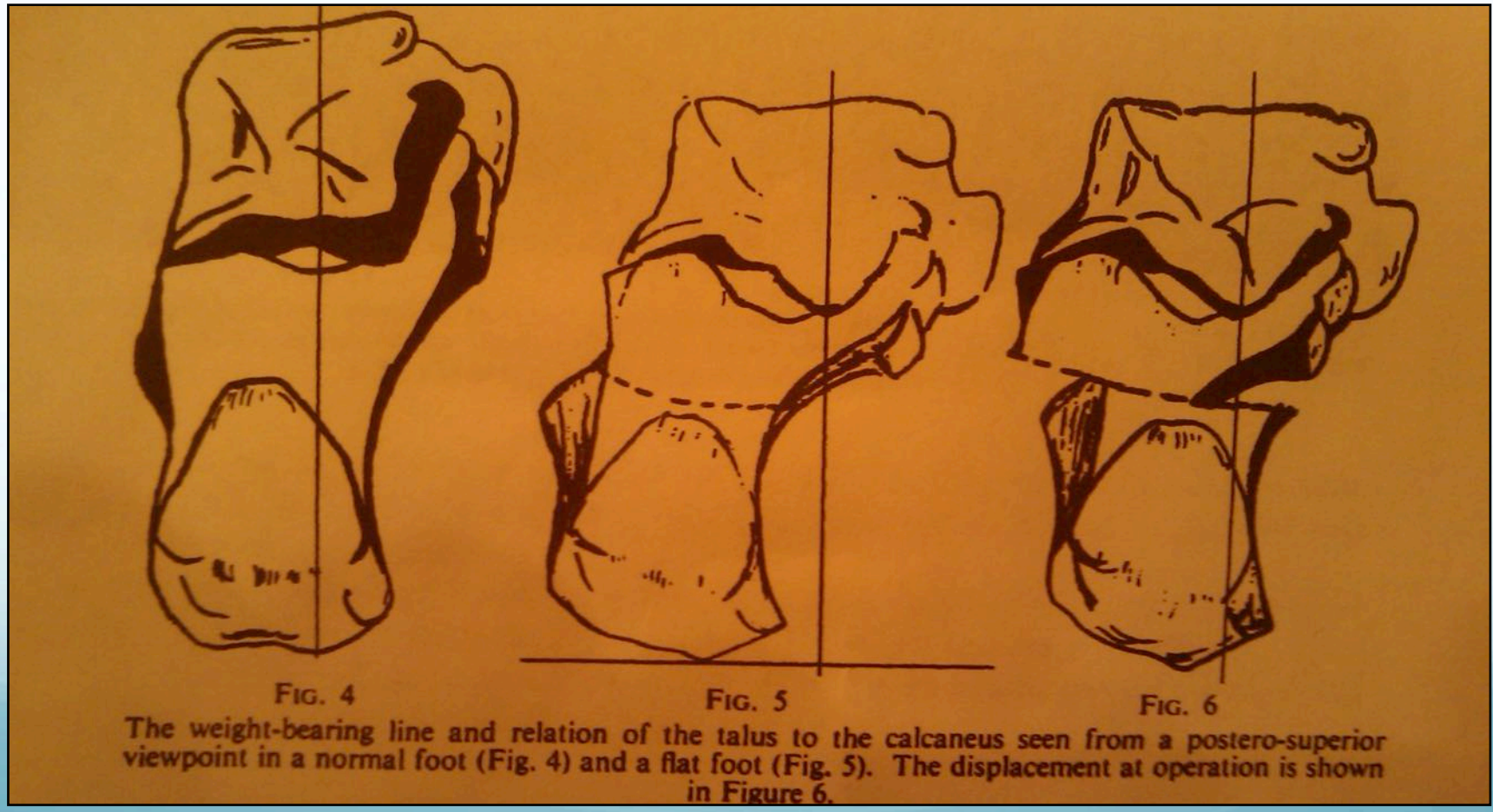
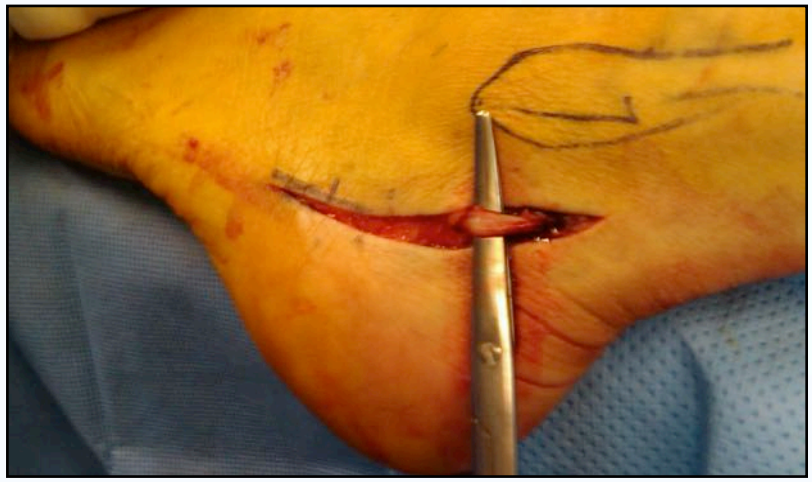


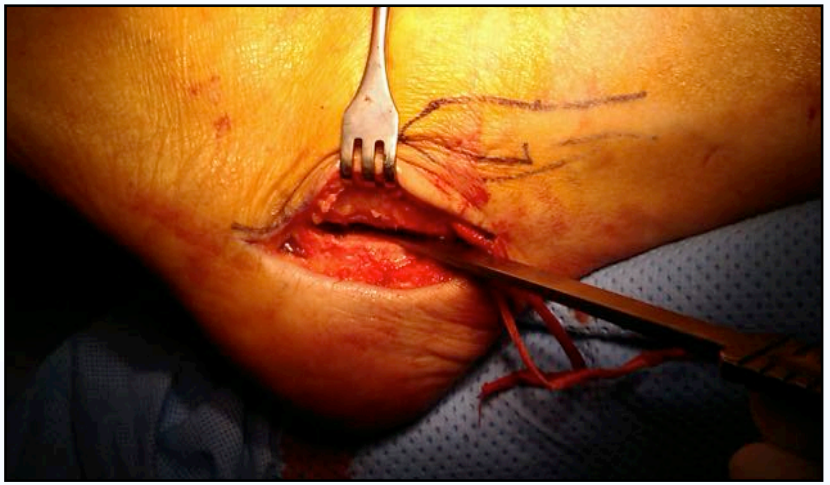
FIG. 4 FIG. 5 FIG. 6

The weight-bearing line and relation of the talus to the calcaneus seen from a postero-superior viewpoint in a normal foot (Fig. 4) and a flat foot (Fig. 5). The displacement at operation is shown in Figure 6.

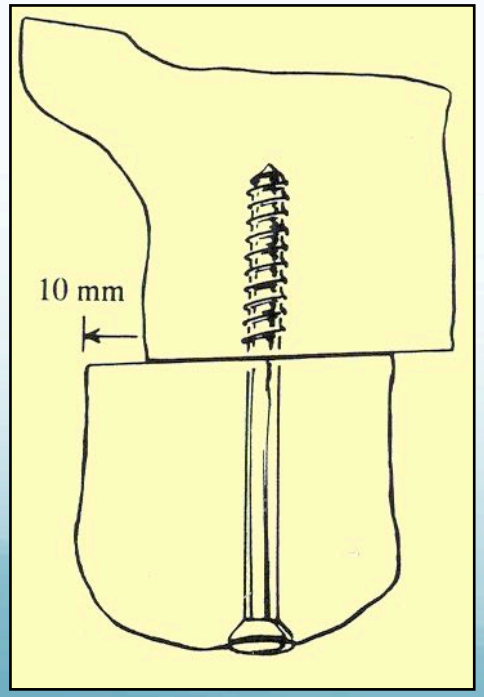
SURGICAL TECHNIQUE MCO



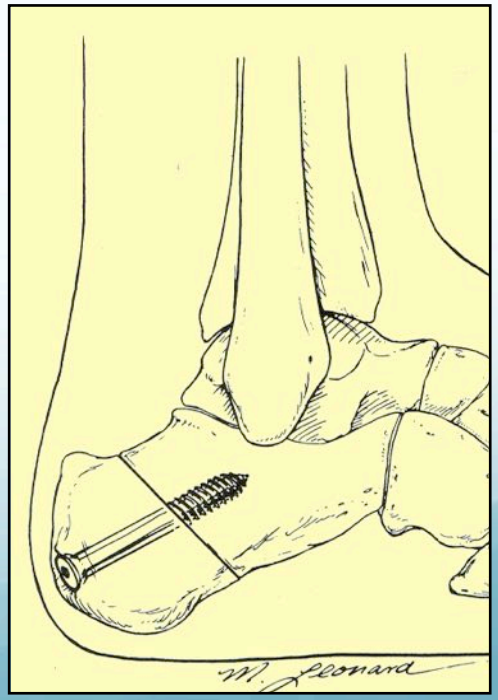
Lateral incision (parallel and behind peroneal tendon) sural n !



Osteotomy // skin incision



MEDIAL TRANSLATION POSTERIOR PART CALCANEUM
(1/3 to ½ of the width of the calcaneus)



1- TREATMENT of AQUIRED FLATFOOT

= **Association** of different procedures that impact hindfoot alignment

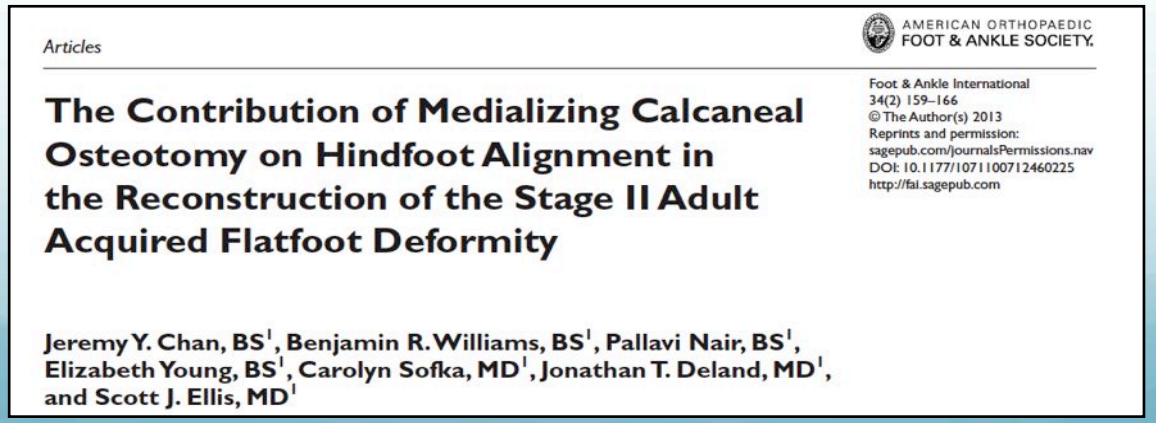
(MCO, LCL, TMT fusion, reconstruction PTT + spring ligament …)

➡ Main **Predictor** of hindfoot **valgus** alignment correction = **MCO**

(others: much lesser effect)

2- LINEAR RELATIONSHIP between:

- amount of MCO displacement
- correction hindfoot alignment



Articles

AMERICAN ORTHOPAEDIC FOOT & ANKLE SOCIETY

The Contribution of Medializing Calcaneal Osteotomy on Hindfoot Alignment in the Reconstruction of the Stage II Adult Acquired Flatfoot Deformity

Jeremy Y. Chan, BS[1], Benjamin R. Williams, BS[1], Pallavi Nair, BS[1], Elizabeth Young, BS[1], Carolyn Sofka, MD[1], Jonathan T. Deland, MD[1], and Scott J. Ellis, MD[1]

Foot & Ankle International
34(2) 159–166

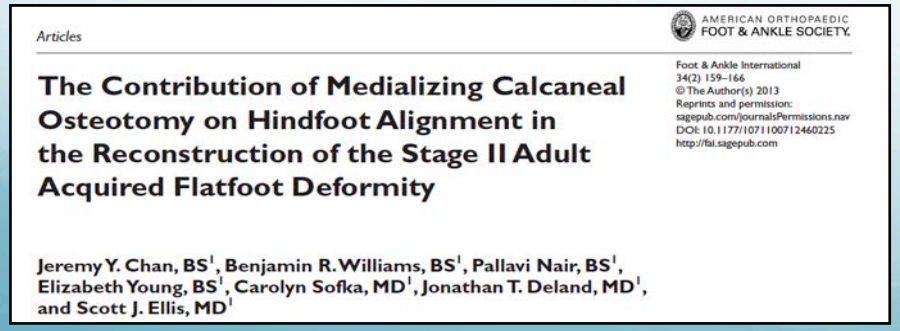
DOI: 10.1177/1071100712460225
http://fai.sagepub.com

3- HINDFOOT MOMENT ARM

- Help surgeon to titrate the amount of correction

- ***0 - 5 mm varus*** = *greatest clinical improvement* *

* *M Conti et al, F&A International, 2015. 36(8):919-927*



Articles

AMERICAN ORTHOPAEDIC FOOT & ANKLE SOCIETY

The Contribution of Medializing Calcaneal Osteotomy on Hindfoot Alignment in the Reconstruction of the Stage II Adult Acquired Flatfoot Deformity

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DOI: 10.1177/1071100712460225
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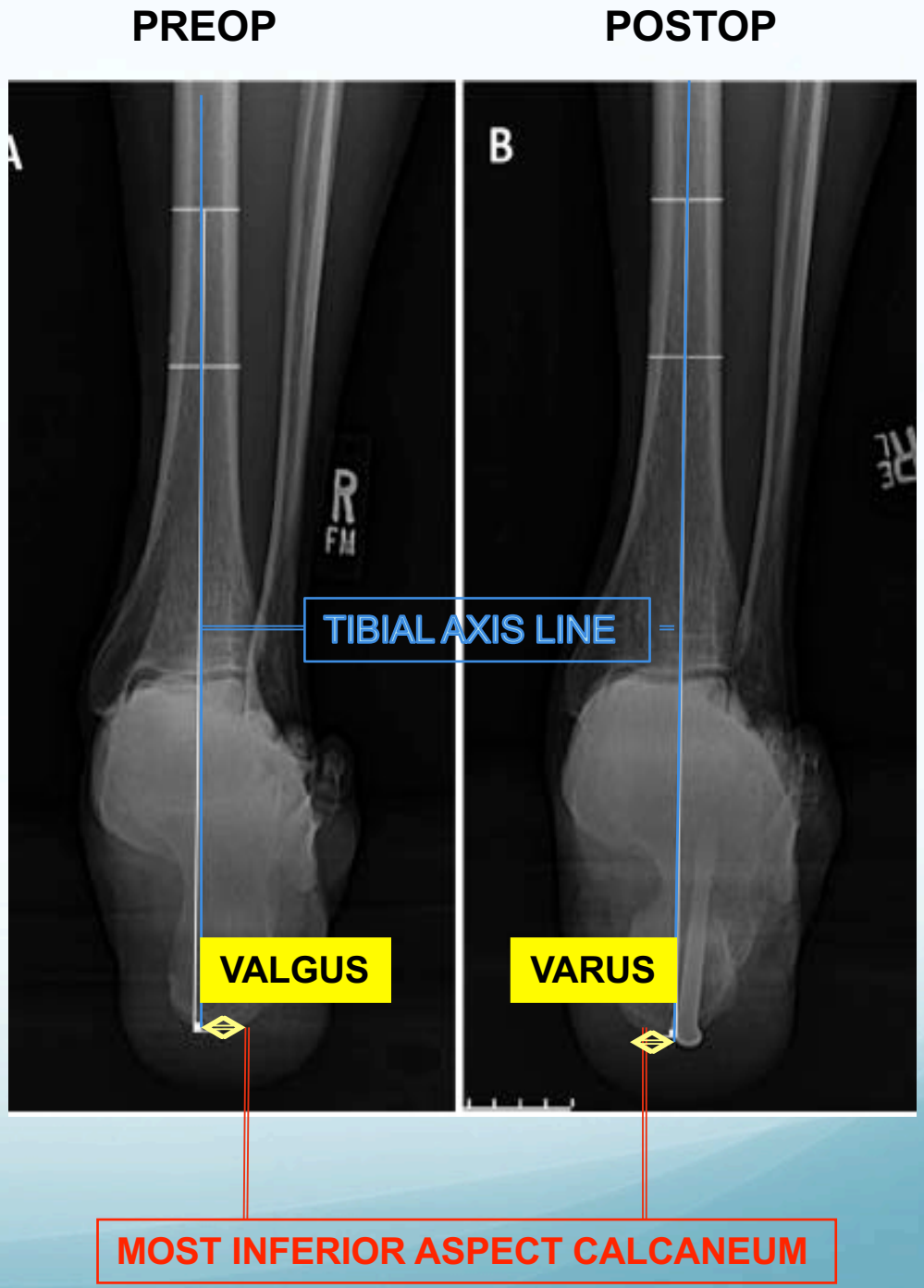
Jeremy Y. Chan, BS[1], Benjamin R. Williams, BS[1], Pallavi Nair, BS[1], Elizabeth Young, BS[1], Carolyn Sofka, MD[1], Jonathan T. Deland, MD[1], and Scott J. Ellis, MD[1]



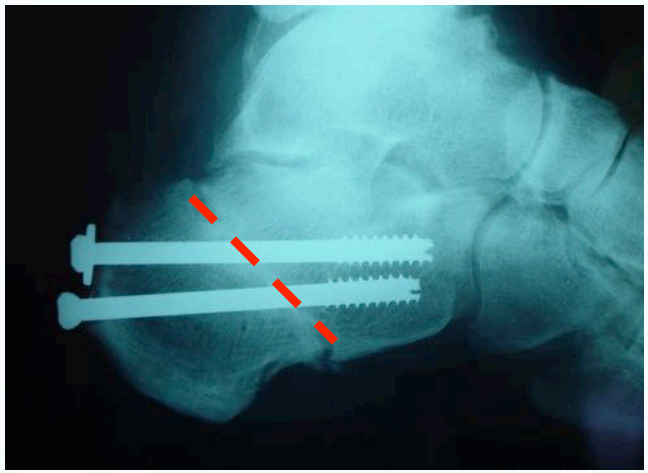
AMERICAN ORTHOPAEDIC FOOT & ANKLE SOCIETY

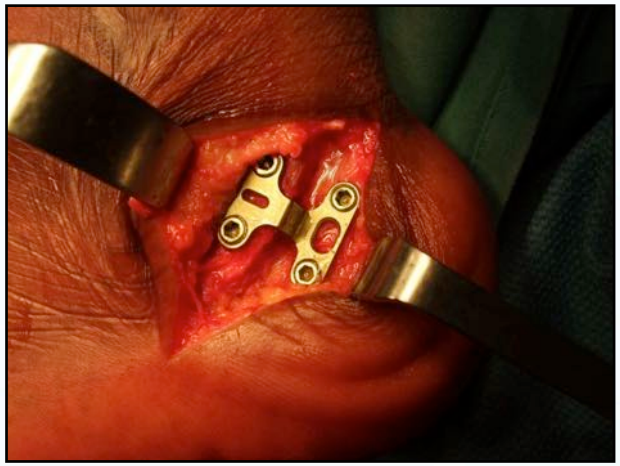
Foot & Ankle International
34(3) 420–425

DOI: 10.1177/1071100712473742
http://fai.sagepub.com

Comparison of Three Different Fixation Methods of Calcaneal Osteotomies

Ali Abbasian, FRCS(Tr&Orth)[1], Razi Zaidi, MRCS[2], Abhijit Guha, FRCS(Tr&Orth)[2], Andrew Goldberg, FRCS(Tr&Orth)[2], Nicholas Cullen, FRCS(Tr&Orth)[2], and Dishan Singh FRCS(Tr&Orth)[2]





MCO FIXATION = 1 headless screw

- 2 headless screws
- Headed screw
- lateral plate

: no better result
: 30 -50% removal
: more non-union

Article

AMERICAN ORTHOPAEDIC FOOT & ANKLE SOCIETY.

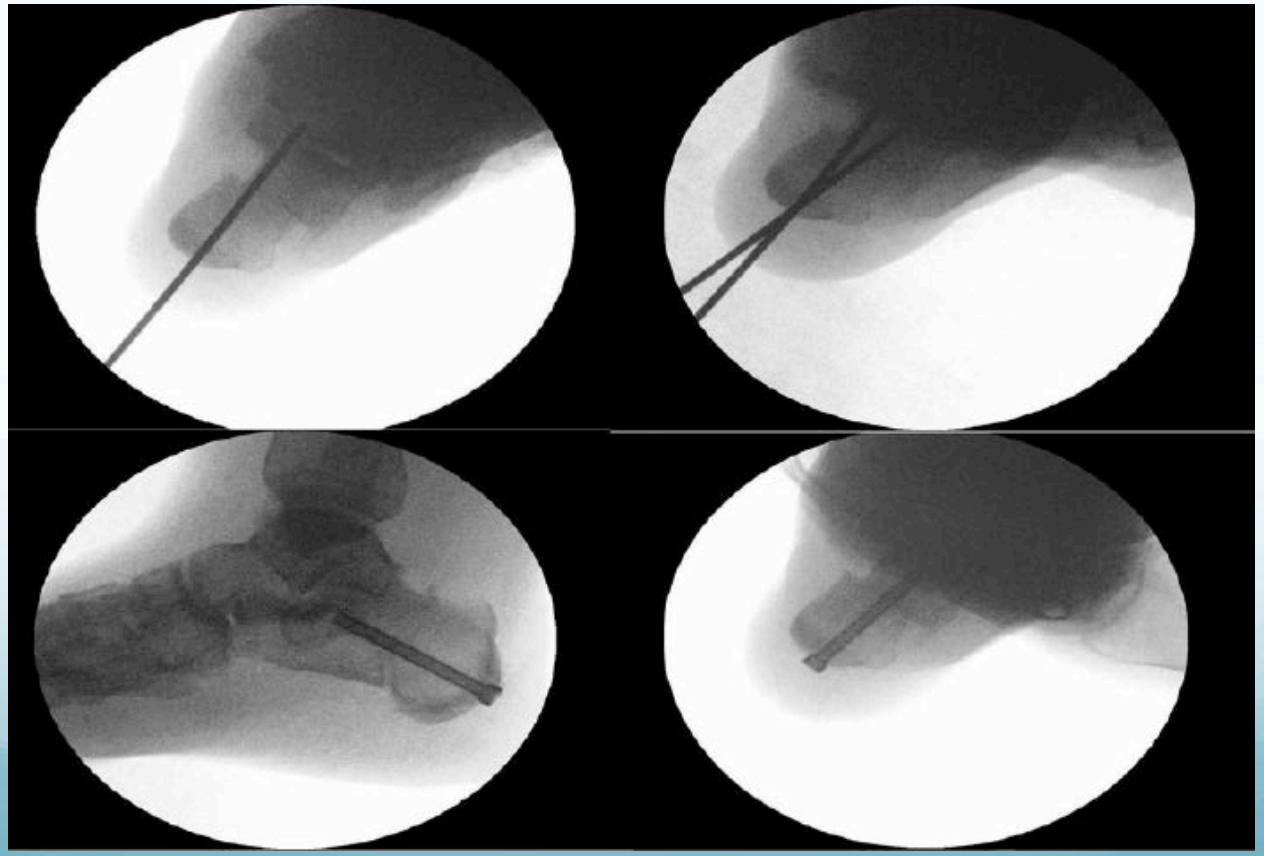
Medial Displacement Calcaneal Osteotomy Using Minimally Invasive Technique

Foot & Ankle International®
2015, Vol. 36(3) 248–252

DOI: 10.1177/1071100714557154
fai.sagepub.com

Ehab Kheir, FRCS Tr&Orth[1], Vishal Borse, MRCS[1], Jon Sharpe, FRCR[2], David Lavalette, FRCS Tr&Orth[1], and Mark Farndon, FRCS Tr&Orth[1]

- Good results
- No non-union
- N = 30



MCO → Correction of :

- Valgus
- Eversion force of the Achilles tendon
- Medial arch + Forefoot abduction

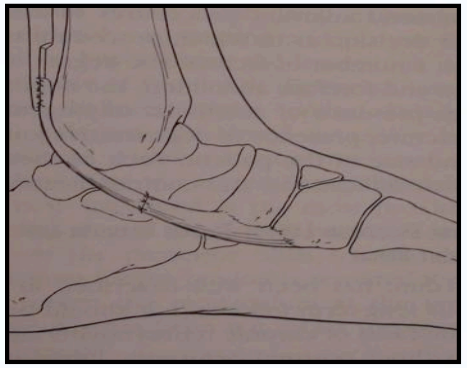
  = only if no severe flatfoot

MCO alone

not enough!

RECONSTRUCTION PTT

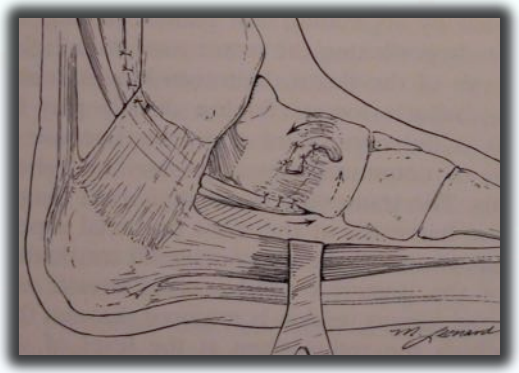
Suture / Z lenghtening

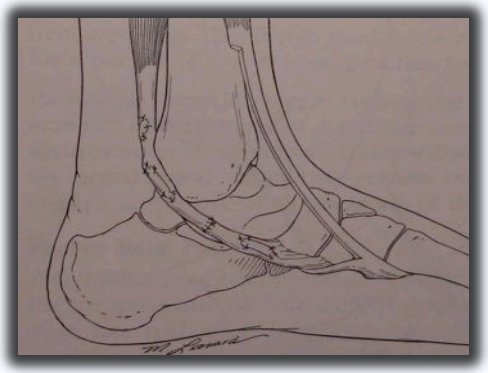


Transfert

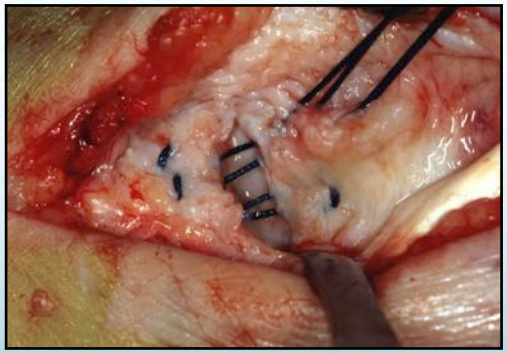
FDL-FHL

Tib ant (Cobb)





RECONSTRUCTION SPRING LIGAMENT



OSTEOTOMY - ARTHRODESIS

LCL, Cotton, MT1

N-C, T-MT

RESULTS
MCO + FDL transfert

Myerson M S *

n:32 st II PTT dysfunction
mean age : 58 y
FU : 20 months (14 to 48)
results : AOFAS score 48 to 84
94% pain relief, improvement arch of the foot

Wacker J T **

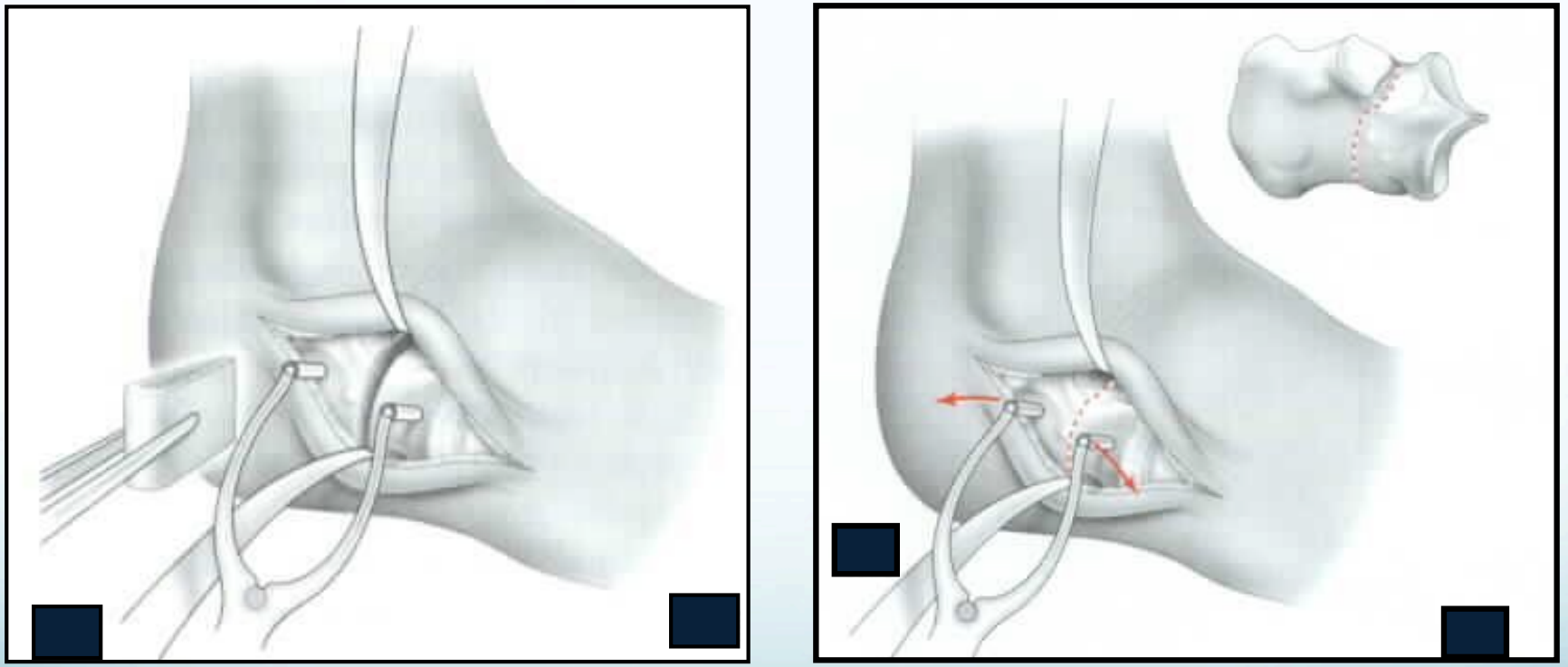
n : 44 st II PTT dysfunction
mean age 61 y
FU : 51 months (38 to 62)
results : AOFAS score 48 to 88,5
95% pain relief
80% improvement arch of the foot

* *Myerson MS, Orthopedics. 19:383-8,1996*
** *Wacker JT, JBJS. 84-B : 54-8, 2002*

CALCANEAL OSTEOTOMY:

Lateral column lengthening

St IID : forefoot abduction



picture from Hintermann B: Techniques in Orthopaedics and Traumatology 2000

EVANS PROCEDURE:

Lateral column lengthening

Correction of:

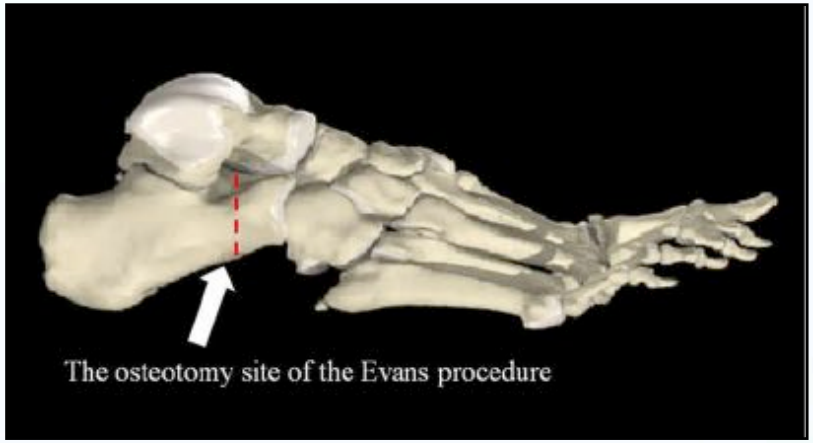
- ***Medial arch height ****

  not because F Pl tightness ***

- ***Forefoot abduction****

  improve coverage Talar head by Navicular

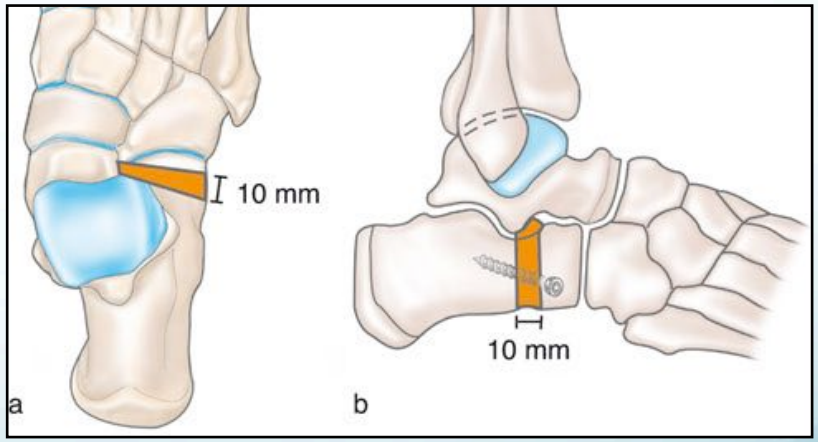
- ***Hindfoot valgus****



Side effect:

- ***Lateral forefoot plantar pressure ↗*****

  → *simultaneous procedure medially*



* *Evans D, Calcaneo-valgus deformity. JBJSBr. 1975;57-B(3):270-278*

** *Benthien et al, Foot Ankle International.2007;28(1):70-77*

*** *Horton, Myerson et al, Foot Ankle International.1998;19:370-373*

LATERAL COLUMN LENGHTENING OSTEOTOMY LCL

calcaneo-cuboidal osteoarthritis ↗

Evans	:	**65%** at 13 years follow-up
Mosier-Laclair	:	**14%** at 5 years follow-up *

Alternative = calcaneocuboïd distraction arthrodesis

- less motion hindfoot,
  *(loss subtalar motion of 18 to 30% and loss TN of 40%**)*

- increasing arthritis hind and midfoot

•Mosier-Laclair, Foot Ankle Clinic (6):95-119, 2001 Mar
*** Deland J et al, Foot Ankle.16(11) , 1995*

Table 1. The Calcaneocuboid Joint Peak Pressures Under 7 Conditions With Vertical Loads of 350 N (kg/cm^2, $\bar{x} \pm s$, n= 6)

Conditions	Peak Pressure Across the CC Joint
Intact foot	9.21 ± 1.60
Flatfoot	24.90 ± 2.45
Corrected with 4 mm LCL	21.68 ± 2.21
Corrected with 6 mm LCL	15.95 ± 2.59
Corrected with 8 mm LCL	11.04 ± 1.15
Corrected with 10 mm LCL	15.20 ± 2.35
Corrected with 12 mm LCL	21.55 ± 2.03

CC, calcaneocuboid; LCL, lateral column lengthening.

CC joint pressure ↗

CC joint Pressure ↘

CC joint Pressure ↗

LCL with 8 mm trapezoidal grafts

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DOI: 10.1177/1071100712464211
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Biomechanical Analysis of the Calcaneocuboid Joint Pressure After Sequential Lengthening of the Lateral Column

Jiang Xia, PhD[1], Peng Zhang, MD[2], Yun-Feng Yang, PhD[2], Jia-Qian Zhou, MD[2], Qian-Ming Li, MD[2], and Guang-Rong Yu, MD[2]

Cadaveric study

Linear relationship : - Graft size (Lenghtening LCL)
- Correction forefoot abduction

(measured by the RX lateral incongruency angle)

➡ ***helpfull for surgeon to titrate the proper amount of correction***

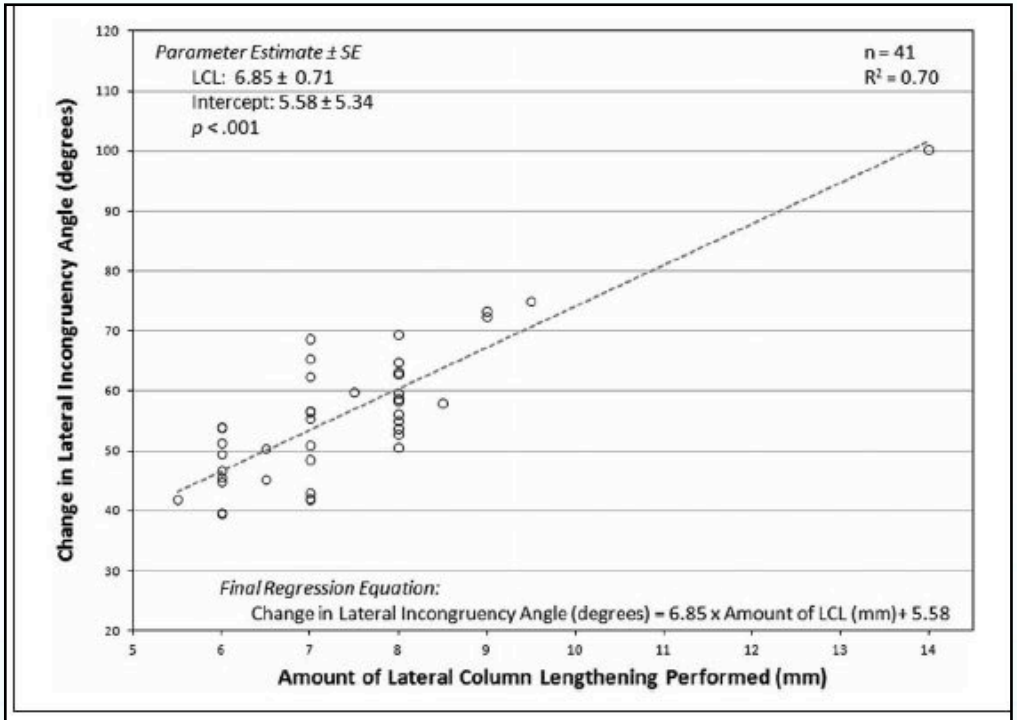

Figure 5. A linear regression model for the amount of LCL performed in relation to the change in lateral incongruency angle is shown. The model demonstrates a significant positive correlation between LCL and the correction in forefoot abduction ($P < .001$). Each additional millimeter of lengthening performed corresponded to a 6.8 degrees change in lateral incongruency angle.

Article

AMERICAN ORTHOPAEDIC FOOT & ANKLE SOCIETY

Foot & Ankle International
1–12
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DOI: 10.1177/1071100715596607
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Contribution of Lateral Column Lengthening to Correction of Forefoot Abduction in Stage IIb Adult Acquired Flatfoot Deformity Reconstruction

Jeremy Y. Chan, MD[1], Stephen T. Greenfield, MD[1], Dylan S. Soukup, BS[1], Huong T. Do, MA[2], Jonathan T. Deland, MD[1], and Scott J. Ellis, MD[1]

Kind of graft shape?

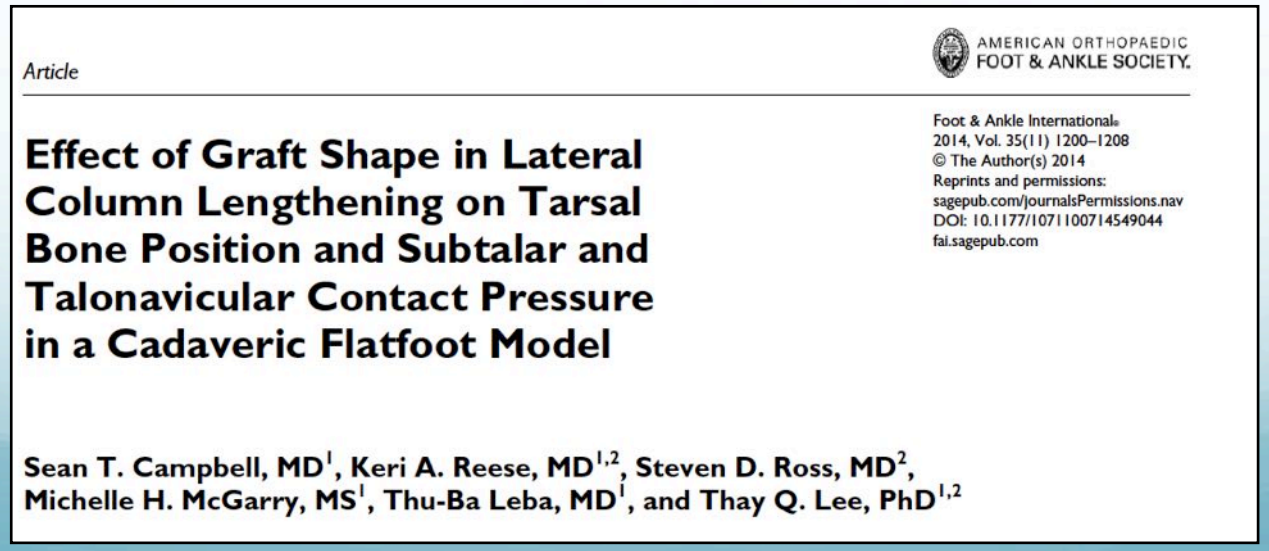
Majority of publications = trapezoidal graft

Rectangular graft

➡ *Better bony realignment = Better flatfoot deformity correction*

(more graft volume medially)

(Intraarticular TN pressure ↓ : trapezoidal = rectangular)



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2014, Vol. 35(11) 1200–1208

DOI: 10.1177/1071100714549044
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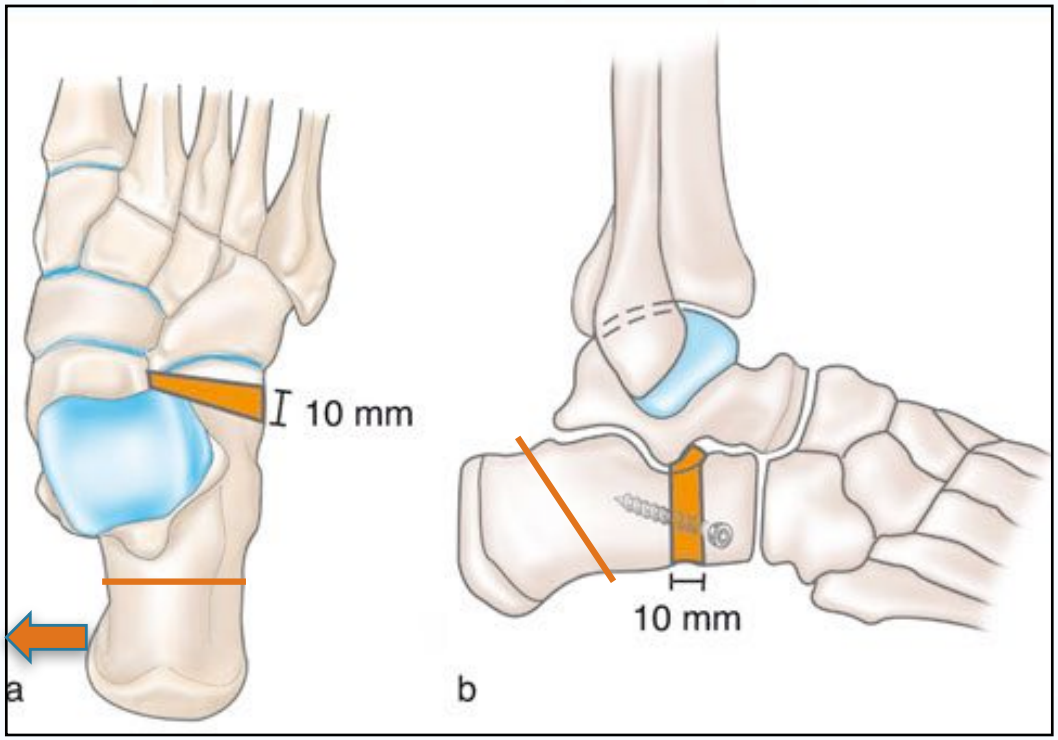
Effect of Graft Shape in Lateral Column Lengthening on Tarsal Bone Position and Subtalar and Talonavicular Contact Pressure in a Cadaveric Flatfoot Model

Sean T. Campbell, MD[1], Keri A. Reese, MD[1,2], Steven D. Ross, MD[2], Michelle H. McGarry, MS[1], Thu-Ba Leba, MD[1], and Thay Q. Lee, PhD[1,2]

DOUBLE OSTEOTOMY : MCO + LCL



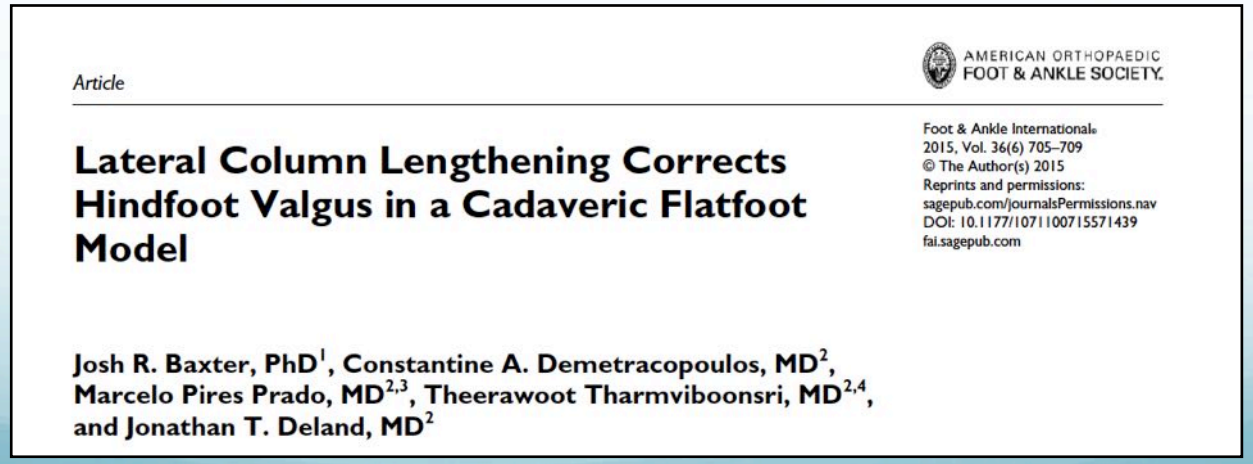
If double osteotomy performed : Prior MCO or Prior LCL?

- Performing MCO prior to the LCL osteotomy

→ *Risk of overcorrection (cfr additional hindfoot inversion)*

- Performing LCL osteotomy prior to MCO

→ ***Reduce risk of overcorrection***



Article

AMERICAN ORTHOPAEDIC FOOT & ANKLE SOCIETY

Lateral Column Lengthening Corrects Hindfoot Valgus in a Cadaveric Flatfoot Model

Foot & Ankle International
2015, Vol. 36(6) 705–709

DOI: 10.1177/1071100715571439
fai.sagepub.com

Josh R. Baxter, PhD[1], Constantine A. Demetracopoulos, MD[2], Marcelo Pires Prado, MD[2,3], Theerawoot Tharmviboonsri, MD[2,4], and Jonathan T. Deland, MD[2]

LCL without MCO

Foot and Ankle Surgery 19 (2013) 56–61

Contents lists available at SciVerse ScienceDirect

Foot and Ankle Surgery

journal homepage: www.elsevier.com/locate/fas

Lengthening osteotomy of the calcaneus and flexor digitorum longus tendon transfer in flexible flatfoot deformity improves talo-1st metatarsal-Index, clinical outcome and pedographic parameter

Martinus Richter MD, PhD*, Stefan Zech MD

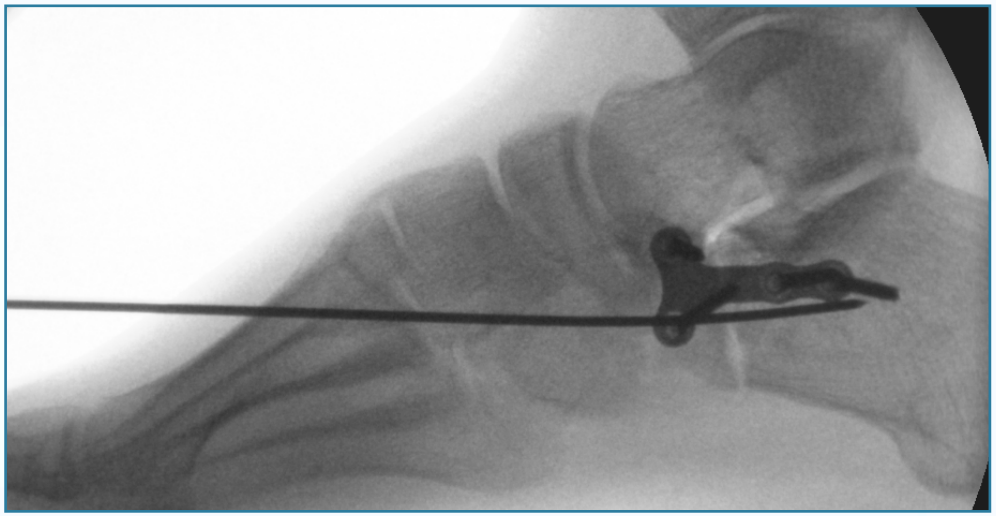
Department for Foot and Ankle Surgery Rummelsberg and Nuremberg, Germany

- LCL osteotomy
  (autologous tricortical bone block, T-plate)
- Reinsertion Post. tib.
- FDL transfer to navicular
- Reconstruction Spring ligament
- Gastroc-slide/lengthening

N=112 feet
FU 2 years n101 feet
58,2y

Talo-MT1 normalized
Post Tib insufficiency improved
VAS FA improved
Pedography normalized

9% wound healing delay



Association
- LCL
- reconstructionTib Post + Spr Lig

- Ach T lenghtening

safe and predictable technique
Flatfoot correction
(Abducto-Plano-Valgus)

CONCLUSION

- **Posterior Tibialis Tendon Dysfunction St II**
  =
  Complex problem
  multiple therapeutic options

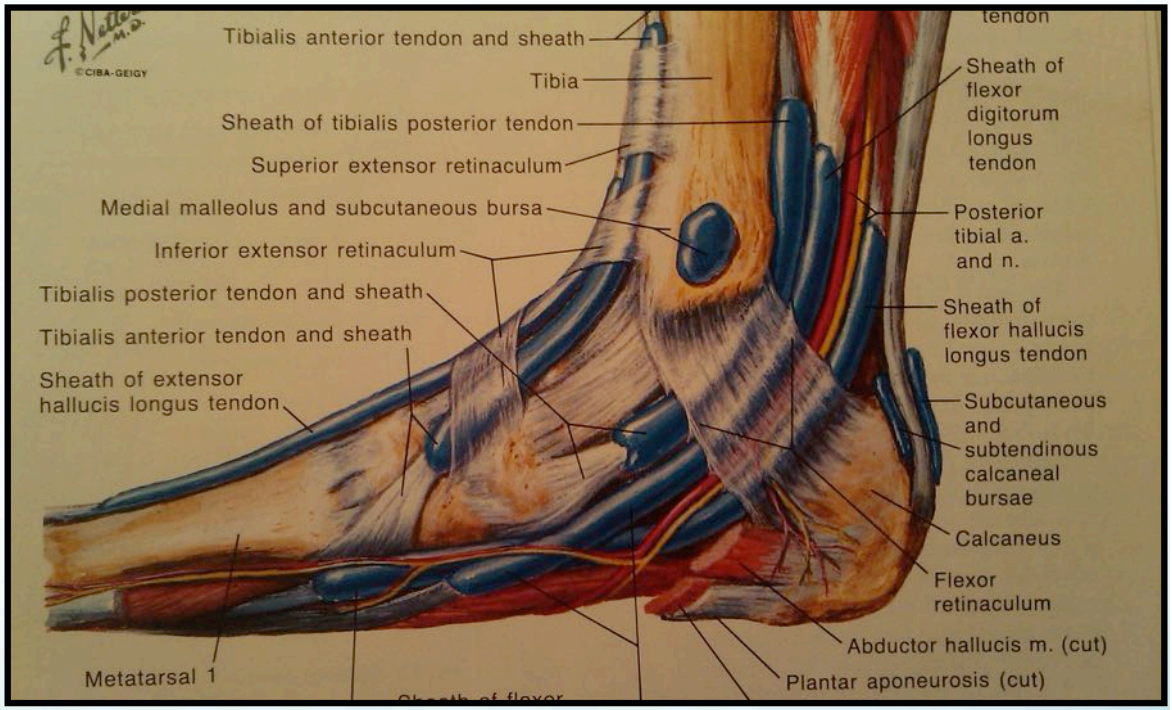
- **MCO or LCL = not to be used alone**
  Need for Additional procedures
  depending on the deformations

Thanks


1770. PIED ANTIOVE,
DE LA STATVE D'HERCVLE DIT FARNESE, MVSEE DE NAPLES

TIBIALIS POSTERIOR TENDON

- Inversion of the heel
- Adduction forefoot
- Plantar flexion of the Ankle



Inversion of the heel
Adduction forefoot
Plantar flexion of the Ankle

Tibialis posterior tendon

PLANO

VALGO

ABDUCTUS

DIAGNOSIS
tibialis posterior dysfunction

- flattening longitudinal arch

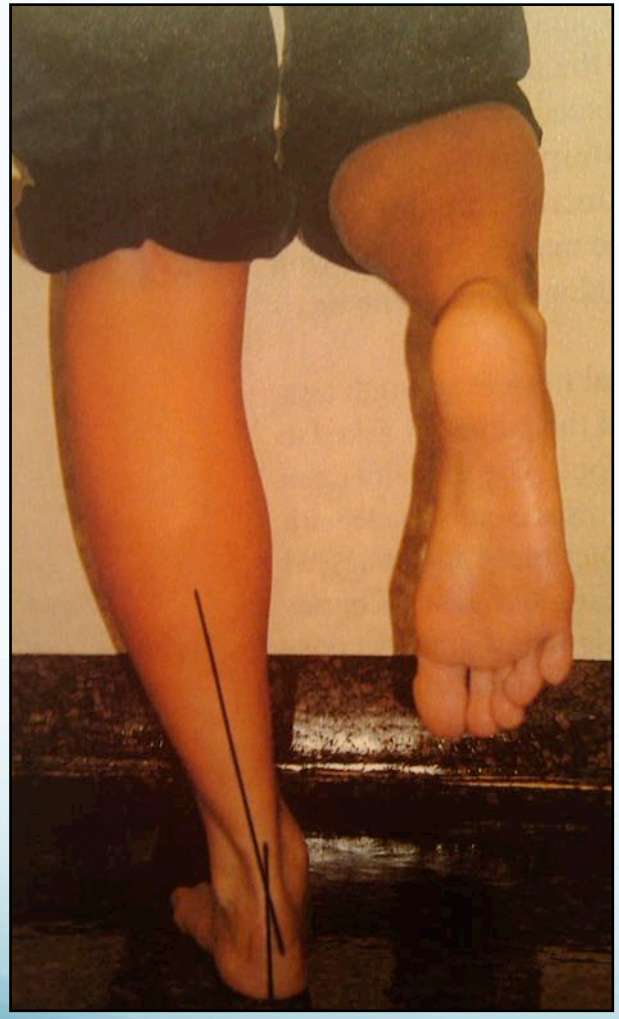
DIAGNOSIS
tibialis posterior dysfunction

- valgus of the hindfoot

DIAGNOSIS
tibialis posterior dysfunction

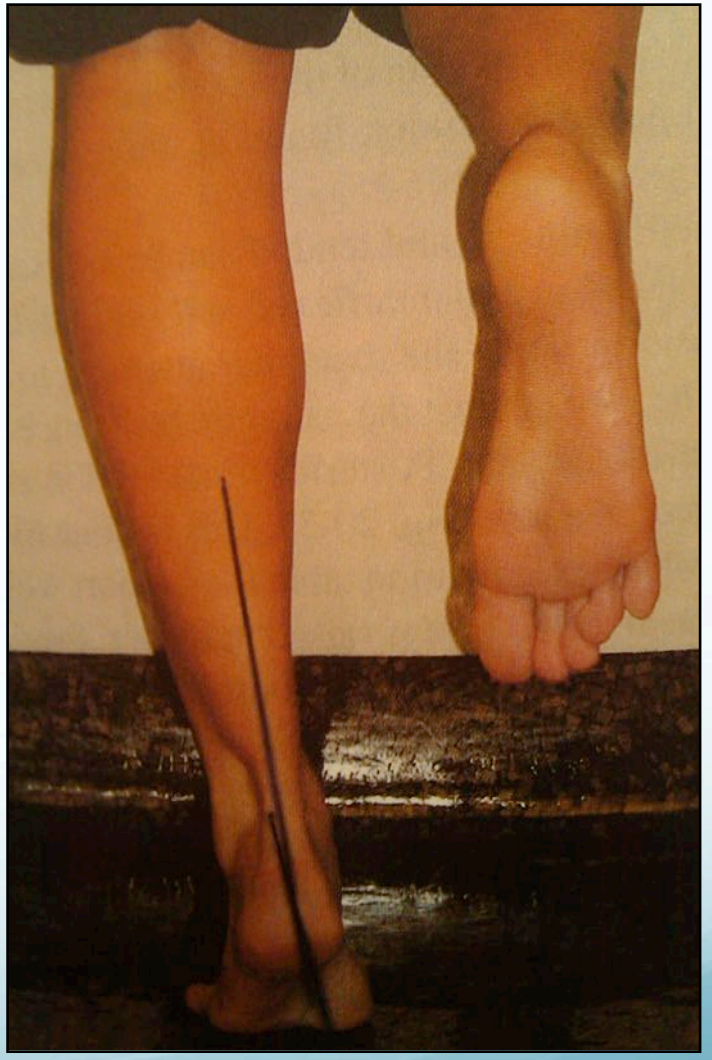
- abduction of the mid and forefoot
- „too-many-toes sign“

DIAGNOSIS
tibialis posterior dysfunction



single-heel rise test

Normal Tib Post

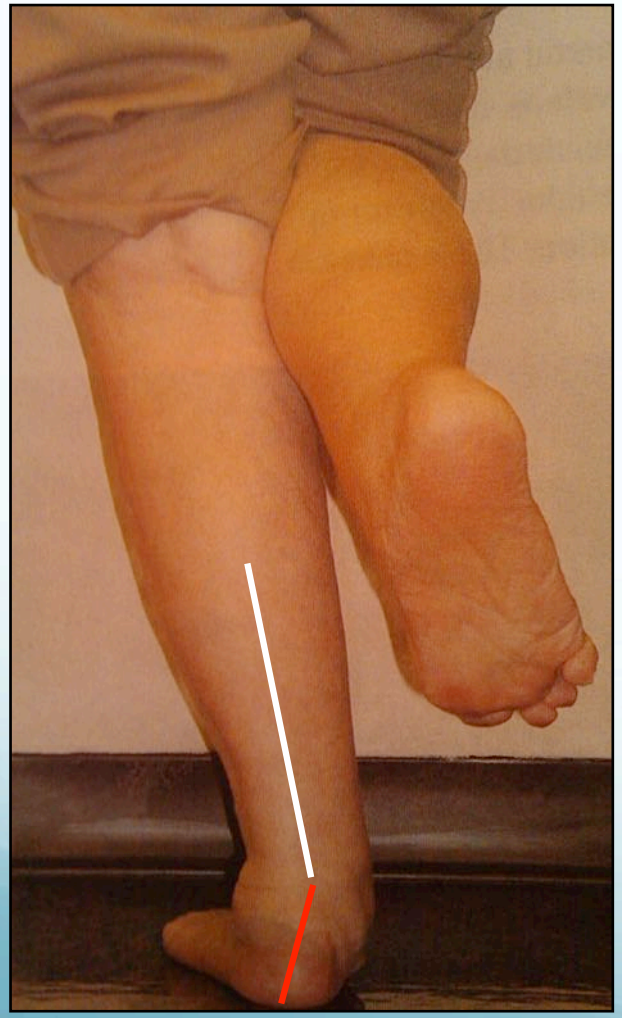


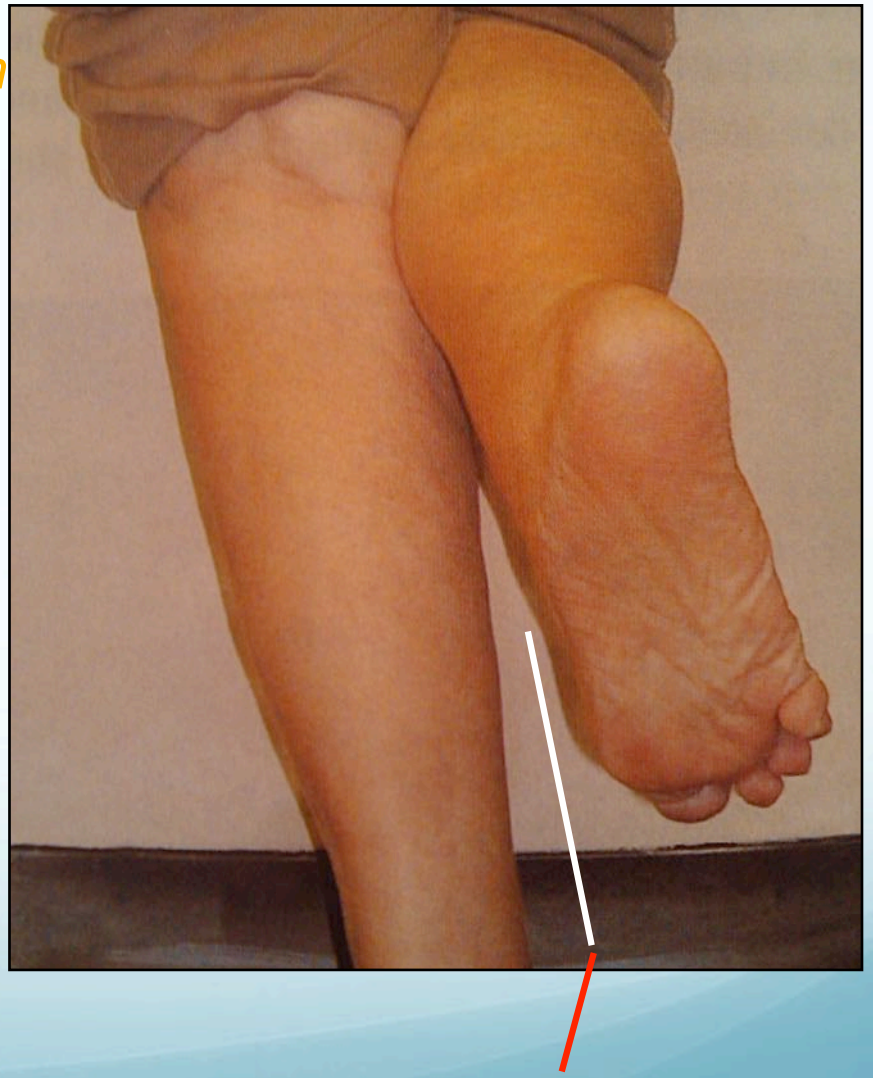
DIAGNOSIS

tibialis posterior dysfunction

„single-heel-rise test“

Tib Post Dysfun





STAGES
tibialis posterior dysfunction

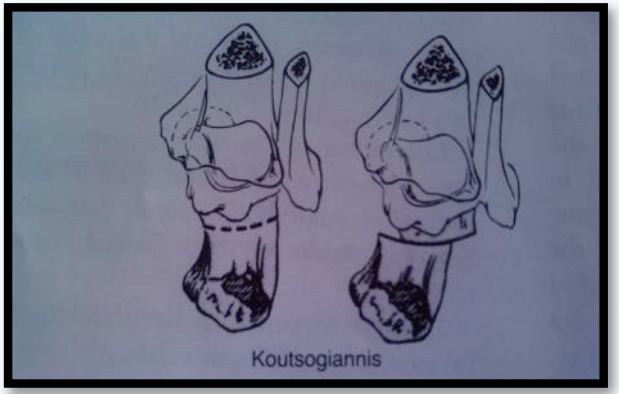
	stage 1	stage 2	stage 3	stage 4
➢ retromalleolar pain	**+**	++	++	++
➢ hindfoot valgus	(+/-)	**++**	++	++
➢ arch flattening	(+/-)	**++**	++	++
➢ forefoot supination	(+/-)	(+)	++	++
➢ forefoot abduction	(+/-)	++	**++**	++
➢ deformity	supple	supple	**rigid**	rigid
➢ **Ankle pain**	-	-	-	**++**

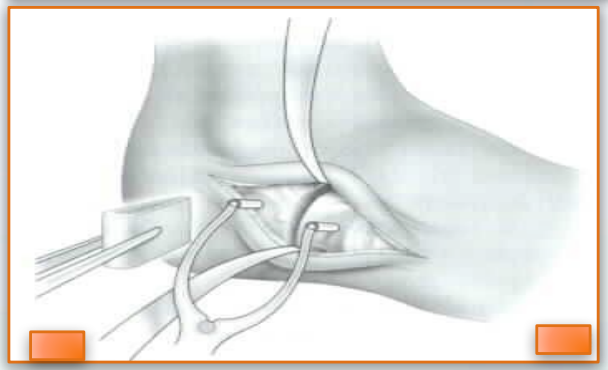
Stages 1, 2 , 3 = Johnson and Strom, Clin Orthop, 1989
Stage 4 = Myerson, JBJS Am, 1996

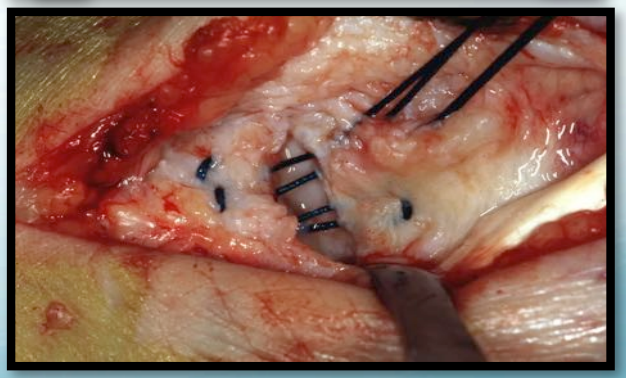
Posterior Tibial Tendon Dysfunction St II TREATMENT

***complex problem that has multiple treatment options** **

- Valgus hindfoot?
- Forefoot abduction?
- Forefoot supination?
- Medial column instability?
- Spring ligament ?
- Tibialis posterior?
- Achilles tendon ?

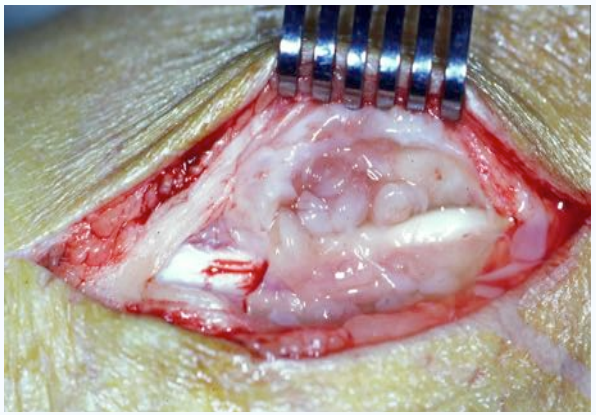




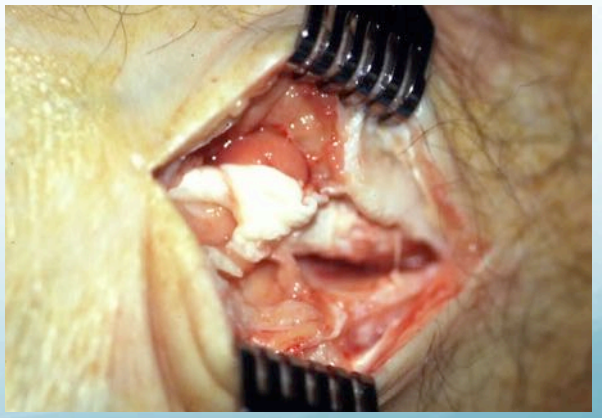


** Hill K, Foot Ankle Clin.8(1):91-104, 2003 Mar*

Posterior Tibial Tendon Dysfunction
Stage 1



- retromalleolar pain
- X Ray Normal
- Stages A : inflammation, no deformation
  B : partial PTT tear, no deformation
  C : partial PTT tear, little hindfoot valgus



→ Tenosynovitis or partial rupture

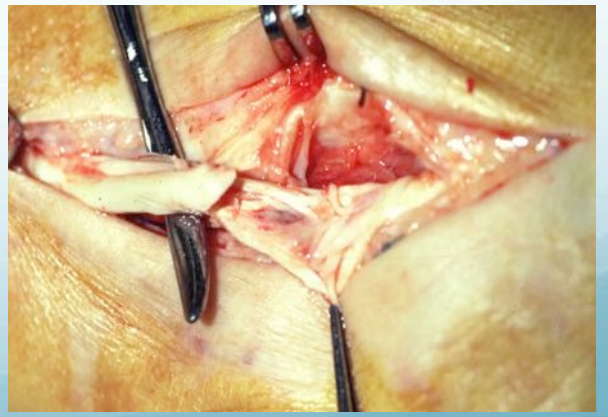
Haddad St, Myerson MS and al, Foot and Ankle Int, 2011,jan.

Posterior Tibial Tendon Dysfunction

Stage 2

Supple pes plano valgus

- *A : valgus hindfoot ; (<50% uncovering TN)*
- *B : forefoot suppination flexible (>50% uncovering TN)*
- *C : A or B with forefoot suppination fixed)*
- *D : Forefoot abduction*
- *E : medial colomn (TN, NC, CMT) instability*



→ Elongation, tendinosis

→ (partial) rupture

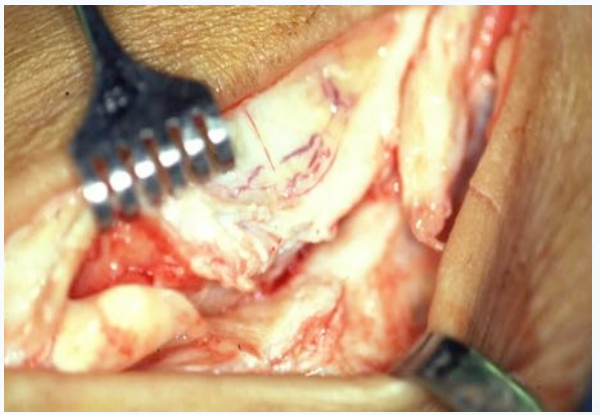
Haddad St, Myerson MS and al, Foot and Ankle Int, 2011,jan.

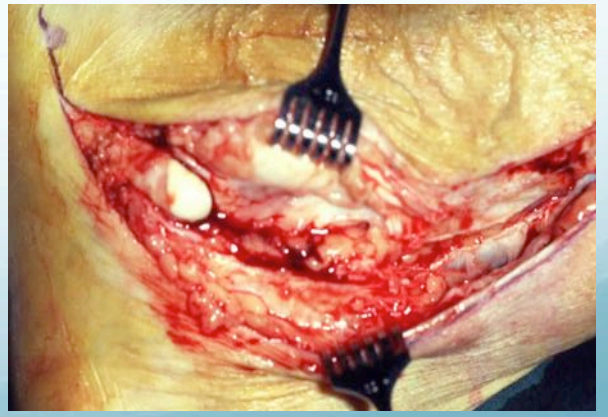
Posterior Tibial Tendon Dysfunction

Stage 3

- Rigid pes plano valgus

- *A :Hindfoot valgus*
- *B :Forefoot abduction*





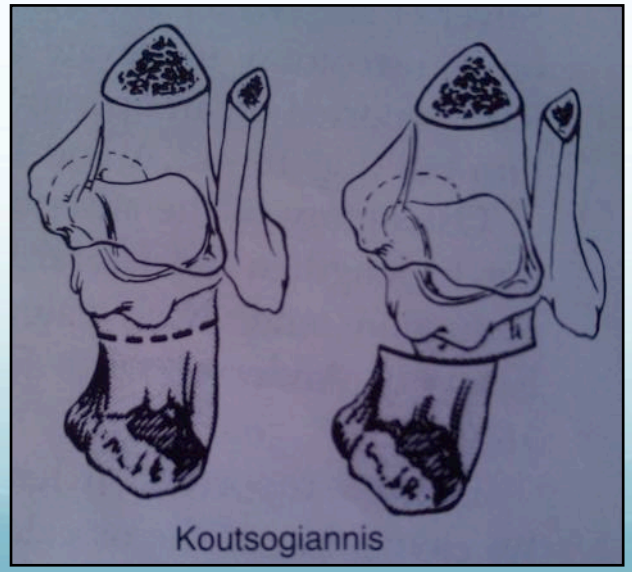
→ More advanced course of tendon rupture

Haddad St, Myerson MS and al, Foot and Ankle Int, 2011,jan

1893 : medial closing wedge (**Gleich**)

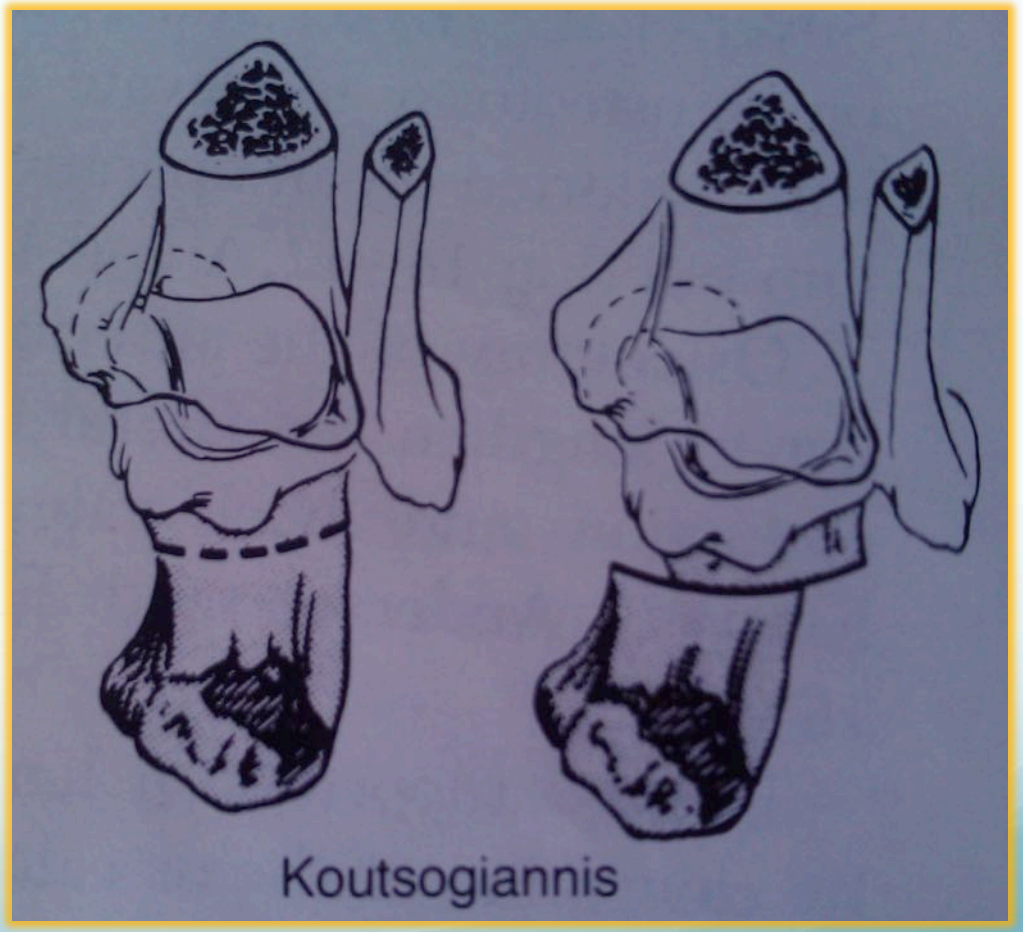
1967: lateral opening wedge (**Silver**)

MEDIALIZING CALCANEAL OSTEOTOMY
MCO (Koutsogiannis. JBJS. Febr 1971)
(valgus correction)



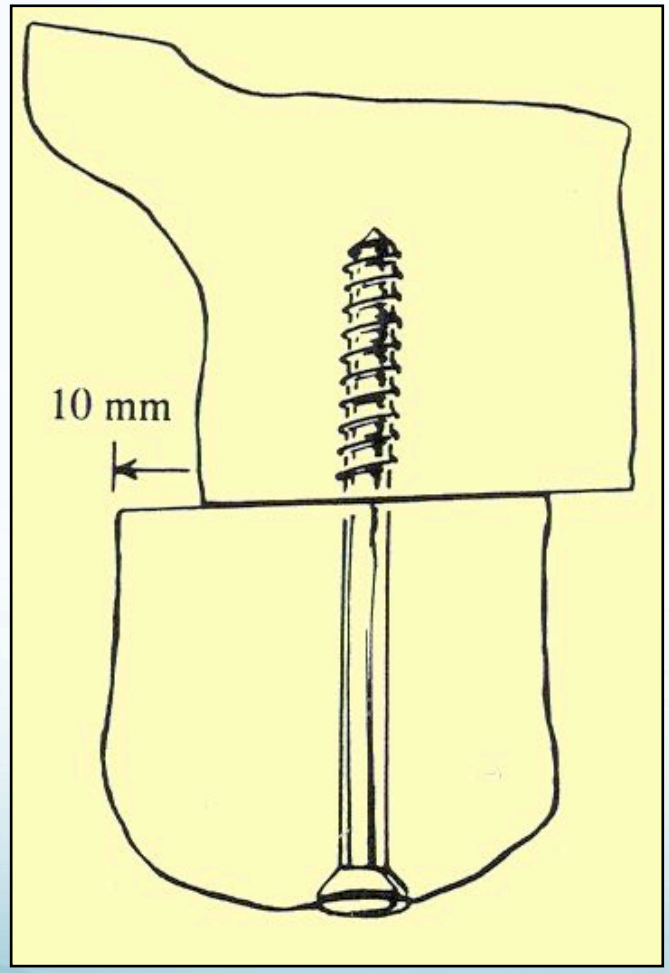
CALCANEAL OSTEOTOMY
(valgus correction)

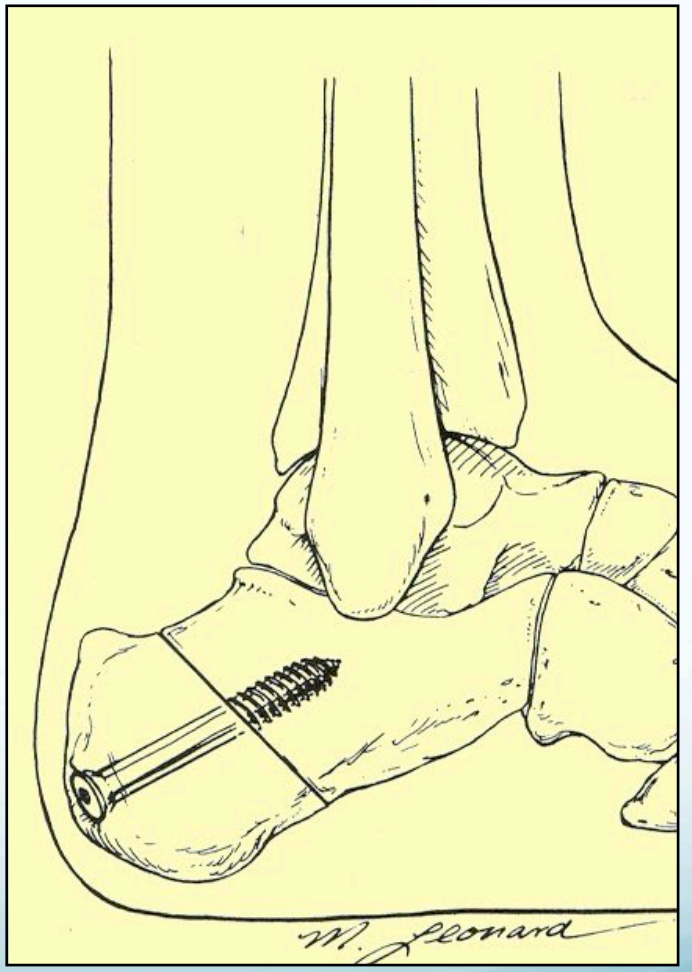
- 1971 : medial translation of the posterior fragment (**Koutsogiannis**) – *JBJS, febr 1971-*



MEDIAL TRANSLATION POSTERIOR PART CALCANEUM

(1/3 to ½ of the width of the calcaneus; 1 cm)



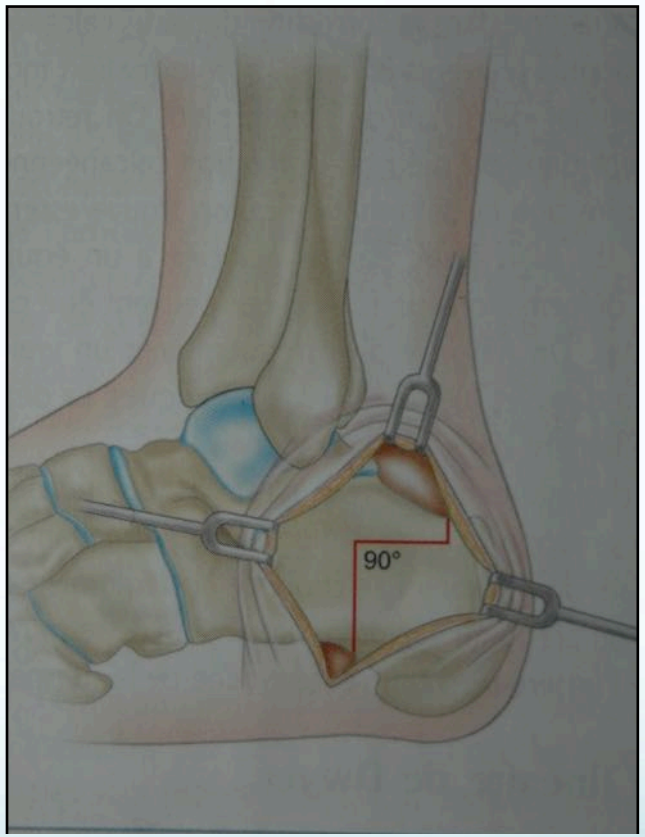


CALCANEAL OSTEOTOMY

(valgus correction)

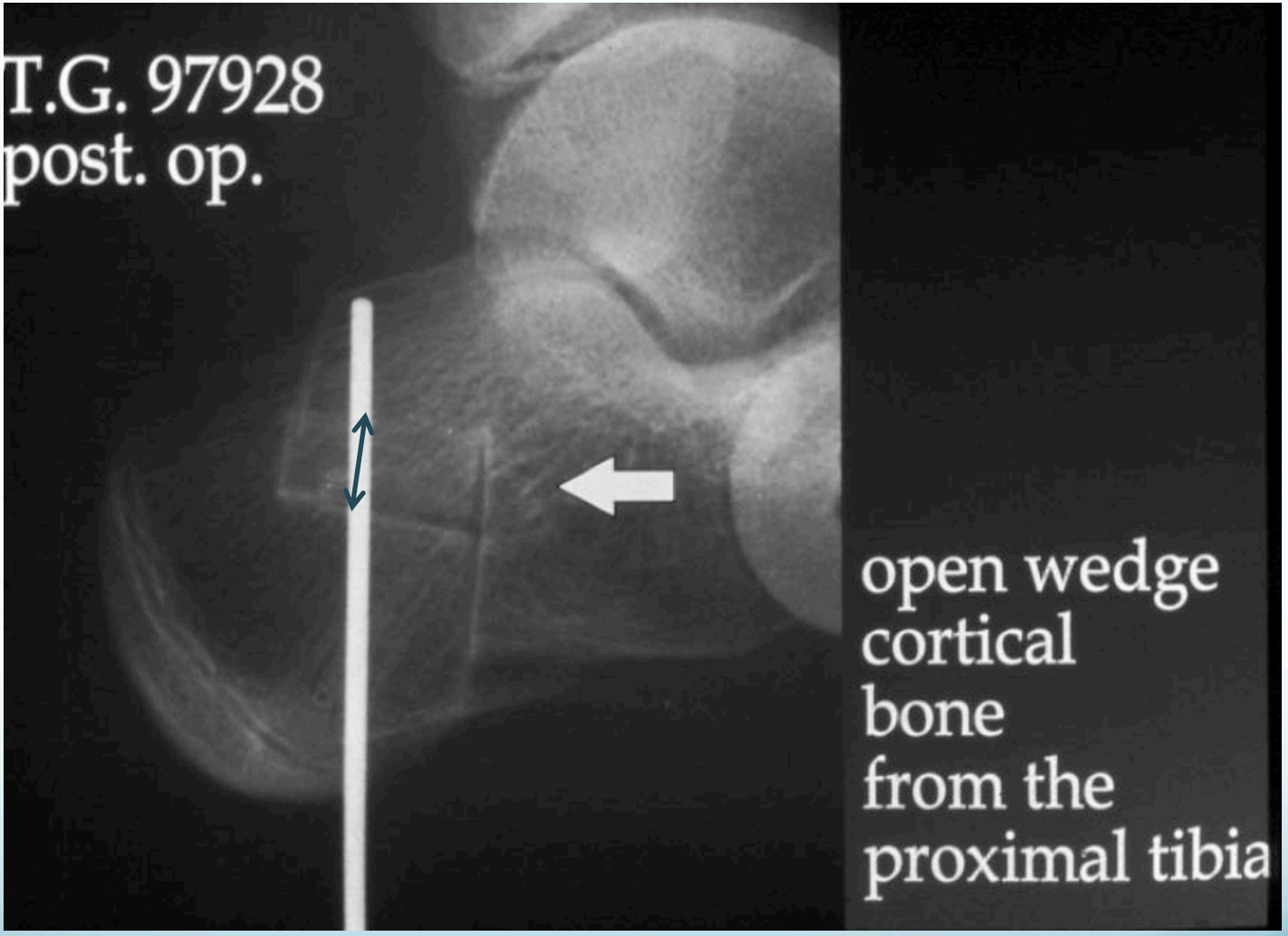
LATERAL OPENING WEDGE OSTEOTOMY

2005 : Z osteotomy
*(**Malerba**)*



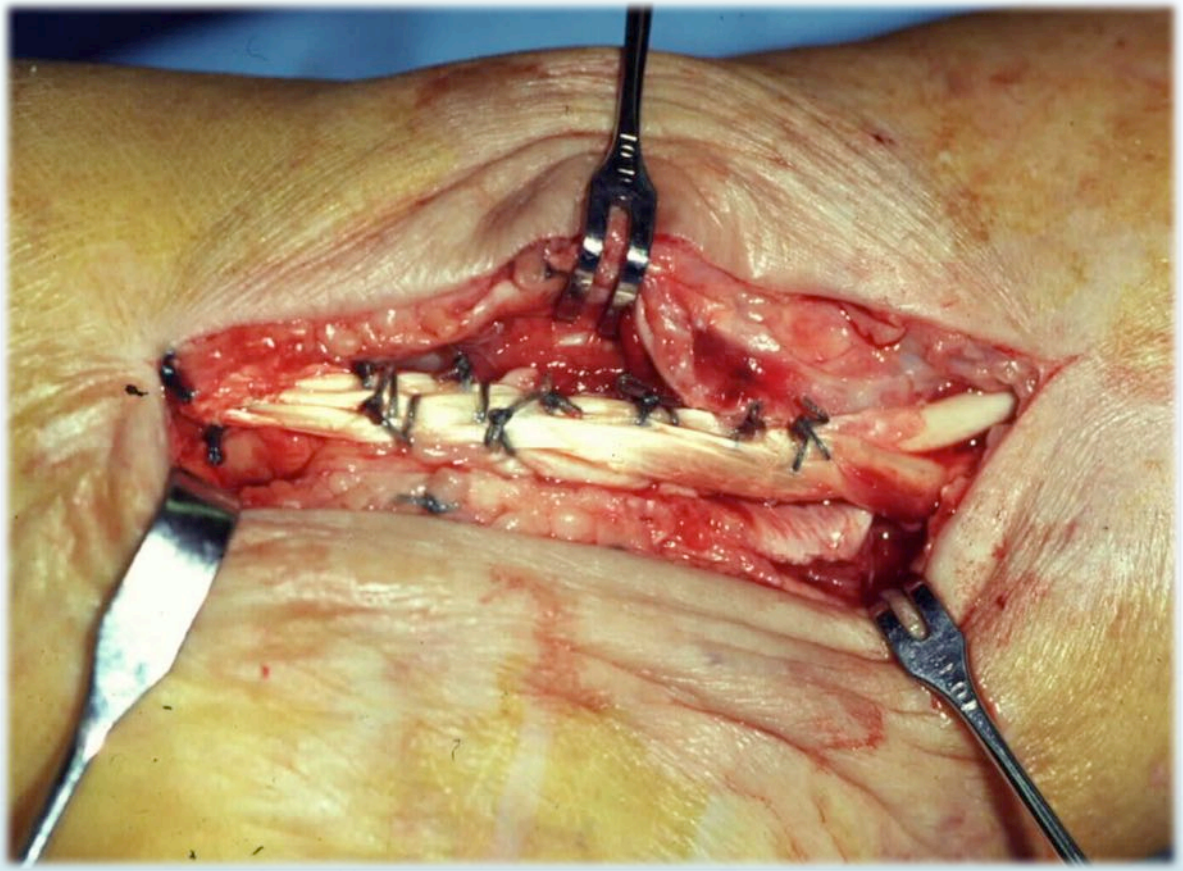
pictures from: Th Leemrijse, B Valtin, Pathologie du Pied et de la cheville, 2009

MALERBA OSTEOTOMY
Lateral *opening* wedge osteotomy

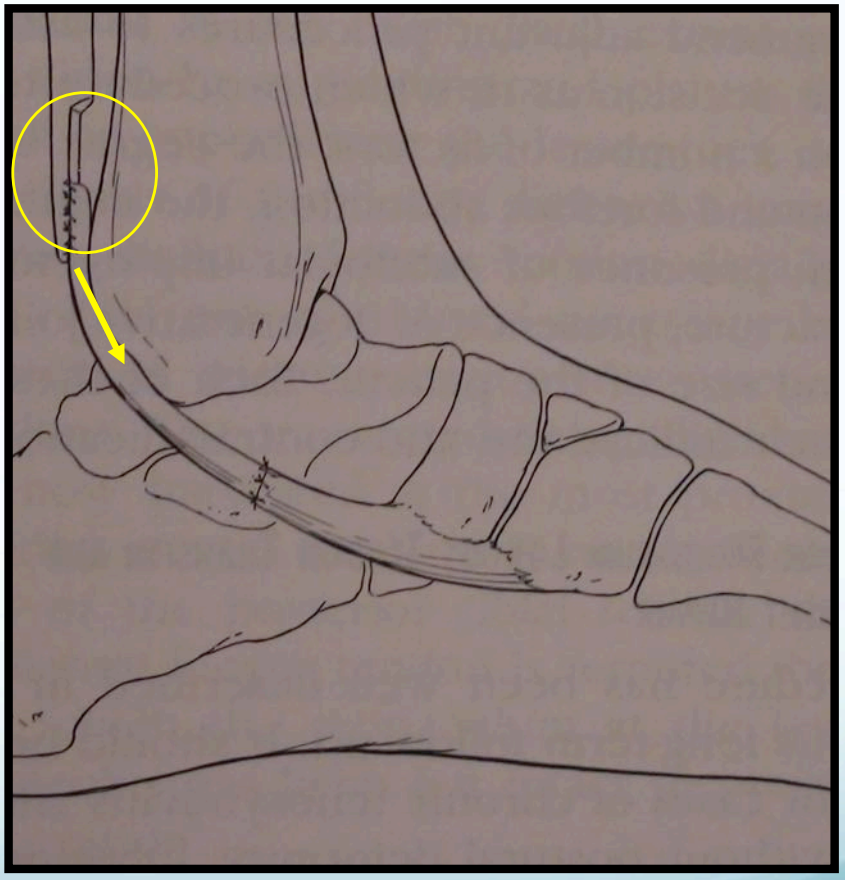


picture from: Th Leemrijse, B Valtin, Pathologie du Pied et de la cheville, 2009

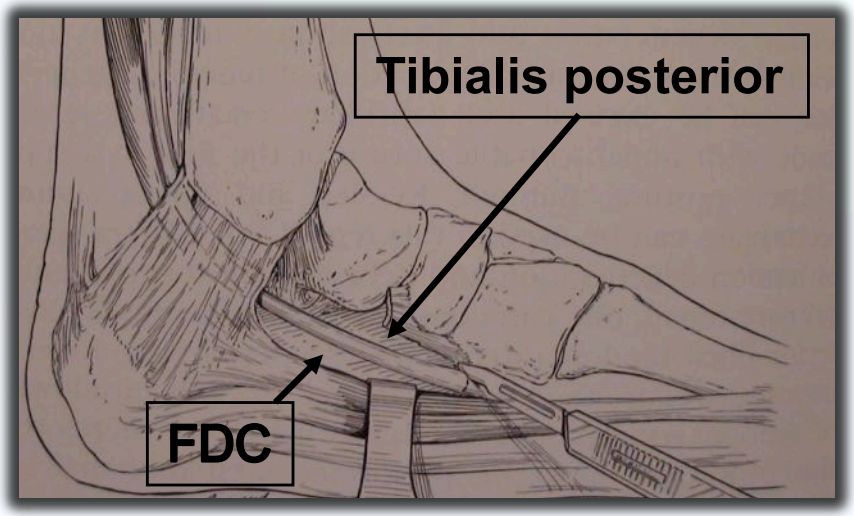
TIBIALIS POSTERIOR RECONSTRUCTION : suture

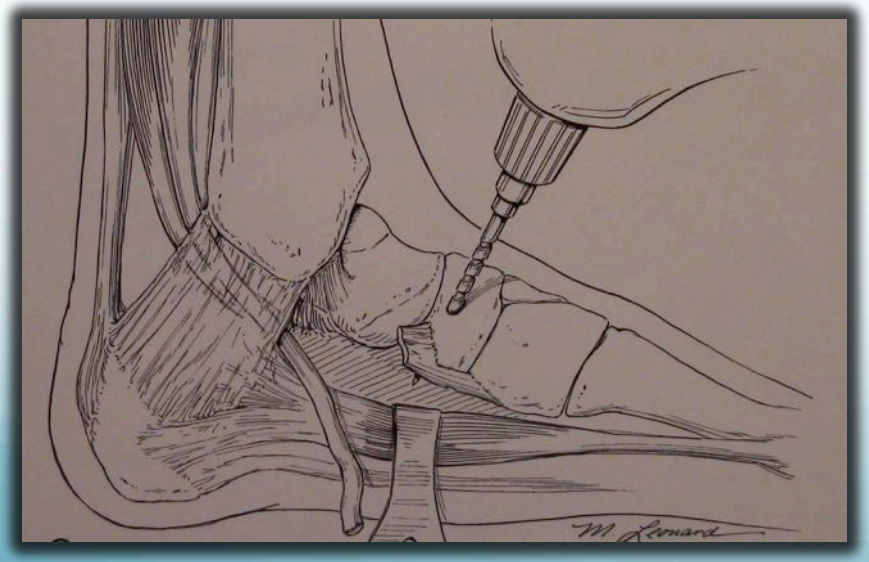


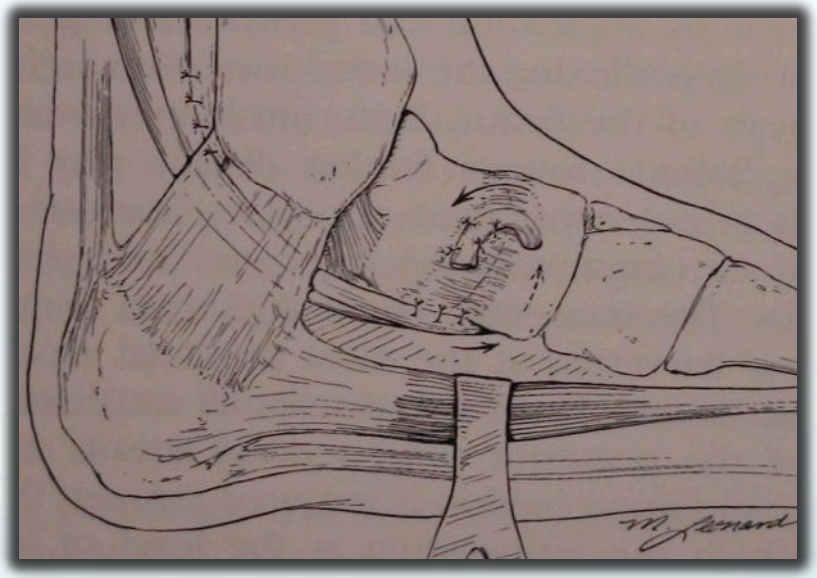
TENDON RECONSTRUCTION:
Z-lengthening



TENDON RECONSTRUCTION : FHL or FDC transfert

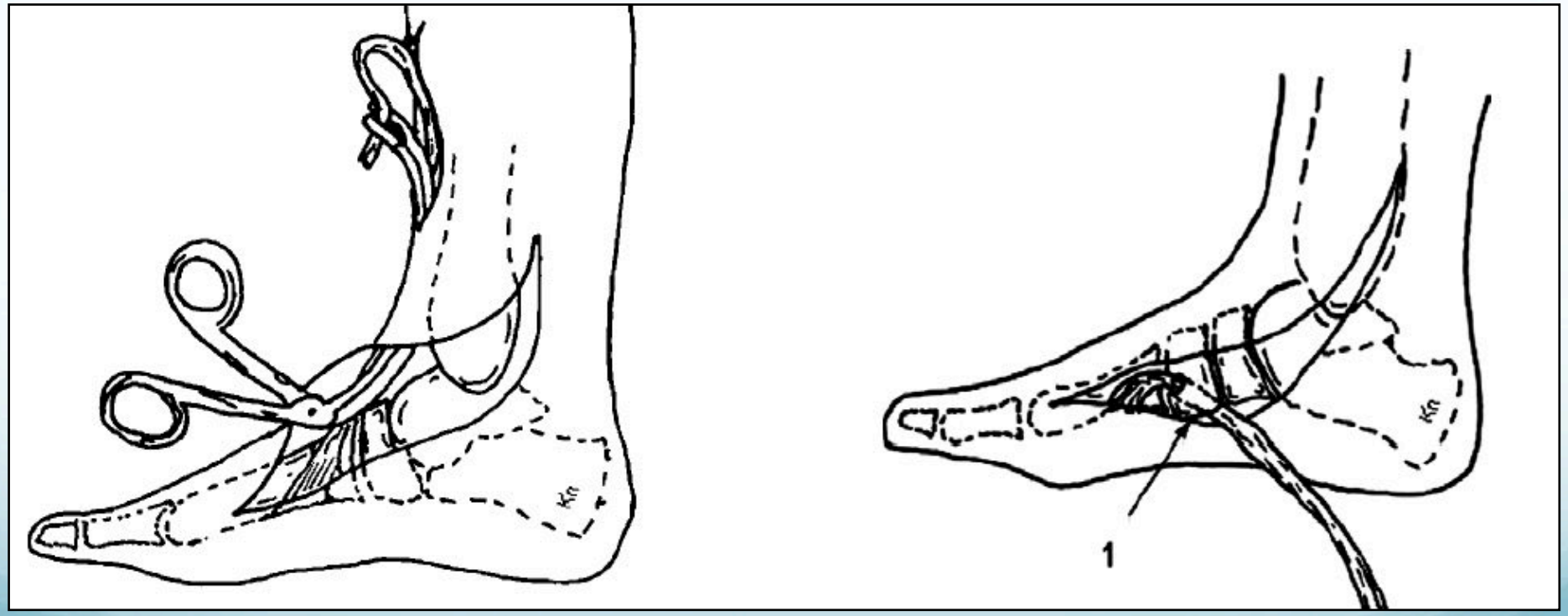






TENDON RECONSTRUCTION WITH TIBIALIS ANTERIOR COBB TECHNIQUE

restore plantar flexion power of the 1st ray
(more distal insertion of the Tib Ant)
supple forefoot supination St IIB



Knupp M, Hintermann B, Foot Ankle Int,. vol 28 (4) : 416-21, 2007

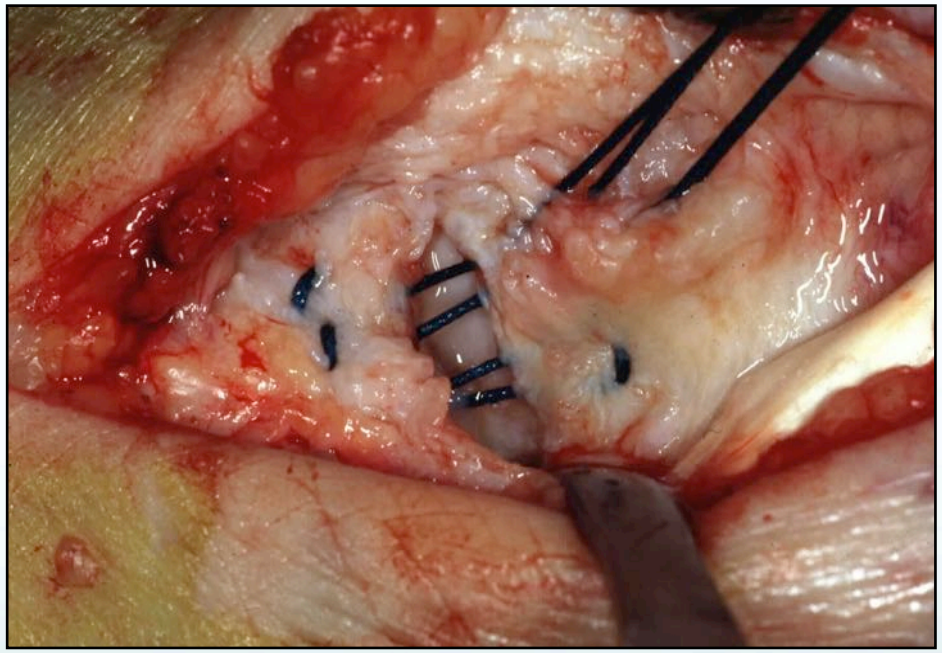
COBB TECHNIQUE

Knupp M, Hintermann B

- n = 22 PTT dysfunction st IIB
- FU : 24 months
- results : AOFAS score 53,2 to 88,5
  excellent / good results : **95 %**
  no decreasing Force of TA

- Cobb technique = apropriate alternative to arthrodesis
  in st II B PTT dysfunction (in addition with other technique)

LIGAMENT RECONSTRUCTION
spring ligament suture



RESULTS
MCO + LCL + FDL transfert *(Mosier-Laclair**)*

- **Satisfaction rate high**
- **No medial arch restauration in all patients**
- **Cc arthritis 14%**

*** Mosier-Laclair, Foot and Ankle Clinic, Mar 2001: (6):95-119;*

Posterior Tibial Tendon Dysfunction

Stage 4

- Rigid pes plano valgus
- Lateral ankle pain

- *A : reductible ankle valgus*
- *B : rigid ankle valgus (more common presentation)*

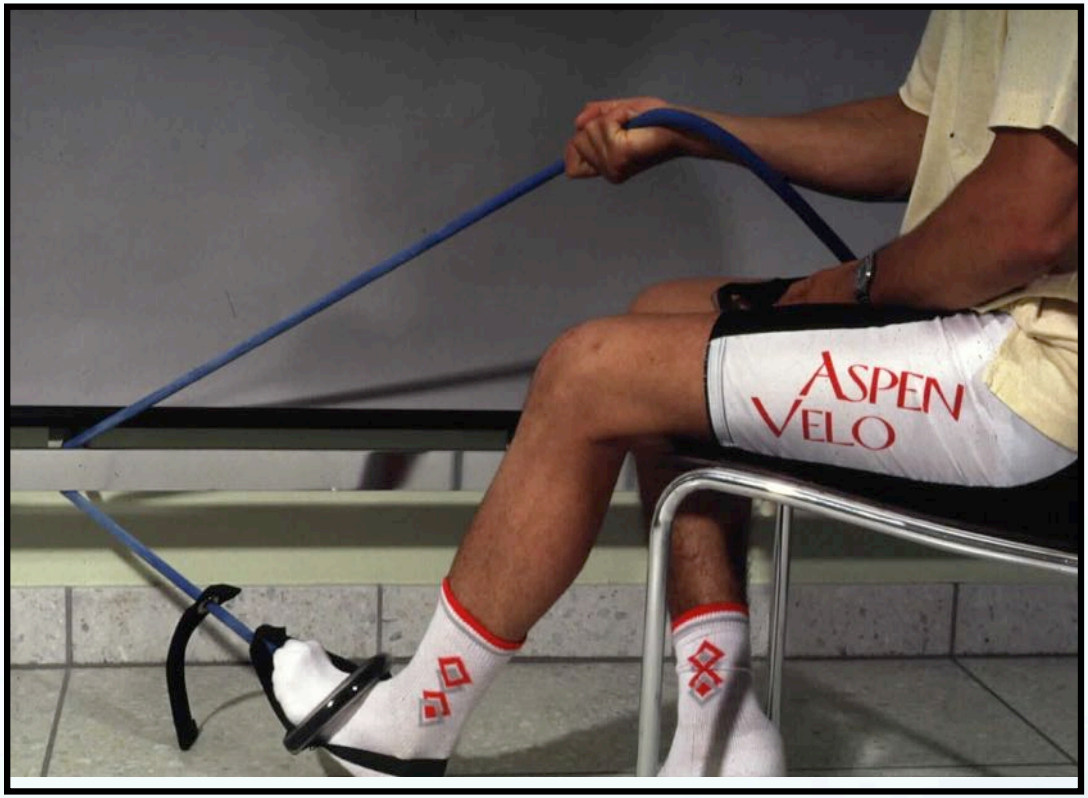
→ rupture

→ ankle arthrosis

Myerson MS and al, Foot and Ankle Int, 2011,jan

Posterior Tibial Tendon Dysfunction
TREATMENT

- Stage 1



→ conservative

- physiotherapy
- shoe corrections
- medial support

→ Surgery? Ténosynovectomy?

LCL osteotomy correct

- Majority of the hindfoot valgus deformity

- While also correct the midfoot deformity

Posterior Tibial Tendon Dysfunction Stage II

Treatment

SURGICAL

- Calcaneal osteotomy

  (>< valgus :MCO and others (Silver, Malherba...))

  (>< abd midfoot :LCL lateral column lenghtening)

- Arthrodesis

  (>< abd forefoot : lateral column lenghtening)

  (>< supp forefoot : medial colomn)

- Tendon reconstruction

  (suture, plasty, transfert FHL or FDC, Cobb)

- Ligament reconstruction

  (spring ligament)

- Others

  (Achilles tendon lenghtening, TN arthrodesis, subtalar arthrodesis, subtalar arthroeresis, medial cuneiform osteotomy, 1st MT osteotomy)

RESULTS
CC arthrodesis + PTT repair + Achilles tendon lenghtening (Lauwerens, 2006)

- **N = 20; FU = 24 months**
- **85% complete relief of pain**
- **10% nonunion**
- **15% sural nerve dammage**

Lauwerens, Acta Orthop, 2006 Feb; 77(1):156-63

RIGID FOREFOOT SUPINATION? STADIUM II C

- **Arthrodesis naviculo-cuneiform 123 ***
- **Arthrodesis 1st tarso-metatarsal**
- **Cotton osteotomy (plantar flexion opening wedge cun 1)****
- **Plantar flexion osteotomy MT1**

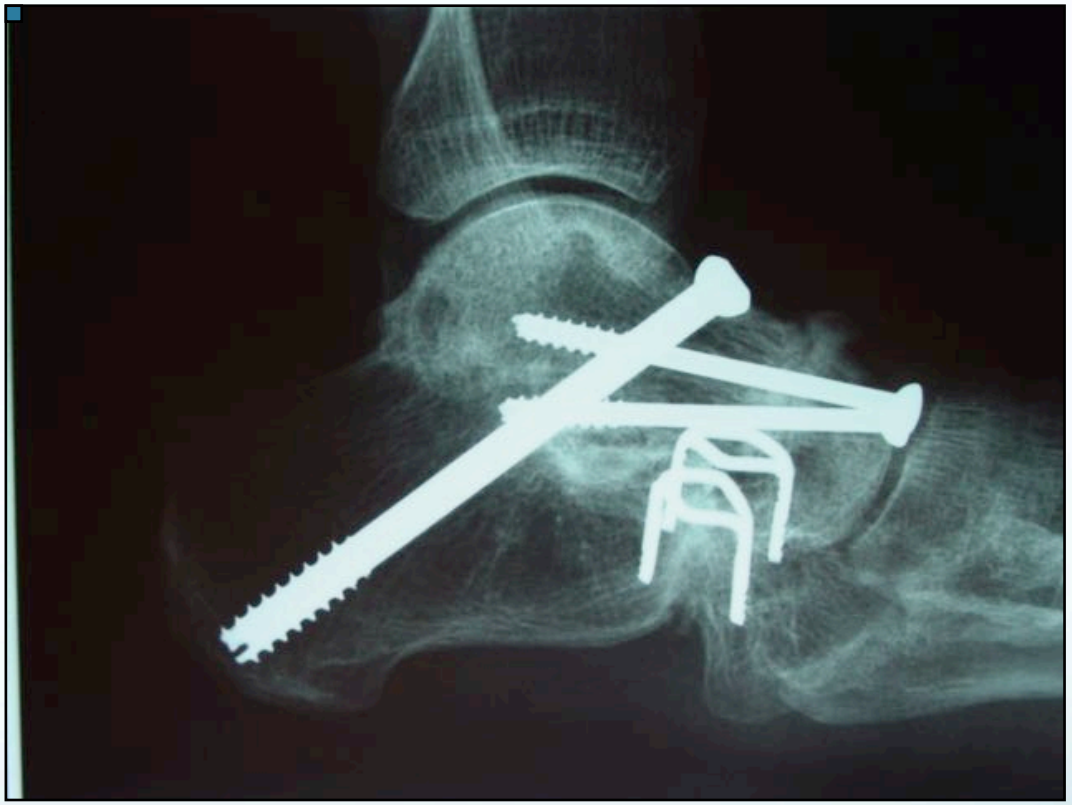
- *Alastair Younger, Foot Ankle Int. 32 (1) : 101-3, 2011*

** *Hirose CB, Foot Ankle Int. 25 : 568-74, 2004*
Stephen J Pinney, Foot Ankle Int, 27 (1) : 66-75, 2006 jan

Posterior Tibial Tendon Dysfunction

Treatment

- Stage 3
  - A : + Medial transl calc ost
  - B : + lenght lat column



→ surgical

- triple arthrodeses

Posterior Tibial Tendon Dysfunction Treatment

- Stage 4

→ Surgical*

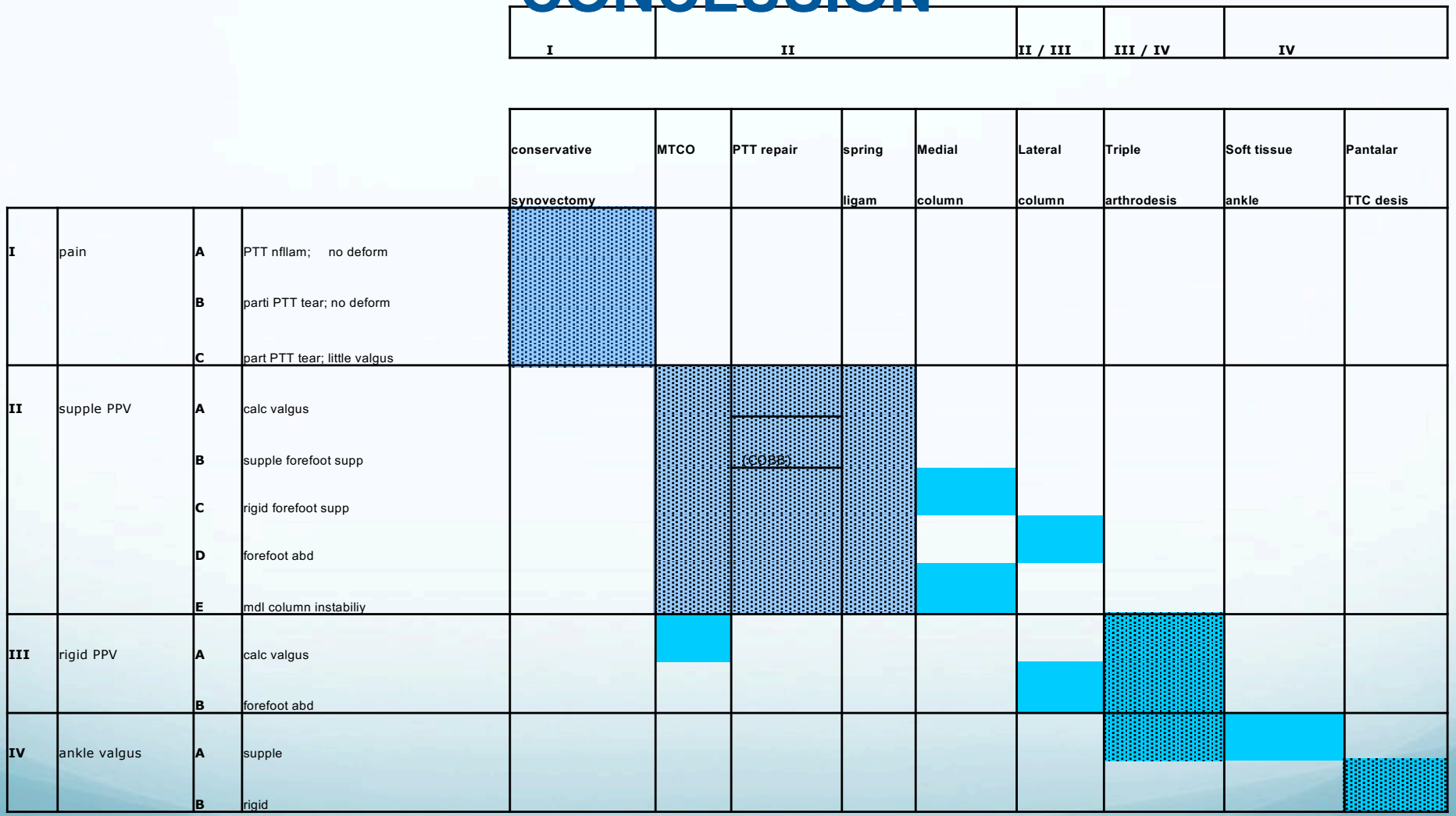
A : ankle soft tissue repair + Triple Arthrodesis

B : Panarthrodesis / TTC arthrodesis

*Bluman EM, Myerson MS, Foot Ankle Clinic, 12(2): 341-62, 2007

Posterior Tibial Tendon Dysfunction TREATMENT

CONCLUSION



Posterior Tibial Tendon Dysfunction
CONCLUSION

- Good physical examination
- Good treatment indication
- Good results

Linear relationship : - LCL graft size
- Correction forefoot abduction

(measured by the RX lateral incongruency angle)

➡ ***helpfull for surgeon to titrate the proper amount of correction***

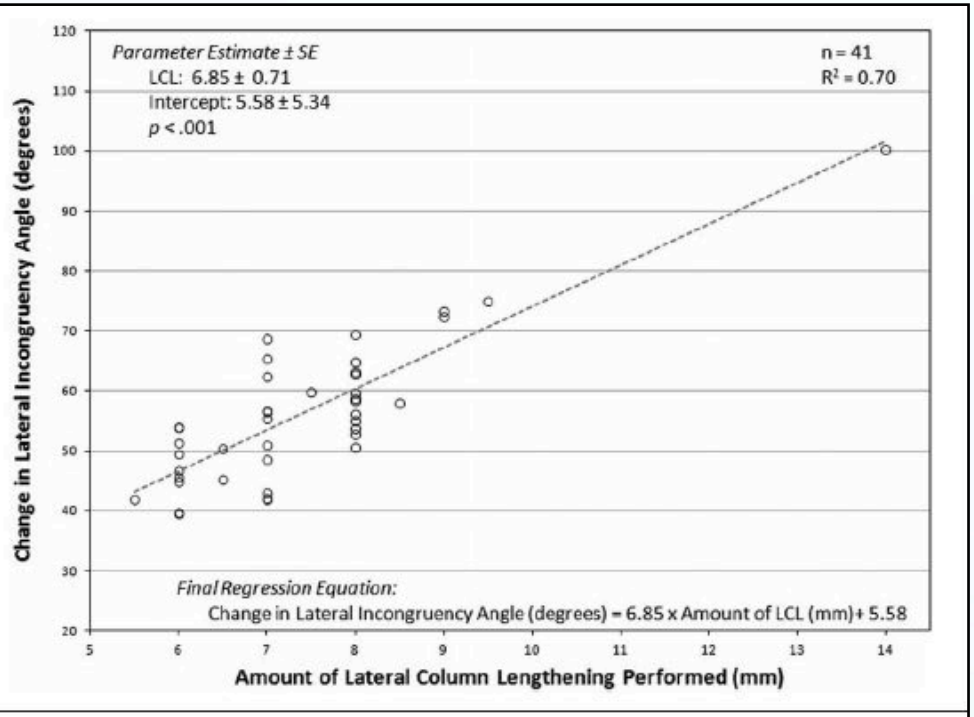


Figure 5. A linear regression model for the amount of LCL performed in relation to the change in lateral incongruency angle is shown. The model demonstrates a significant positive correlation between LCL and the correction in forefoot abduction ($P < .001$). Each additional millimeter of lengthening performed corresponded to a 6.8 degrees change in lateral incongruency angle.

Figure 1. Preoperative (A) and postoperative (B) anteroposterior radiographs of the foot in a stage IIb flatfoot patient demonstrating the lateral incongruency angle (λ). The lateral incongruency angle was defined as the angle between a line connecting the lateral aspect of the talar and navicular articular surfaces (TN) and a line connecting the lateral aspect of the talar neck and talar articular surface (TT). The angle was defined as a positive value when the TN line was positioned lateral to the TT line, indicating a position of relative forefoot abduction. Change in the lateral incongruency angle was the only parameter found to be significantly correlated with the amount of lateral column lengthening performed.

Article

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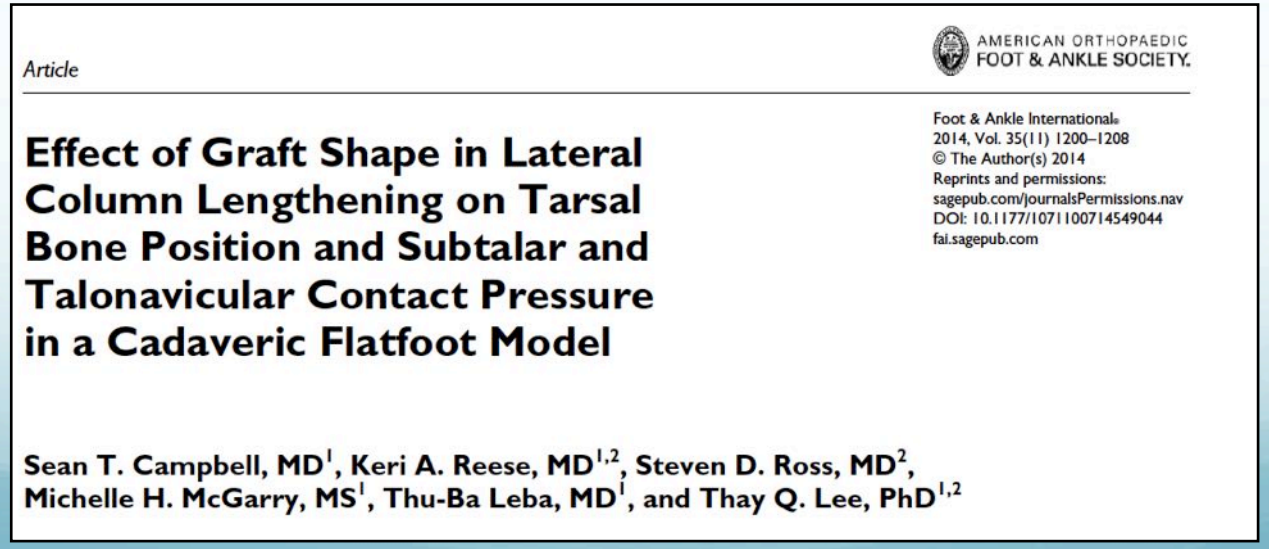
Contribution of Lateral Column Lengthening to Correction of Forefoot Abduction in Stage IIb Adult Acquired Flatfoot Deformity Reconstruction

Jeremy Y. Chan, MD[1], Stephen T. Greenfield, MD[1], Dylan S. Soukup, BS[1], Huong T. Do, MA[2], Jonathan T. Deland, MD[1], and Scott J. Ellis, MD[1]

What kind of graft shape?

Rectangular graft (no trapezoidal)

- *better bony realignment = better flatfoot deformity correction*
  (more graft volume medially)
- *Intraarticular TN pressure ↓ :trapezoidal = rectangular*



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DOI: 10.1177/1071100714549044
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Effect of Graft Shape in Lateral Column Lengthening on Tarsal Bone Position and Subtalar and Talonavicular Contact Pressure in a Cadaveric Flatfoot Model

Sean T. Campbell, MD[1], Keri A. Reese, MD[1,2], Steven D. Ross, MD[2], Michelle H. McGarry, MS[1], Thu-Ba Leba, MD[1], and Thay Q. Lee, PhD[1,2]

CONCLUSIONS

- Tibialis Posterior Dysfunction St II

=

Complex problem

multiple therapeutic options

- MCO or LCL = not to be used alone

Additional procedures mandatory

depending on the deformations

- Displacement :

- MCO = *Hindfoot moment arm = 0-5 mm varus*
- LCL = 0,8 cm

- Double Osteotomy: LCL prior to the MCO

avoid overcorrection