Talus fractures in climbers

Kelios Bonetti

Medical Doctor

PHD Traumatology and Orthopeadic

IRCRA
International Rock Climbing Research Association

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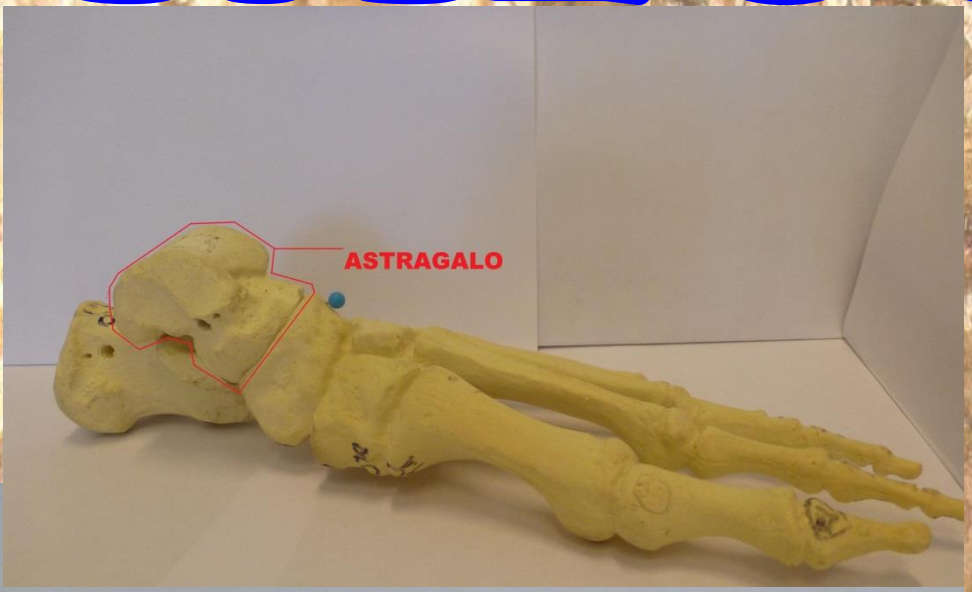
TALUS



ABOUT TALUS FRACTURES

- Talus fracture (TF) is quite frequent in high energy traumas [1].
- The talus has a <u>reduced blood supply</u>, when it becomes compromised by trauma to the bone, it does not form a good bone callus and there is a risk of aseptic necrosis [2].

[1] JJ. Halvorson, SB. Winter, RD. Teasdall, "Talar neck fractures: a systematic review of the literature," J Foot Ankle Surg, vol. 52(1), pp. 56–61, 2013.
[2] PJ. Kelly, CR. Sullivan, "Blood supply of the talus," Clin Orthop Relat Res, vol. 30, pp. 37–44, 1963.

ABOUT TALUS FRACTURES

- Furthermore the pain that derives from the fracture can cause algodystrophy, with an increase in the pain and consequential diminishment of weight bearing, which results in decalcification and an ulterior increase in pain [1].
- Because of these complications often TF leads to problems in climbing and in every day life[3].

[1] JJ. Halvorson, SB. Winter, RD. Teasdall, "Talar neck fractures: a systematic review of the literature," J Foot Ankle Surg, vol. 52(1), pp. 56–61, 2013.
[3] HA. Vallier, SE. Nork, DP. Barei, "Talar neck fractures: results and outcomes," J Bone Joint Surg Am, vol. 86(8), pp. 1616–1624, 2004

T.F. quite rare in climbers [4] but sometimes brings invalidating consequences .

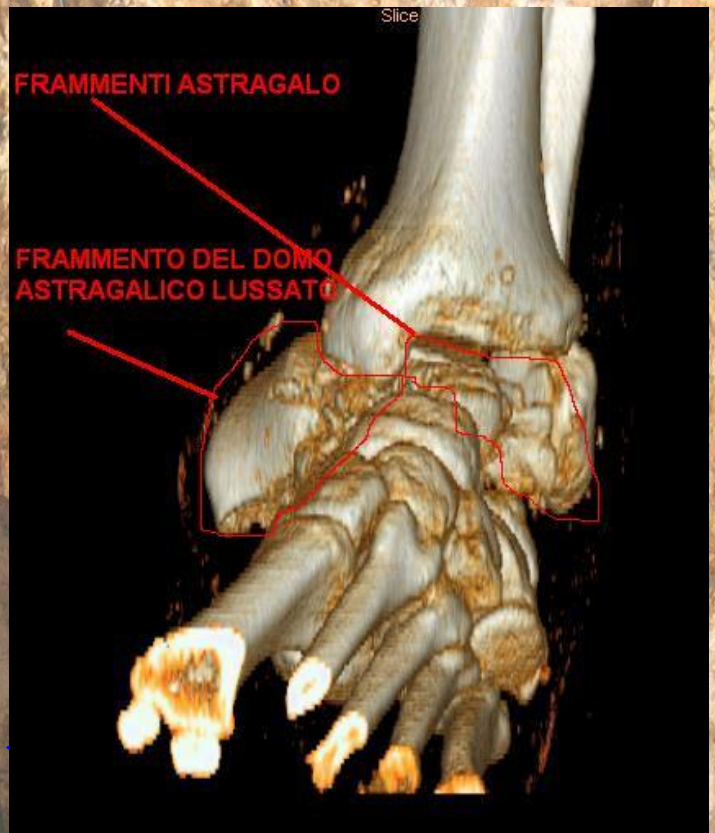
So I have gathered data to try to identify:

- causes

-consequences

-best treatment

-prognosis



[4] V. Schöffl, T. Küpper, "Feet injuries in rock climbers," World J Orthop, 18;4(4), pp. 218-228, 2013.

For this reasons I have a undertaken this statistical analysis of TF in I asked my patients and other climber volunteers on the web to fill out a questionnaire. I gathered data from 24 patients, who were climbers and had 25 TF (one was bilateral).

STUDIO SCIENTIFICO FRATTURE ASTRAGALO & ARRAMPICATA

Sono il Dottor Kelios Bonetti, esperto in patologia arrampicatoria, sto eseguendo uno studio sulle fratture di astragalo e l'arrampicata
Le sarei grato se volesse compilare il seguente modulo e ricalcare la forma delle proprie dita.
I dati raccolti raccolti verrano trattati in forma anonima.

NOTA IMPORTANTE SULLA COMPILAZIONE:

NELLE DOMANDE IN CUI è PRESENTE UNA SCELTA MULTIPLA SEGNARE UNA X NEL CAMPO PRESCELTO

NELLE DOMANDE IN CUI è RICHIESTO UN NUMERO FARE ATTENZIONE ALL'UNITà DI MISURA

COGNOME (facoltativo)
NOME (facoltativo)
DATA NASCITA (facoltativo)
PESO CM
ALTEZZA KG
sesso (m/f) M

QUANTI ANNI FA è AVVENUTA LA FRATTURA? NUMERO
COME è AVVENUTA LA FRATTURA

DURANTE L'ARRAMPICATA — SI= X ; NO= VUOTO
- CON LA CORDA IN FALESIA — SI= X ; NO= VUOTO
  - PRECIPITANDO A TERRA — SI= X ; NO= VUOTO
  - PRECIPITANDO SU UNA CENGIA — SI= X ; NO= VUOTO
  - URTANDO CONTRO LA PARETE ROCCIOSA — SI= X ; NO= VUOTO
  - ALTRO — SI= X ; NO= VUOTO
- CON LA CORDA IN MONTAGNA — SI= X ; NO= VUOTO
  - PRECIPITANDO A TERRA — SI= X ; NO= VUOTO
  - PRECIPITANDO SU UNA CENGIA — SI= X ; NO= VUOTO
  - URTANDO CONTRO LA PARETE ROCCIOSA — SI= X ; NO= VUOTO
  - ALTRO — SI= X ; NO= VUOTO
- BOULDER — SI= X ; NO= VUOTO
  - CADENDO SUL CRASH PAD — SI= X ; NO= VUOTO
  - CADENDO FUORI DAL CRASH PAD — SI= X ; NO= VUOTO
  - CADENDO TRA I CRASH PAD — SI= X ; NO= VUOTO
- PLASTICA — SI= X ; NO= VUOTO
  - CADENDO SUL CRASH PAD — SI= X ; NO= VUOTO
  - CADENDO FUORI DAL CRASH PAD — SI= X ; NO= VUOTO
  - CADENDO TRA I CRASH PAD — SI= X ; NO= VUOTO

NON DURANTE L'ARRAMPICATA — SI= X ; NO= VUOTO
- MOTO — SI= X ; NO= VUOTO
- AUTO — SI= X ; NO= VUOTO
- SPORT — SI= X ; NO= VUOTO
- PRECIPITAZIONE — SI= X ; NO= VUOTO

LUNGHEZZA DEL VOLO IN METRI

TIPO DI FRATTURA
- INFRAZIONE — SI= X ; NO= VUOTO
- SCOMPOSTA LIEVE — SI= X ; NO= VUOTO
- SCOMPOSTA GRAVE — SI= X ; NO= VUOTO
- ESPOSTA — SI= X ; NO= VUOTO
- ASSOCIATA AD ALTRE FRATTURE — SI= X ; NO= VUOTO
- ASSOCIATA A LUSSAZIONE — SI= X ; NO= VUOTO

TRATTAMENTO
- GESSO — SI= X ; NO= VUOTO
- FILI DI K — SI= X ; NO= VUOTO
- VITI CON MINI ACCESSO — SI= X ; NO= VUOTO
- VITI CON UN TAGLIO >2 CM — SI= X ; NO= VUOTO

DOPO QUANTO HAI INIZIATO IL CARICO SFIORANTE? (IN SETTIMANE)
DOPO QUANTO HAI INIZIATO IL CARICO PARZIALE? (IN SETTIMANE)

DOPO QUANTO HAI INIZIATO IL CARICO TOTALE? (IN SETTIMANE)

PER QUANTO TEMPO HAI PORTATO IL GESSO? (IN SETTIMANE)

PER QUANTO TEMPO HAI PORTATO IL TUTORE? (IN SETTIMANE)

HAI ESEGUITO TERAPIE FISICHE (ULTRASUONI, TECARTERAPIA ETC)? SI=X — SI= X ; NO= VUOTO

NE HAI AVUTO BENEFICIO?
- SI — SI= X ; NO= VUOTO
- NO — SI= X ; NO= VUOTO
- IN PARTE — SI= X ; NO= VUOTO

DOPO QUANTO HAI INIZIATO AD ARRAMPICARE? (MESI)
DOPO QUANTO SEI TORNATO A BUON LIVELLO? (MESI) SE MAI SCRIVERE M
GRADO PRIMA DEL TRAUMA
GRADO DOPO UN ANNO DAL TRAUMA
GRADO ATTUALE

ATTUALMENTE HAI CONSEGUENZE DAL TRAUMA?

SI=X — SI= X ; NO= VUOTO, PIU' DI UNA RISPOSTA VALIDA

QUANDO C'è IL DOLORE?
- SEMPRE — SI= X ; NO= VUOTO
- CAMMINANDO — SI= X ; NO= VUOTO
- CORRENDO/FACENDO SPORT — SI= X ; NO= VUOTO
- ARRAMPICANDO — SI= X ; NO= VUOTO
- DOPO GLI SFORZI — SI= X ; NO= VUOTO

QUANTO è IL DOLORE?
- LIEVE — SI= X ; NO= VUOTO
- DISCRETO — SI= X ; NO= VUOTO
- INTENSO — SI= X ; NO= VUOTO

NO = X — SI= X ; NO= VUOTO, PIU' DI UNA RISPOSTA VALIDA

INIZIALMENTE QUANDO C'ERA IL DOLORE?
- SEMPRE — SI= X ; NO= VUOTO
- CAMMINANDO — SI= X ; NO= VUOTO
- CORRENDO/FACENDO SPORT — SI= X ; NO= VUOTO
- ARRAMPICANDO — SI= X ; NO= VUOTO
- DOPO GLI SFORZI — SI= X ; NO= VUOTO

LA CAVIGLIA INFORTUNATA è TORNATA AD AVERE LA STESSA MOBILITà DELL'ALTRA?
- SI=X
- NO = X

Il sottoscritto inviando via mail questi dati, ai sensi della legge 31/12/1996 numero 675 inerente la tutela dei dati personali, esprimo il mio consenso a raccogliere
e analizzare statisticamente a fini di ricerca scientifica i propri dati personali, purchè sia assicurata la riservatezza e l'anonimato degli stessi.
Grazie e buona arrampicata, il tempo dedicato per la compilazione di questa scheda, aiuterà a far progredire lo studio dell'arrampicata.

DATA RESULTS AND M@IL AVAILABLE FOR OTHER STUDIES

POPULATION

- **24 climber who had 25 talus (a patient had bilateral talus fracture)**
- **before fracture they climb between 5b (french) and 8b (boulder font)**
- **12% was women.**
- ***Data was gathered from 1-15 years after trauma.***
- ***Follow-up after 1 year from the trauma only for the patients recruited before 1 year from the trauma.***

RESULTS

Regarding the type of activity in which the trauma occurred:

Climbing type:	%
Multipitch	37,5
Crag	37,5
Indoor bouldering	4
Boulder	0
Other	21

N.B. TIMING PROBLEM, BOULDER PROBLEM

Crag injuries were:

- 44% falling to the ground
- 22% falling on a ledge
- 22% bumping against the rock wall
- then several other mechanisms traumatic less frequent.

Multipitch injuries were:

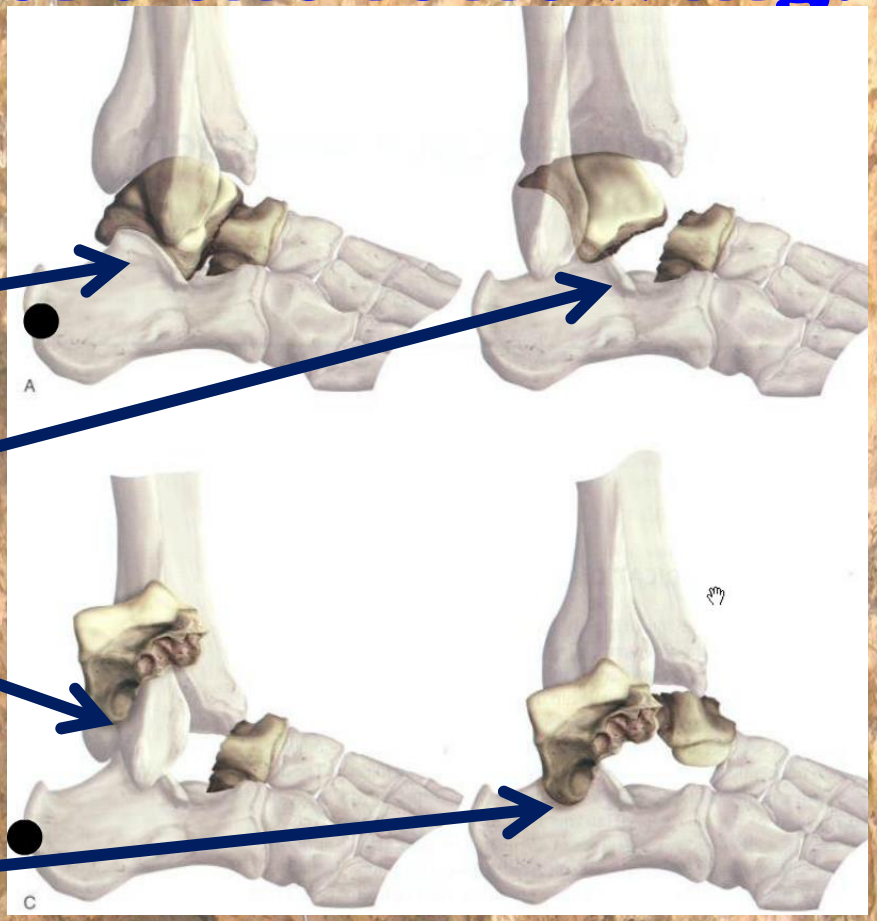
- 56% bumping up against the vertical rock wall
- 22% falling on a ledge
- in addition to other mechanisms traumatic, no falling to the ground

Bouldering injuries occurred all falling into the gap between the mattresses indoor.

Length average of the flight is **6 meters**, with a range **from 1 meter to 15 meters**!

The diagnosis were the following:

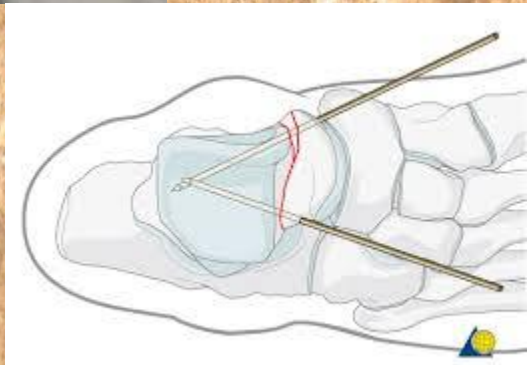
Diagnosis	%
Creep (Hawkins I)	17
Mild scomposition (Hawkins II)	25
Severe scomposition (Hawkins III)	45
Associated luxation (Hawkins IV)	16
Exposition	12



[5] LG. Hawkins, “Fractures of the neck of the talus,” J Bone Joint Surg Am, vol. 52(5), pp. 991–1002, 1970.

Treatment

TREATMENT	%
Plaster cast	62
K wire	12
Percutaneus screw	17
Open reduction and screw	37,5



Rehabilitation

Activity	From week to week	Average weeks
Touchtoe loading	1-19	9
Partial loading	1-20	12
Total loading	4-20	16
Plaster cast	1-18	6
Brace	4-24	12
Climbing	1-12(only who restart)	7

50% of the climber has performed physical therapy, only 25% of thats have benefited

Outcome

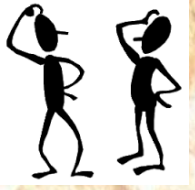
After rehabilitation:

- **67% had a decrease of range of motion (ROM)**
- **70% had pain in the following cases:**

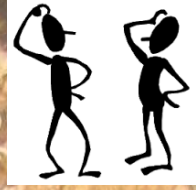
Outcome pain:	%
Always	4
Walking	20
Running	50
Climbing	8

Climback

- Between 1 month and the 12th month, on average at month 7.
- The return to a good level occurred between the 3 months and 3 years after trauma.
- The 37% is no longer returned to a good level.
- On average, the level after the trauma is reduced by 1 degree (e.g. from 6b to 6a) (career bias)



DISCUSSION



The data reported in this study demonstrate that:

- The **consequences of TF are very often invalidating** and an **high percentage needed surgical intervention.**
- TF are not all the same, they have **different degree**
- DEGREE PROBLEM: In this study **nearly all the TF had an high degree**, but these patients contacted me in quality of expert in climbing pathology, because they had problems going back to climbing, this is what happens with the high degree TF.

GRADE

- On average the ability of the climber after TF **was reduced by one grade,**

CAREER PROBLEM:

the climbers who had low degree TF stepped up their grade as time passed altering the statistics.

BOULDER IS SAFER whithout mat?

- It resulted from the data that all the boulderers hurted themselves falling onto the mattresses.
- In our opinion this data should not be interpreted as if this is the only way, it can also happen if they fall outside the crash-pad, but as there were only a few boulderers in the study non were found.

Multipich.... Long falls

- The high percentage

of TF (37%) that happened

during multipitch might surprise

- In a year there are usually a reduced number of hour passed in the multipitch and falls are usually less frequent than in crag or bouldering.
- But the falls could be longer (15 meters!), the energy higher and therefore fractures more frequent.

CONCLUSION

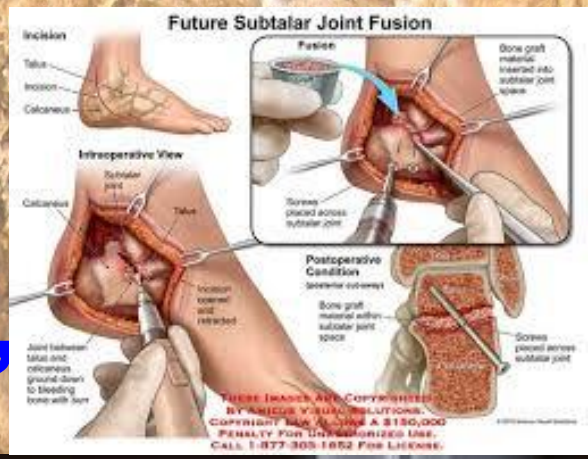
The cause of TF is nearly always a fall from a height with an impact of the foot against the ground, the wall or the mattresses.

The TF are varied with different causes and seriousness. Because they are caused by falls with different characteristics, so they need of different treatments.

Very often leave problems that go from the decrease of range of motion to chronic pain. In the worst cases the climbing activity can be impaired.

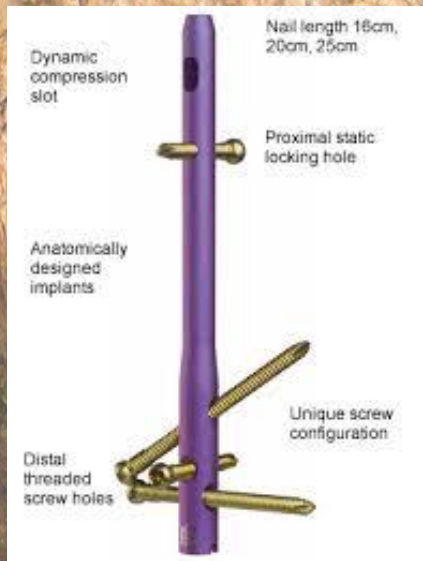
Secondary arthritis who needed subtalar arthrodesis? How did they do in climbing?

- The patient in this study had operation in other hospitals
- I hadn't operated climbers, who had a subtalar arthritis
- BUT few weeks ago I visited a patient who had this problem



S.T. 59 YO
16 YEARS AGO
TIBIAL FR &
TALAR FR WITH
POST
TRAUMATIC
ATRHOSIS
TALO-
CALCANEUS
ARTICULATIO

ARTHRODESIS TIBIOTALARY AND SUBTALAR WITH TRIGEN INTRAMEDULLAR NAIL

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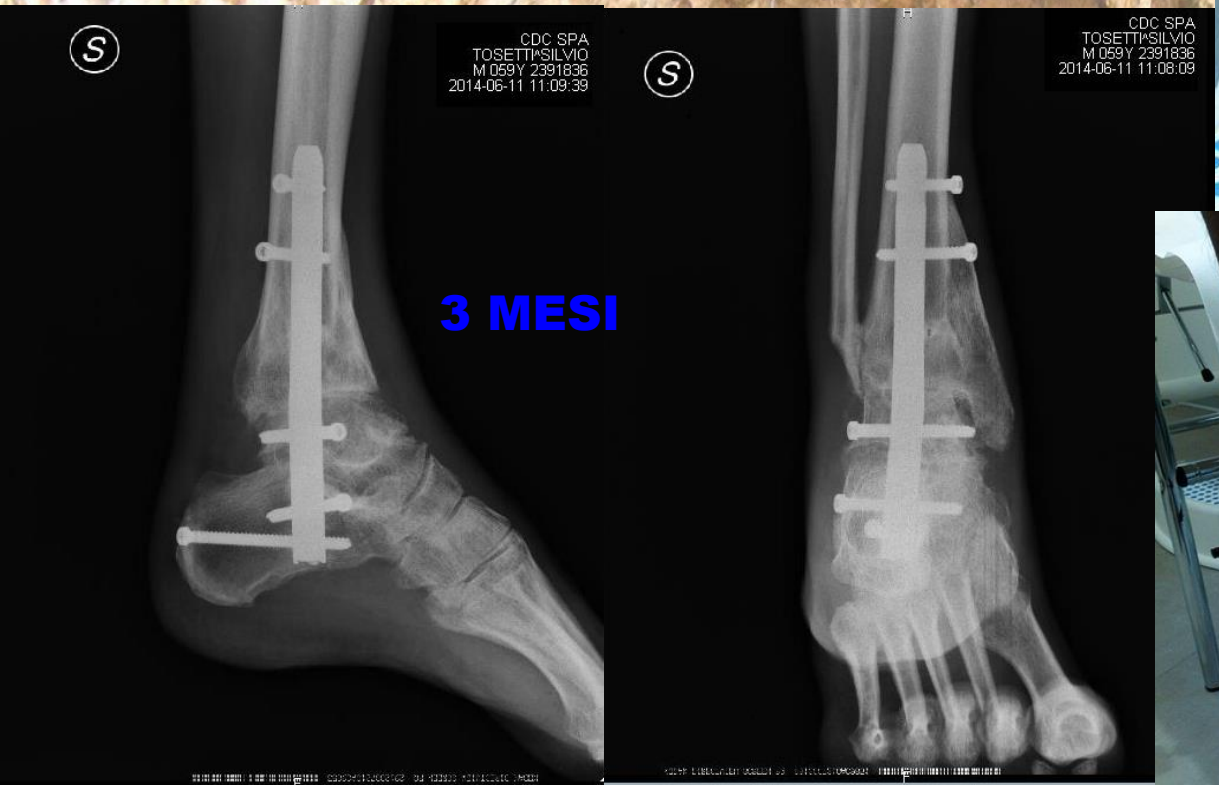
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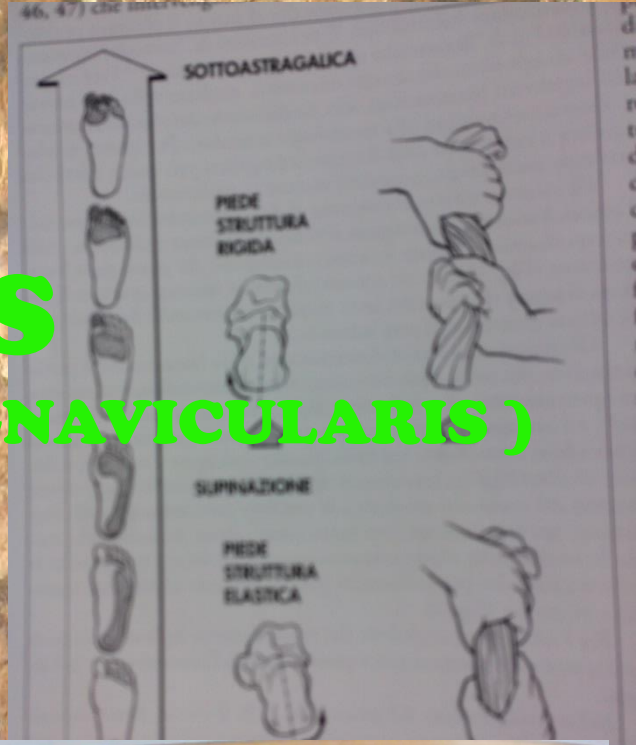
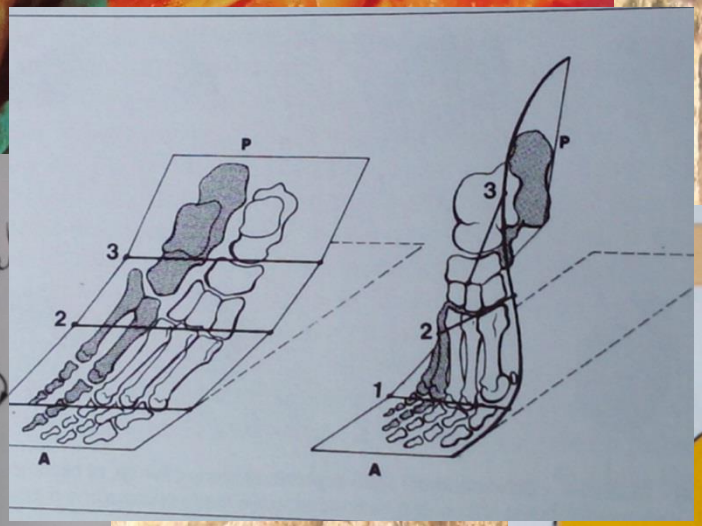
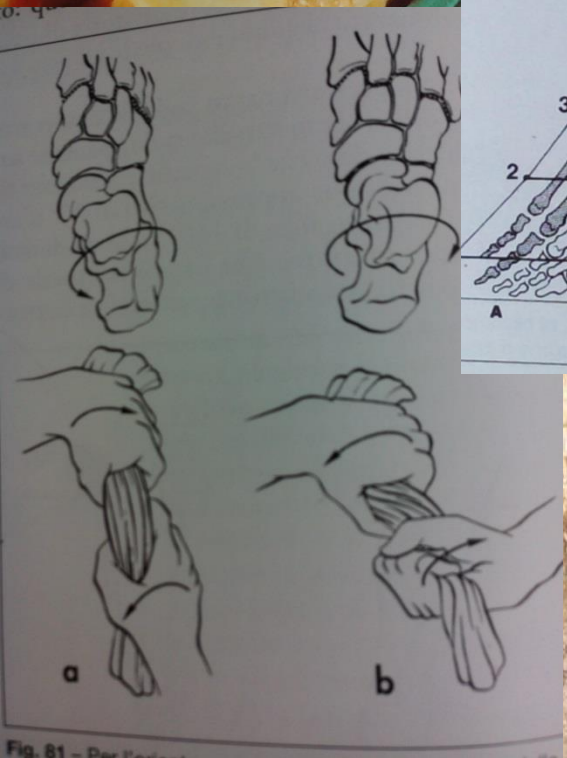
COXA PEDIS

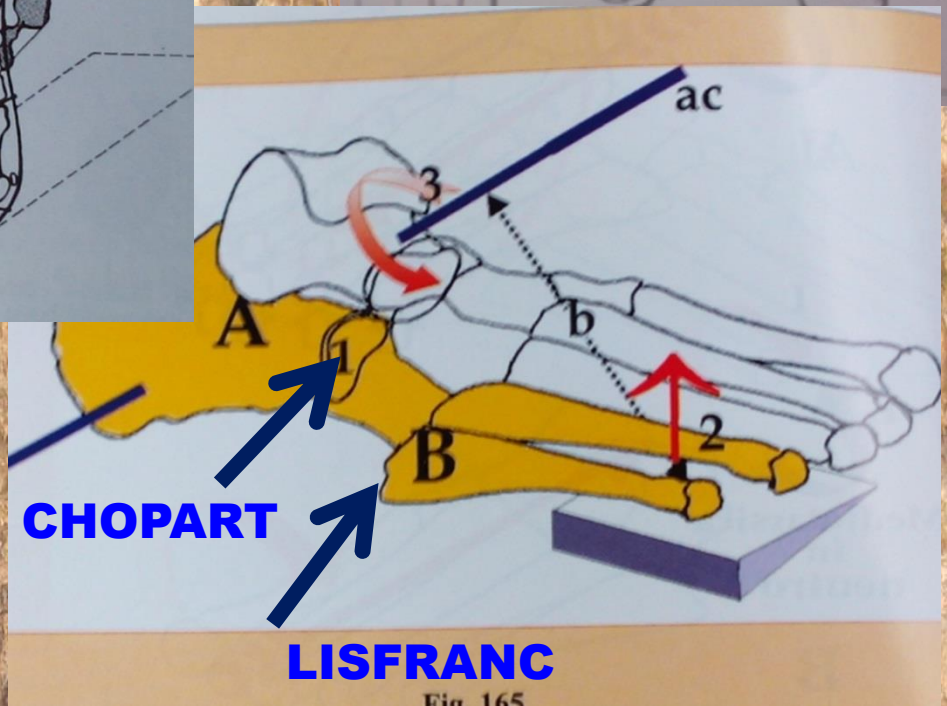
(ARTICULATIO TALO-CALCANEUS-NAVICULARIS)

ENARTROSIS







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