Talus fractures in climbers

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ABOUT TALUS FRACTURES

- Talus fracture (TF) is quite frequent in high energy traumas [1].

- The talus has a **reduced** blood supply, 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].


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].

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

For this reasons I have 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 verranno 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 FARNE ATTENZIONE ALL’UNITÀ DI MISURA

Cognome (facoltativo)
Nome (facoltativo)
Data Nascita (facoltativo)
Peso
Altezza
 Sesso (m/f)
Quanti anni fa è avvenuta la frattura?

**Come è avvenuta la frattura durante l’arrampicata?**

- Si: X; No: Vuoto
- **Con la corda in Palestra**
- **Con la corda in Montagna**
- Boulder
- Plastica
- NON DURANTE L’ARRAMPICATA

**Tipo di Frattura**

- Infrazione
- Scomposta lieve
- Scomposta grave
- Estrapola
- ASSOCIATA AD ALTRE FRATTURE
- ASSOCIATA A LUSSAZIONE
- **Non**
- **Si**
- **Viti con mini accesso**
- **Viti con un taglio >2 cm**
- ASSOCIATA A LUSSAZIONE
- ASSOCIATA A ALTRE FRATTURE
- **Non**
- **Si**
- **Viti con mini accesso**
- **Viti con un taglio >2 cm**

**Trattamento**

- Gesso
- Fil di K
- Viti con mini accesso
- Viti con un taglio >2 cm

**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)?**

**DOPO QUANTO HAI INIZIATO AD ARRAMPICARE? (MESI)**

**DOPO QUANTO SEI TORNATO A BUON LIVELLO? (MESI) SE MAI SCRIVERE M**

**SEMPRE**
**IN PARTE**
**NO**

**ATTUALMENTE HAI CONSEGUENZE DAL TRAUMA?**

**SEMPRE**
**CAMMINANDO**
**CORTISSIMO/FACENDO SPORT**
**ARRAMPICANDO**
**DOPO GLI SFORZI**

**QUANDO C’è IL DOLORE?**

**SEMPRE**
**CAMMINANDO**
**CORTISSIMO/FACENDO SPORT**
**ARRAMPICANDO**
**DOPO GLI SFORZI**

**QUANTO è IL DOLORE?**

**LIEVE**
**DISCRETO**
**INTENSO**
**NO = X**

**INIZIALMENTE QUANDO C’ERA IL DOLORE?**

**SEMPRE**
**CAMMINANDO**
**CORTISSIMO/FACENDO SPORT**
**ARRAMPICANDO**
**DOPO GLI SFORZI**

**LA CAVITÀ INFORTUNATA è TORNATA AD AVERE LA STESSA MOBILITÀ DELL’ALTRA?**

**SEMPRE**
**CAMMINANDO**
**CORTISSIMO/FACENDO SPORT**
**ARRAMPICANDO**
**DOPO GLI SFORZI**

Grazie e buona arrampicata, il tempo dedicato per la compilazione di questa scheda, aiuterà a far progredire lo studio dell’arrampicata.

DATA RESULTS AND MAIL 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:

<table>
<thead>
<tr>
<th>Climbing type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multipitch</td>
<td>37.5</td>
</tr>
<tr>
<td>Crag</td>
<td>37.5</td>
</tr>
<tr>
<td>Indoor bouldering</td>
<td>4</td>
</tr>
<tr>
<td>Boulder</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>21</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creep (Hawkins I)</td>
<td>17</td>
</tr>
<tr>
<td>Mild scomposition (Hawkins II)</td>
<td>25</td>
</tr>
<tr>
<td>Severe scomposition (Hawkins III)</td>
<td>45</td>
</tr>
<tr>
<td>Associated luxation (Hawkins IV)</td>
<td>16</td>
</tr>
<tr>
<td>Exposition</td>
<td>12</td>
</tr>
</tbody>
</table>

## Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plaster cast</td>
<td>62</td>
</tr>
<tr>
<td>K wire</td>
<td>12</td>
</tr>
<tr>
<td>Percutaneus screw</td>
<td>17</td>
</tr>
<tr>
<td>Open reduction and screw</td>
<td>37.5</td>
</tr>
</tbody>
</table>
## Rehabilitation

<table>
<thead>
<tr>
<th>Activity</th>
<th>From week to week</th>
<th>Average weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touchtoe loading</td>
<td>1-19</td>
<td>9</td>
</tr>
<tr>
<td>Partial loading</td>
<td>1-20</td>
<td>12</td>
</tr>
<tr>
<td>Total loading</td>
<td>4-20</td>
<td>16</td>
</tr>
<tr>
<td>Plaster cast</td>
<td>1-18</td>
<td>6</td>
</tr>
<tr>
<td>Brace</td>
<td>4-24</td>
<td>12</td>
</tr>
<tr>
<td>Climbing</td>
<td>1-12 (only who restart)</td>
<td>7</td>
</tr>
</tbody>
</table>

50% of the climber has performed physical therapy, only 25% of that have benefited.
Outcome
After rehabilitation:
- 67% had a decrease of range of motion (ROM)
- 70% had pain in the following cases:

<table>
<thead>
<tr>
<th>Outcome pain:</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>4</td>
</tr>
<tr>
<td>Walking</td>
<td>20</td>
</tr>
<tr>
<td>Running</td>
<td>50</td>
</tr>
<tr>
<td>Climbing</td>
<td>8</td>
</tr>
</tbody>
</table>
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 without 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.
**Multipitch.... Long falls**

- The **high percentage** of **TF** (37%) that happened during multipitch might surprise.
- In a year there are usually a reduced number of hours 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
Coxa Pedis
(Articulatio Talo-Calcaneus-Navicularis)
Enarthrosis

Chopart
Lisfranc