



CHEVILLE



Pathomécanique de l'instabilité de Cheville

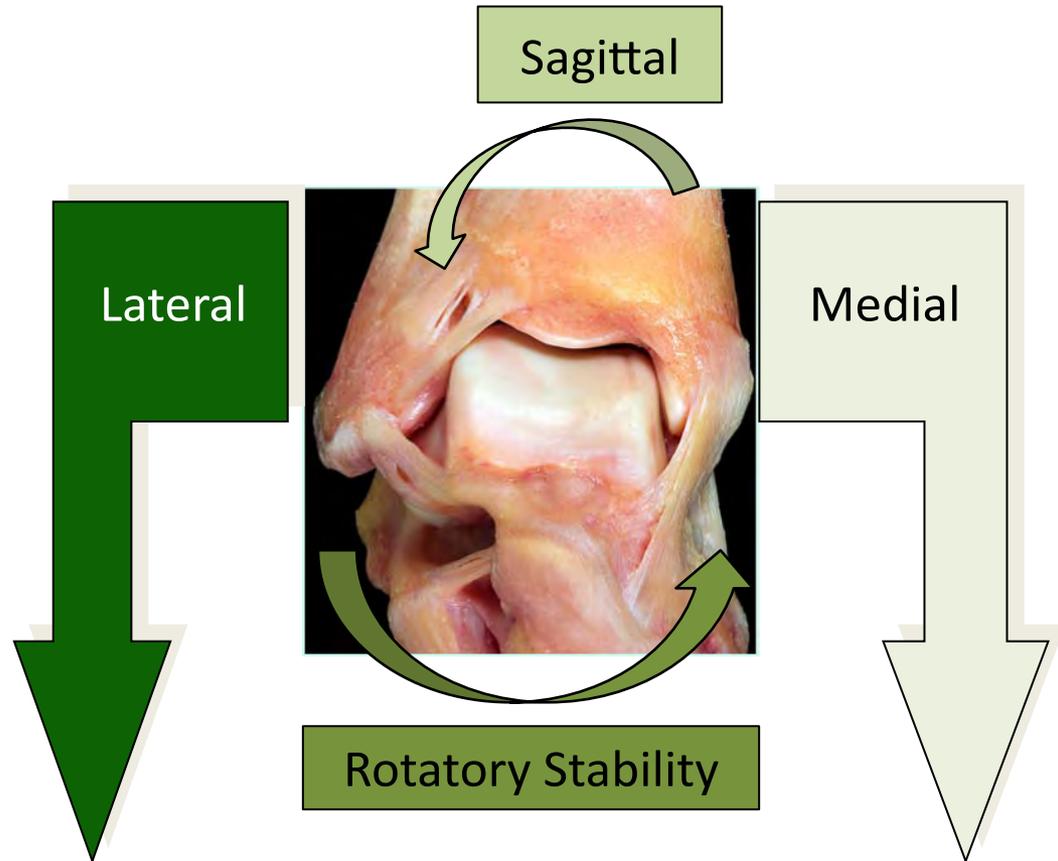
EFAS day
17th EFORT
June 2016
Geneva

Pr Christian MABIT



FACTEURS STABILITE

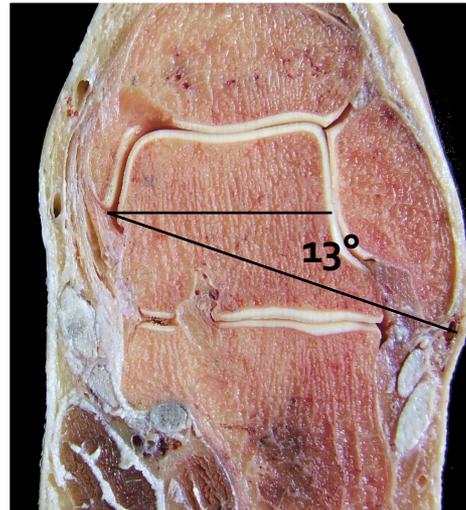
OS
LIGAMENTS
MUSCLES
PROPRIOCEPTION



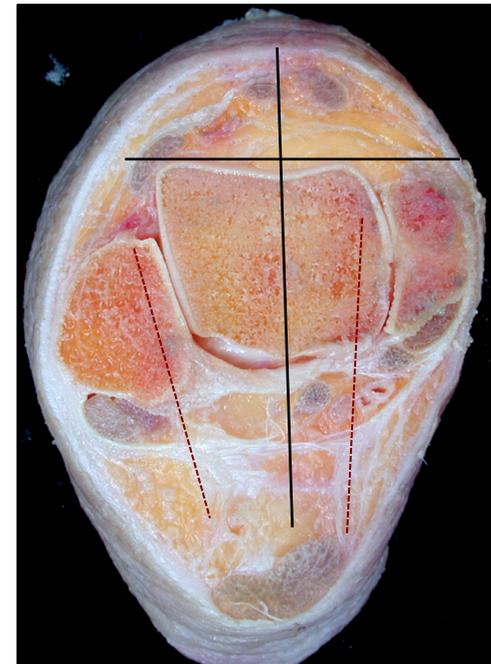
Stabilité ostéologique

Articulation Talo-Crurale
« TENON- MORTAISE »

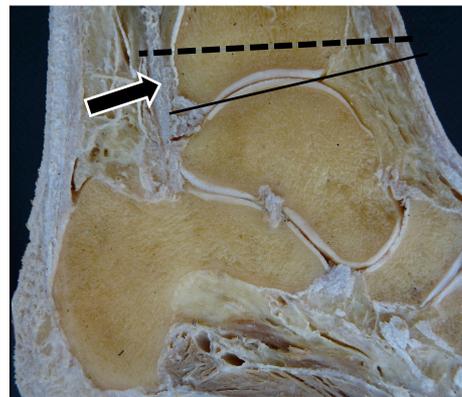
FRONTAL Plan



HORIZONTAL Plan



SAGITTAL Plan





CHEVILLE

Pathomécanique instabilité

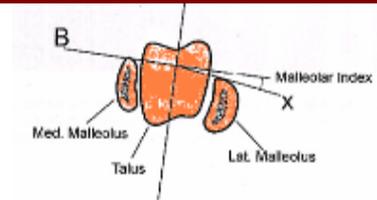
Stabilité ostéologique

- . Dôme talaire « oversized »
- . Antéro-position talus / tibia
- . Morphologie tibio-talaire

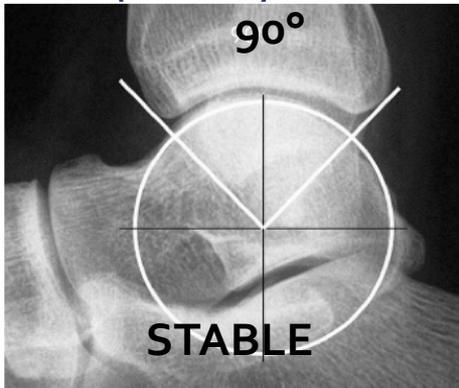
Incongruence ?



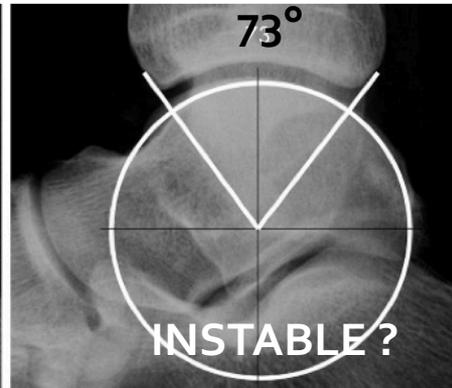
Malposition ?



- . *Scranton axial malleolar Index (FAI 2000)*
- . *Lebrun intermalleolar index (Am J Sports Med 2005)*



A Frigg, O Magerkurth et al. (KSSTA 2007)



A Frigg, V Valderrabano (Br J Sports Med)



Uys HD, Rijke AM (Am J Sports Med 2002)

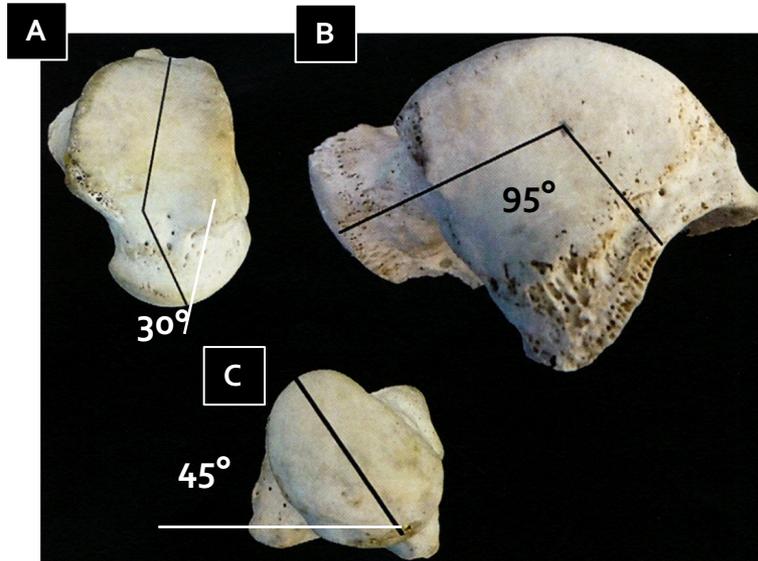


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Pathomécanique instabilité

Stabilité ostéologique

TALUS

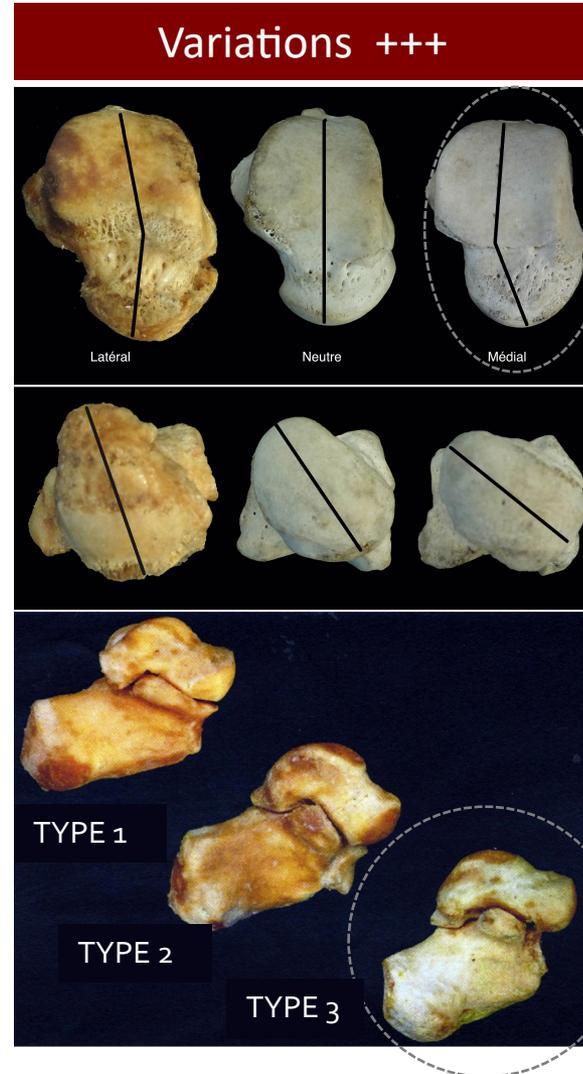


- A. DECLINAISON angle
- B. INCLINAISON angle
- C. TORSION angle

Pas de corrélation angulaire...

Bonnel F et al.

*Biometry of bone components in the talonavicular joint
OTSR 2011*



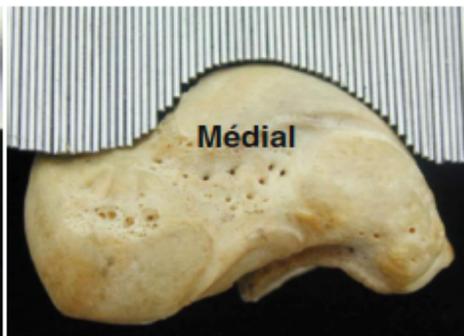
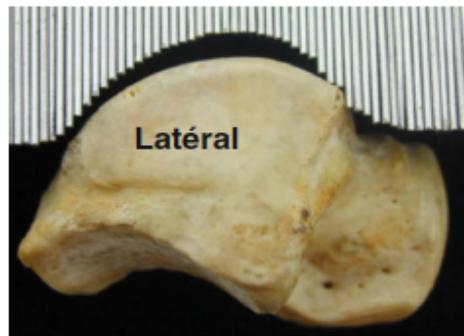
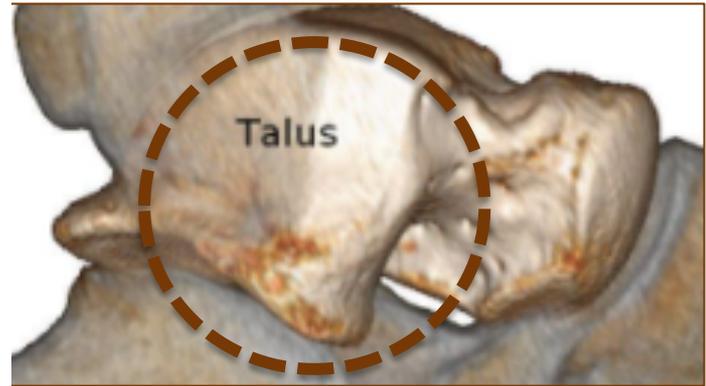
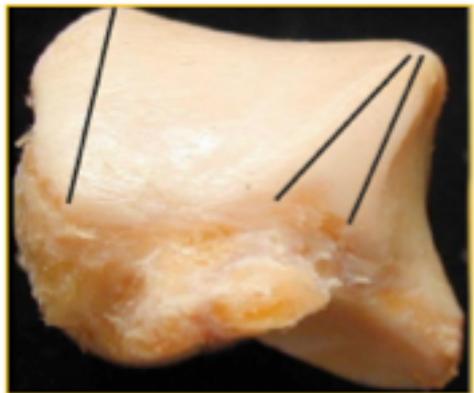
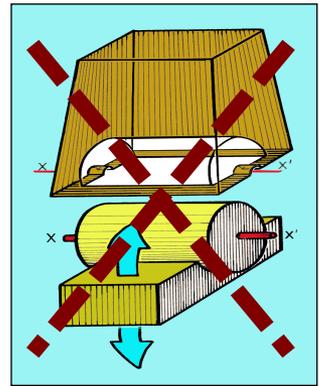


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Pathomécanique instabilité

Stabilité ostéologique

TALUS



RC : radius of curvature

Type 1 (66%) $RC_{lat.} > RC_{med.}$
Type 2 (19%) $RC_{lat.} = RC_{med.}$
Type 3 (15%) $RC_{lat.} < RC_{med.}$

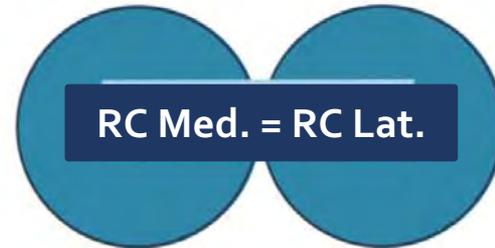


CHEVILLE

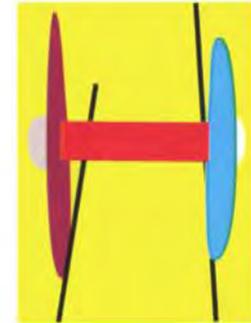
Pathomécanique instabilité

Cinématique

ROLLING/SLIDING

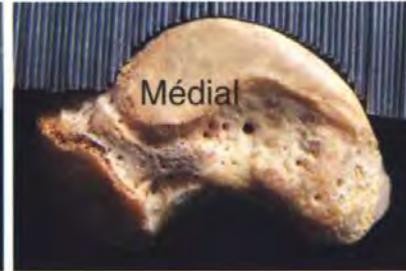
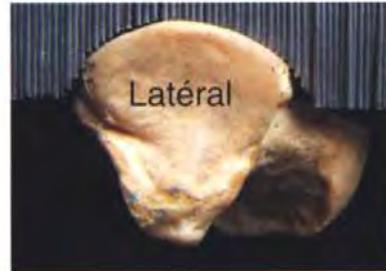
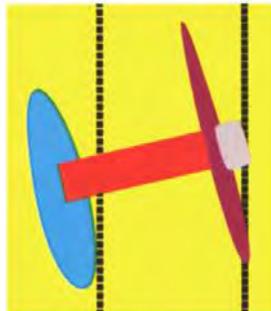
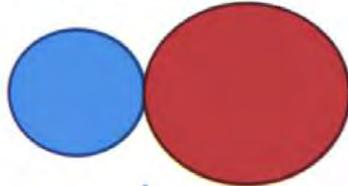


EQUILIBRATED



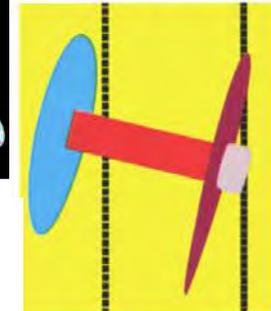
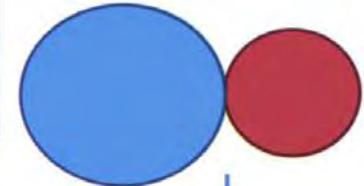
TYPE I

RC Med. < RC Lat.

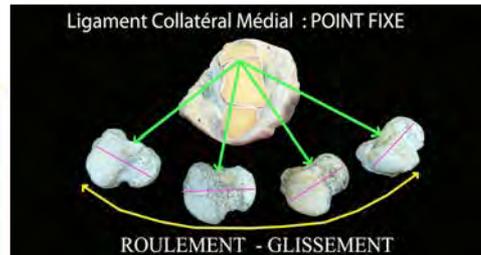


TYPE III

RC Med. > RC Lat.

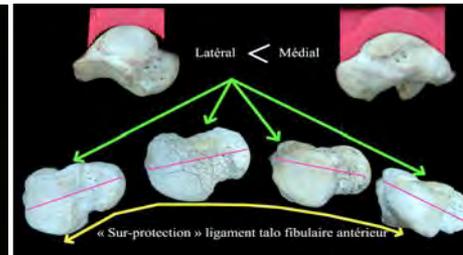


Ligament Collatéral Médial : POINT FIXE



Type I : ATF ligt.
STRAINED

Latéral < Médial



Type III: ATF ligt.
PROTECTED



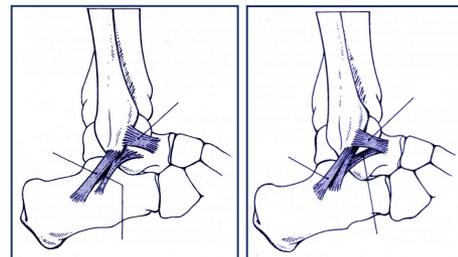
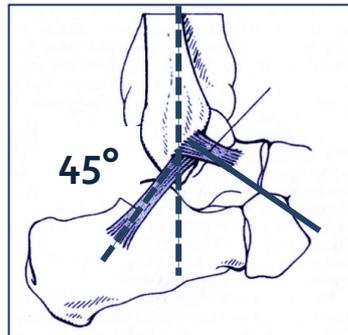
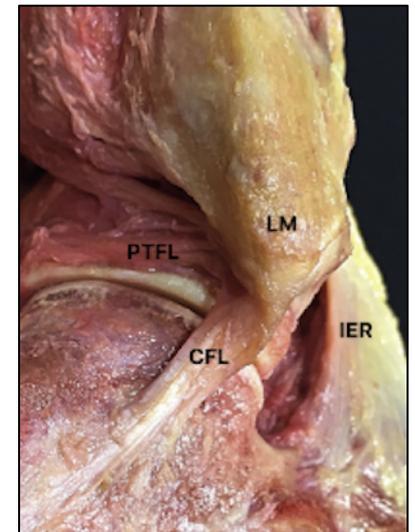
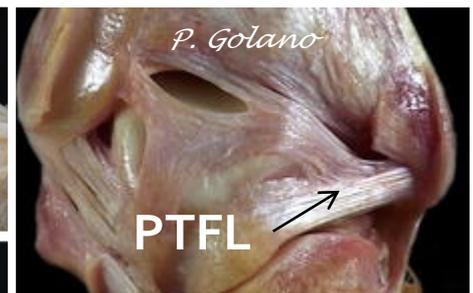
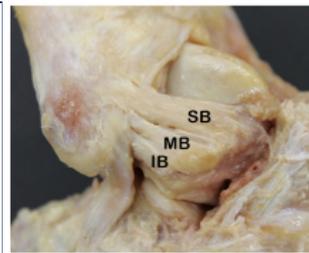
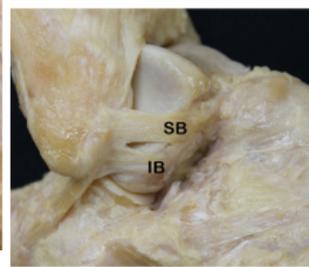
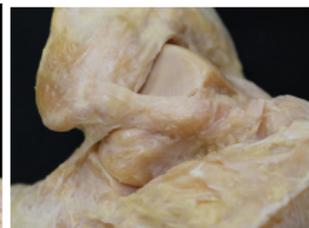
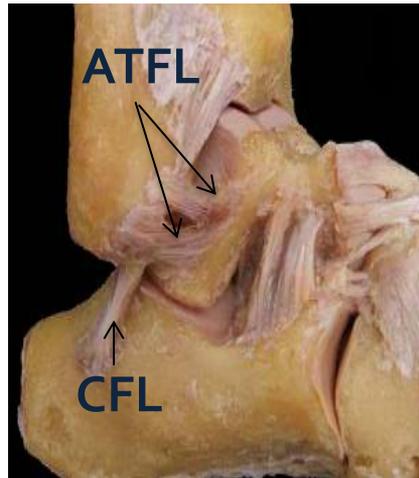
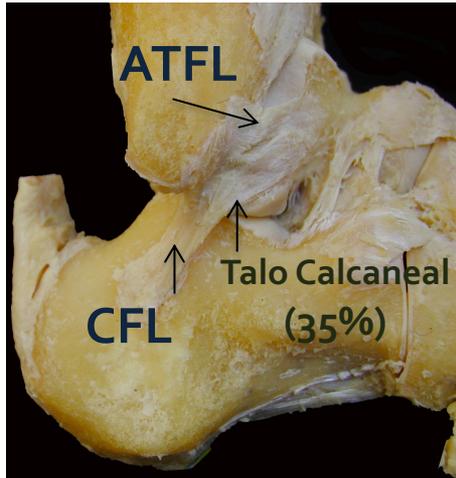
CHEVILLE

Pathomécanique instabilité

Stabilité ligamentaire

Ligament collatéral latéral (LCL)

... 3 composants: **Antero TaloFibular Lig** / **CalcaneoFibular Lig** / **Post Tal Fib Lig**



VARIATIONS +++ (Milner ; Wiersma-Griffioen)

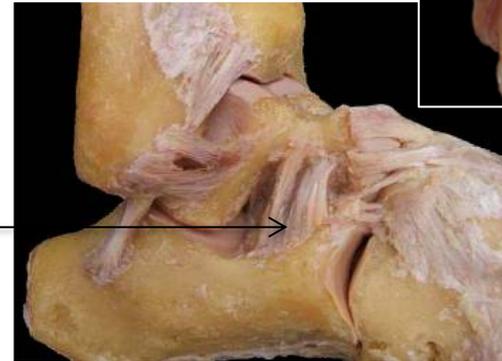
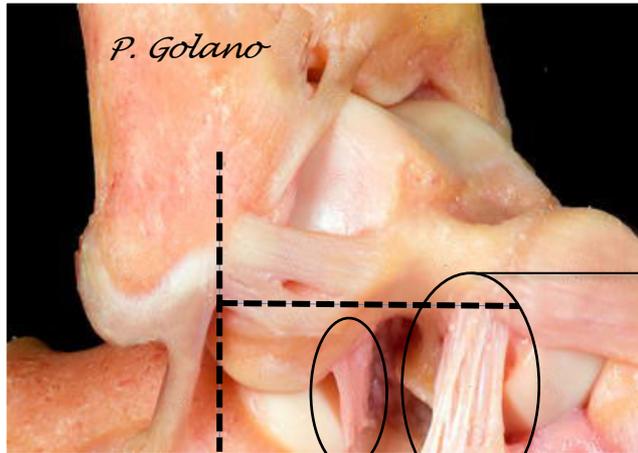


CHEVILLE

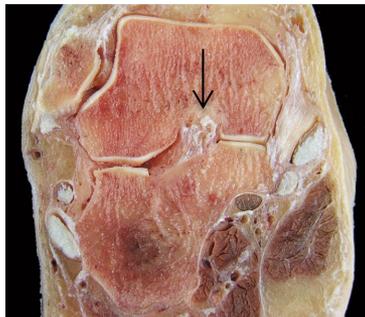
Pathomécanique instabilité

Stabilité ligamentaire

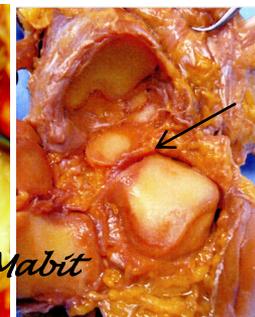
Articulation subtalaire +++



CERVICAL Lig
(AnteroLateral TaloCalcaneal lig.)



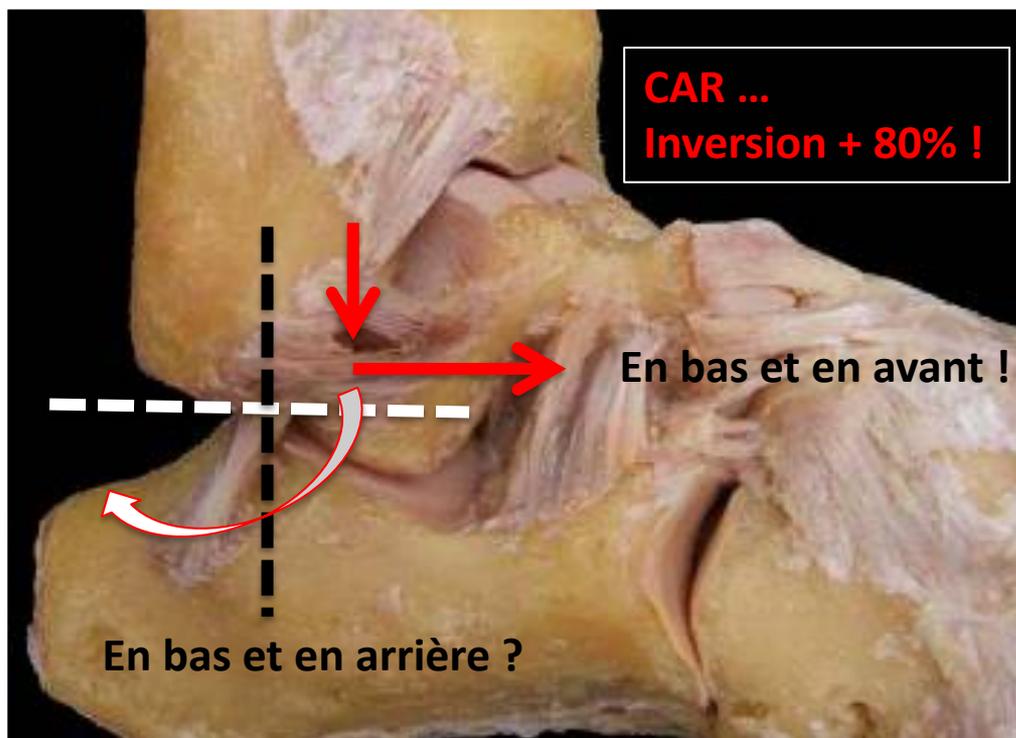
Interosseous TaloCalcaneal Lig



Coxa Pedis

Stabilité ligamentaire

« Progression » lésionnelle ...

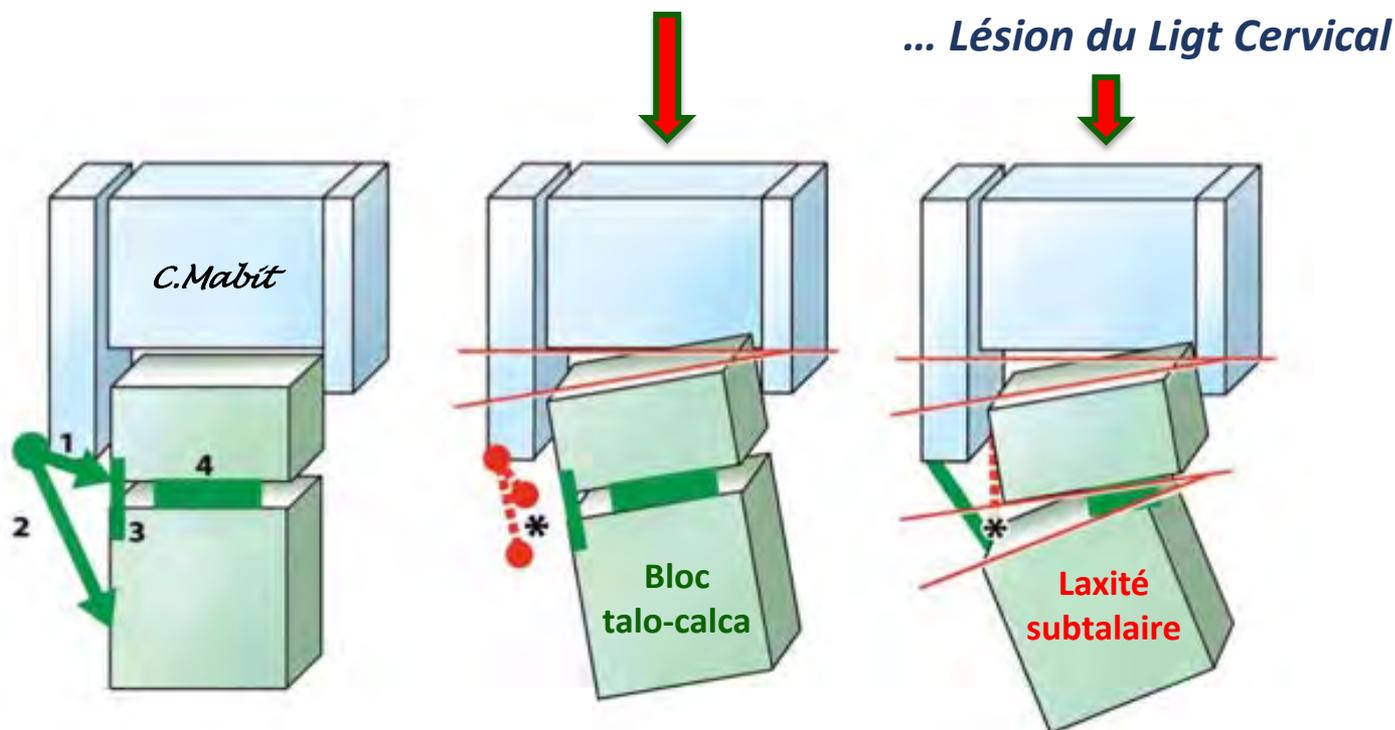




Instabilité subtalaire

Pb de définition ?

... Lésion du Lig fib.calca ???



1. 2: Fx Ant / Moy LCLat 3 . Lig Cervical 4. lig Talo-calcaneén



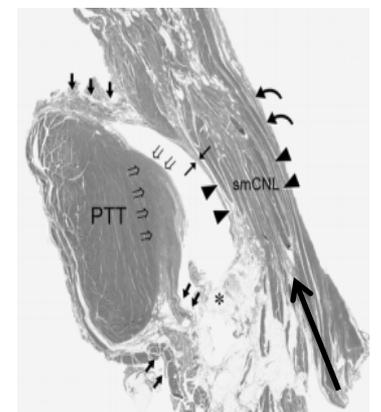
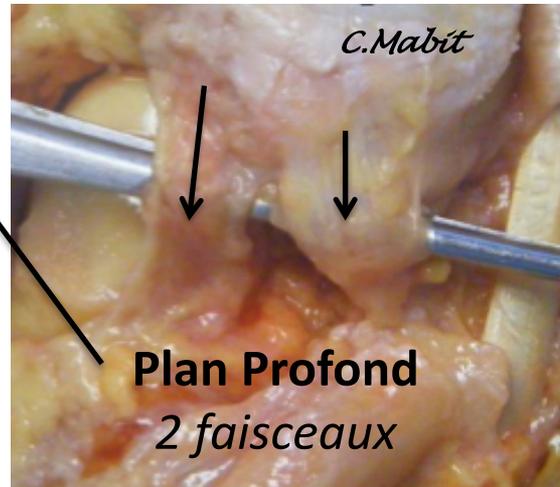
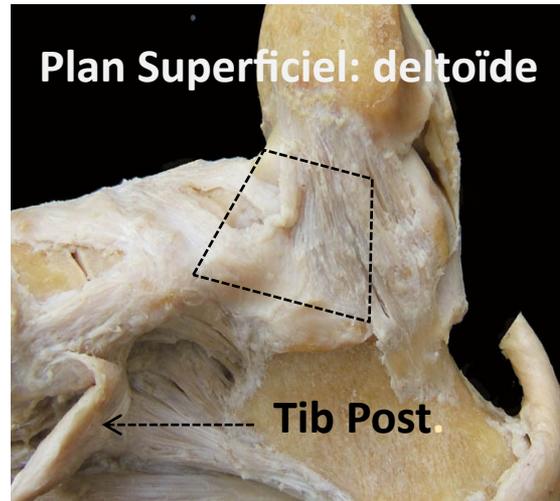
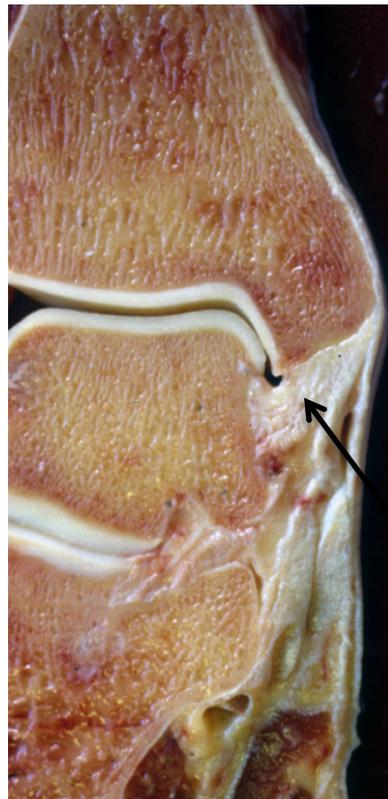
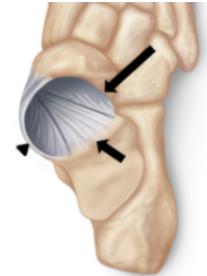
CHEVILLE

Pathomécanique instabilité

Stabilité ligamentaire

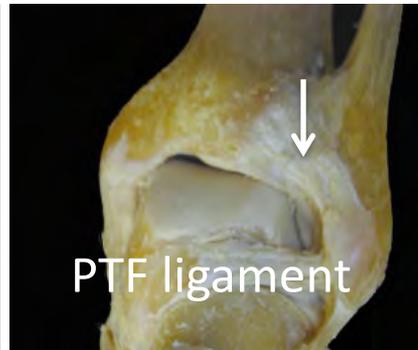
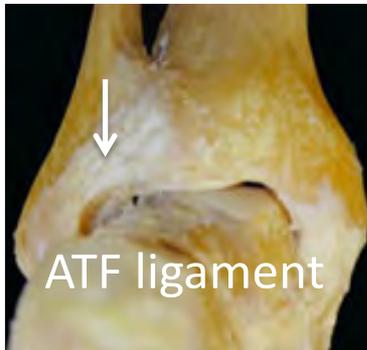
Ligt. Collatéral médial(LCM)

... 2 couches.



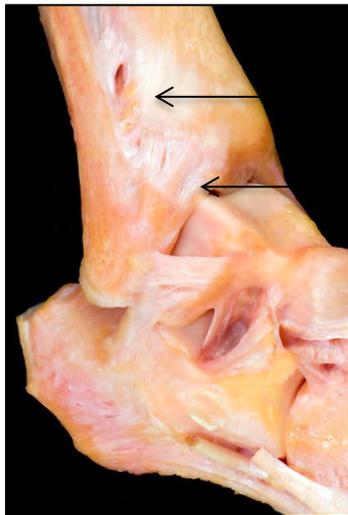
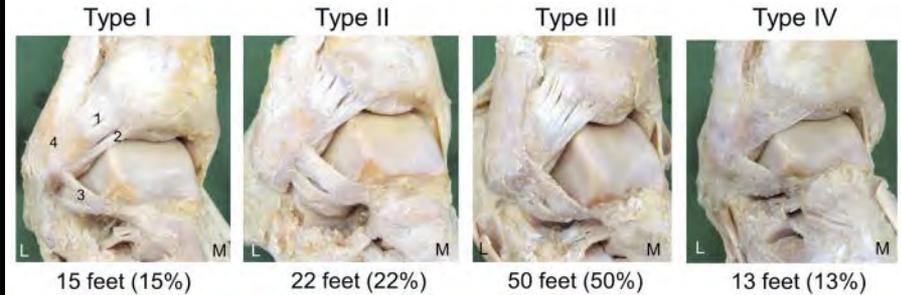
SPRIN
G

SYNDESMOSE tibio-fibulaire

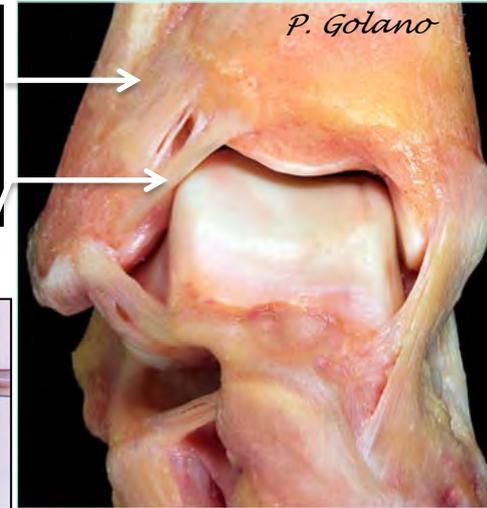
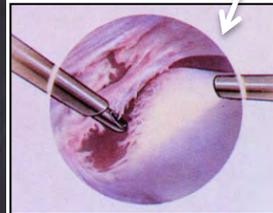


Morphological features of the inferior fascicle of the anterior inferior tibiofibular ligament

M. Edama, M. Takeishi, S. Kurata, T. Kikumoto, T. Takabayashi, R. Hirabayashi, T. Inai, M. Ikezu, F. Kaneko & I. Kageyama

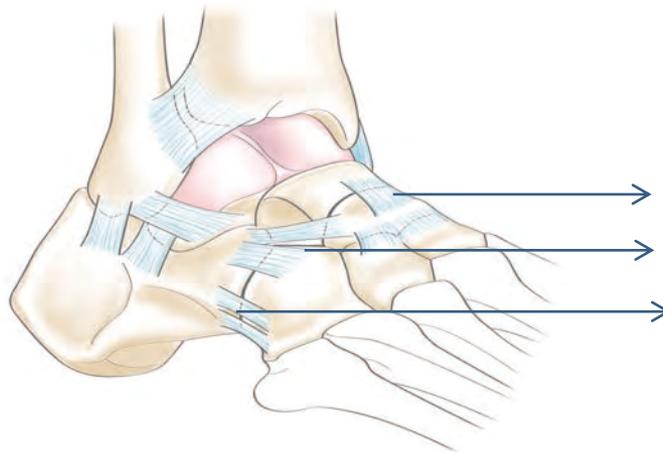


Antero superior tibio fibular
Antero-inferior tibio fibular
(Basset Lig)



Stabilité ligamentaire

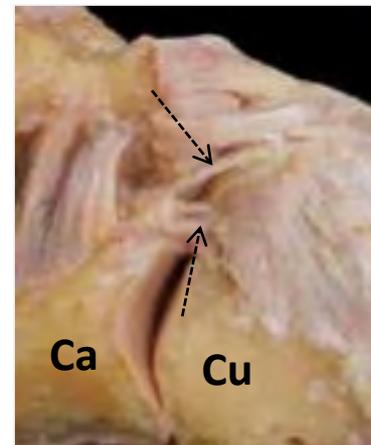
Articulation médio-tarsienne (Chopart)



Ligt. talo naviculaire

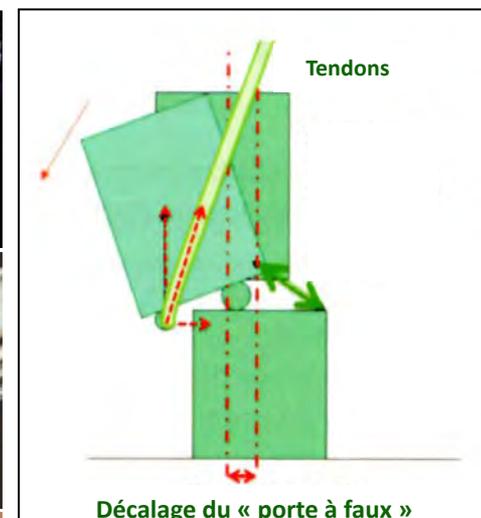
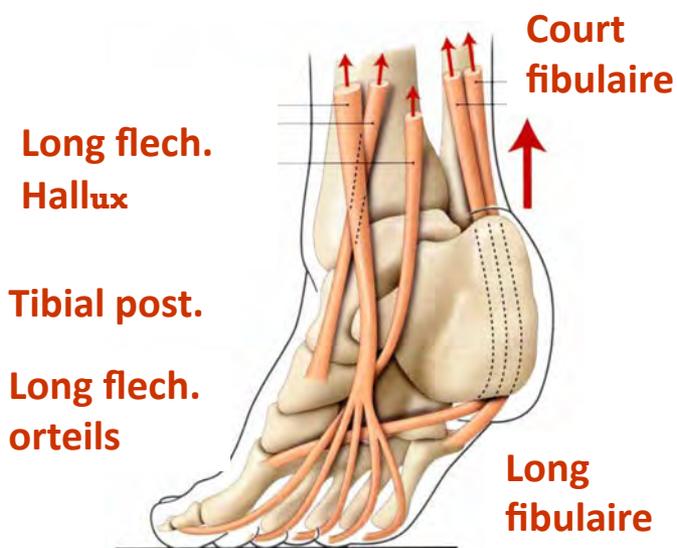
Ligt. bifurqué de Chopart

Ligt. calcanéocuboidien lat



Stabilité tendino-musculaire

... Balance Musculaire



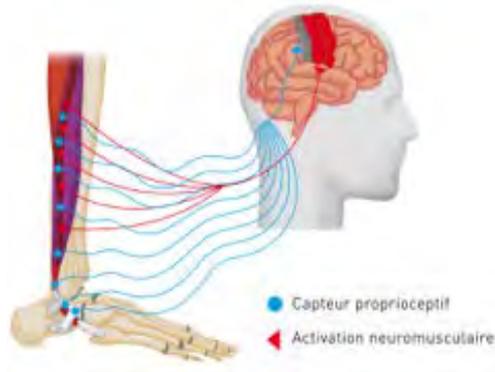
Structure d'équilibration du « porte à faux »



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Pathomécanique instabilité

Stabilité proprioceptive

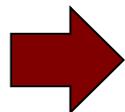


Réponse neuro-musculaire à
Mécanisme aigu en INVERSION ...

... toujours entre 60 to 200 ms

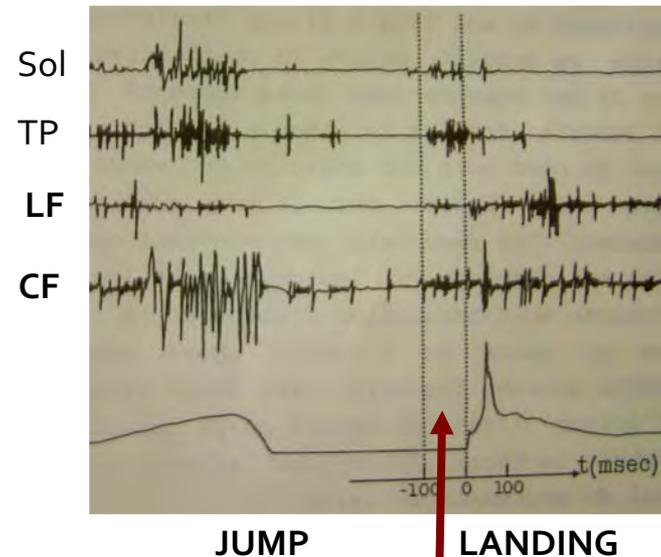
OR ... lésion ligamentaire < 30 msec

(Thonnard , Vaes)



Intérêt du concept de pré-activation musculaire

EMG : ankle tendinous effectors
(Thonnard)



PRE-ACTIVATION

Instabilité

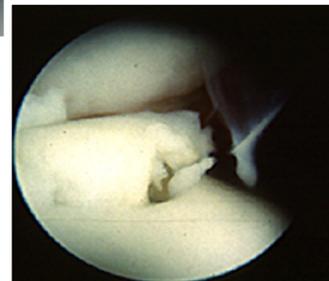
2 Entités

Mécanique

- *Ligamentaire*
- *OstéoArticulaire*

Fonctionnelle

- *Déficit proprioceptif*
- *Déséquilibre neuro-musculaire*



Laxité et ... ses Complications évolutives



Orthopaedics & Traumatology: Surgery & Research

Volume 96, Issue 4, June 2010, Pages 424–432



Review article

Chronic ankle instability: Biomechanics and pathomechanics of ligaments injury and associated lesions

F. Bonnel^a, E. Toullec^b, C. Mabit^c, Y. Tourmé^d, et la Sofcot

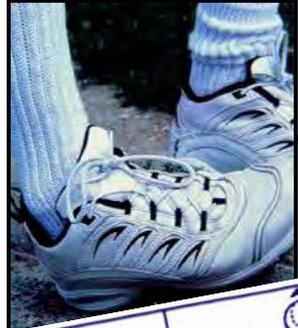


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Pathomécanique instabilité

Mécanismes lésionnels

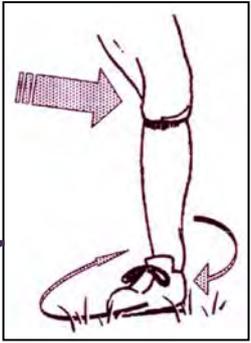
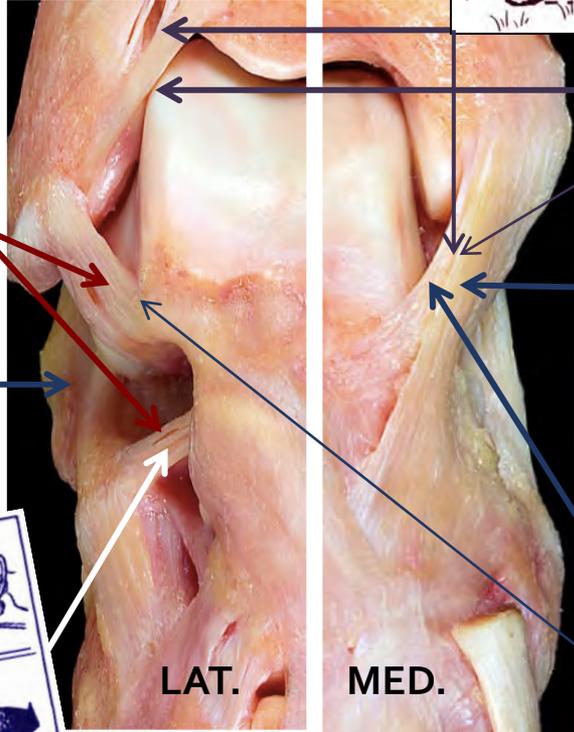
INVERSION
+ 80%



**VARUS /
DORSI FLEXION**



Jump landing
(Pisani G)



ROTATION



**VALGUS /
EVERSION**



**PLANTAR
FLEXION**



CHEVILLE

Pathomécanique instabilité

Lésions Associées

CERVICAL Ligament +++ 65%

Subtalar ligaments: MRI normal and pathological findings.

MP Boncoeur-Martel, C Mabit *et al.*

Radiology 1998;209(P):613.

SYNDESMOSIS 15%

Isolated syndesmotic injuries in acute ankle sprains: diagnostic significance of clinical examination and MRI.

LG Grosterlinden, M Hartel, J Yamamurat *et al.*

KSSA 2016;24:1180-6

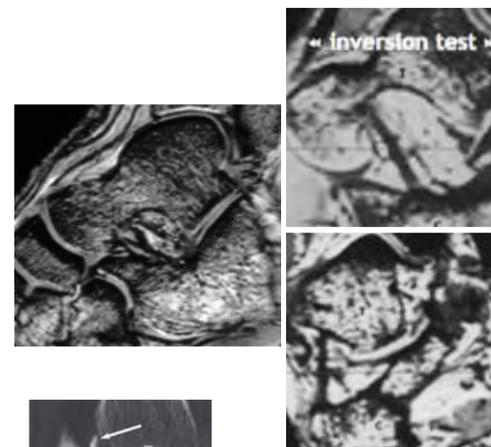
Médio-tarsienne (Chopart bifurcate lig.) : 3,4%

Inversion (75%) ; Hyper Plantar flexion (22%)

Midtarsal joint sprain: epidemiologic study.

A Thioun, C Szymanski, X Demondion, C Maynou *et al.*

OTSR (in press)



- Instabilité « complexe »
- *si lésions négligées ... risque échec thérapeutique*



CHEVILLE

Pathomécanique instabilité

Importance du Bilan Clinique + Imagerie

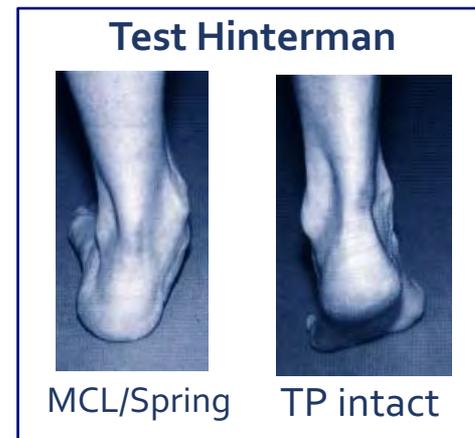
- Limitation de mobilité

- Rétraction gastrocnémiens (++++)
... déficit de Dorsi flexion

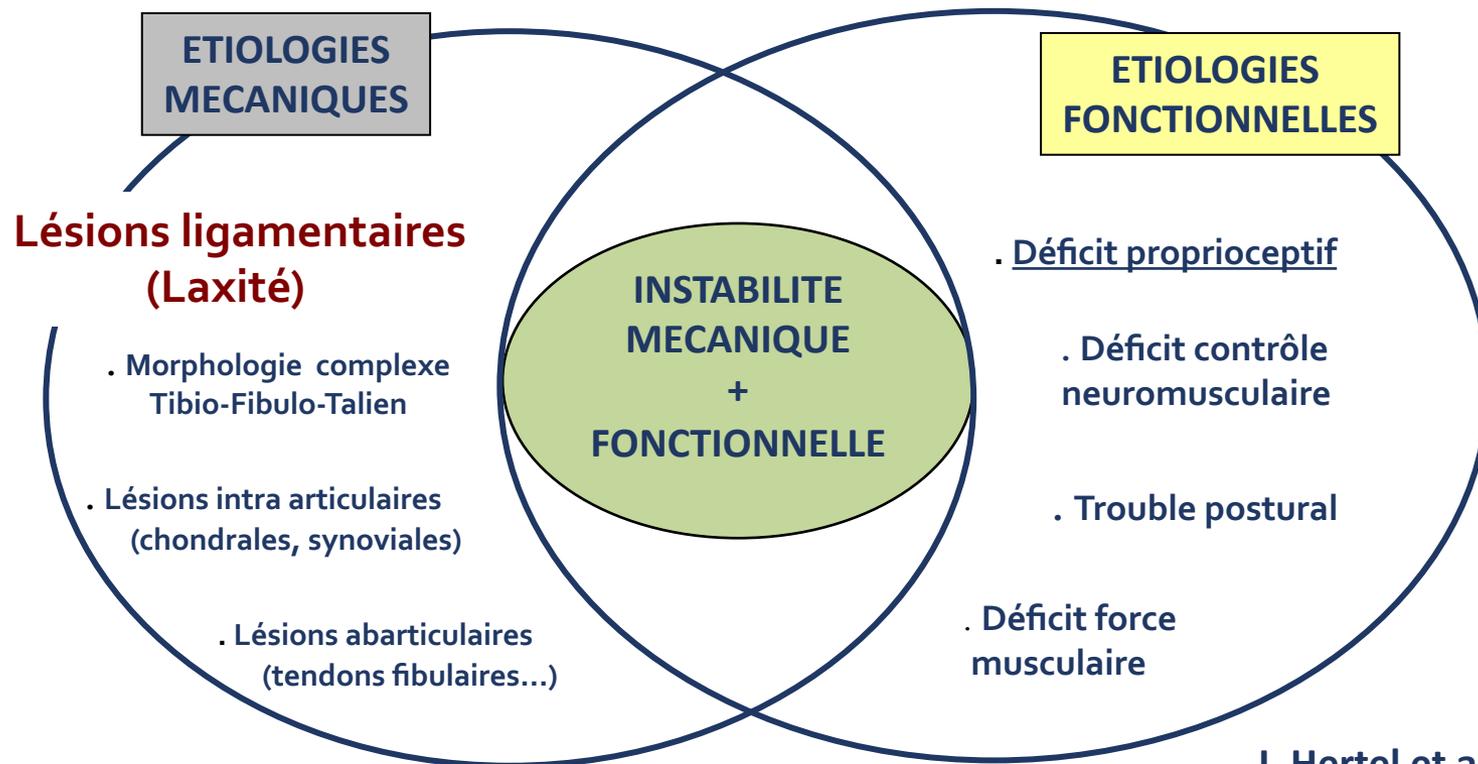


- Alignement Arr. pied

... *varus*
statique/ dynamique



Instabilité PLURI FACTORIELLE !



J. Hertel et al.
J. Athl Train 2002

ENTORSES

Pathologie considérée comme bénigne

Prise en charge initiale ?

Bilan lésionnel de gravité ?



20% à 40% de séquelles

dont

L'INSTABILITE CHRONIQUE = la plus fréquente

SYNDROME FONCTIONNEL



Pourquoi traiter une instabilité de la cheville ?

*La chirurgie de la laxité prévient les récurrences et protège ...
des LODT et de l'arthrose Tib.Talaire*

Cahier des charges !

✧ **Traiter la laxité latérale**

... ***mais aussi*** laxités associées :

... **sans oublier** les facteurs favorisants dominés par le ***varus de l'arrière-pied***

✧ **ni** les lésions créées par la chronicité :

. *LODTalaires*

. *Lésions fissuraires des fibulaires / luxation*

. *Conflits antérieur et postérieur*

ORIGINAL ARTICLE

OTSR 2010

Chronic lateral ankle instability surgical repairs: The long term prospective

C. Mabit^{a,*}, Y. Tourné^b, J.-L. Besse^c, F. Bonnel^d, E. Toullec^e, F. Giraud^f, J. Proust^g, F. Khiami^h, C. Chaussard^h, C. Gentyⁱ, Sofcot (French Society of Orthopedic and Traumatologic Surgery)

88 % de chevilles stables

2 % d'arthrose

Merci ...

