Pulley ruptures: splint and conservative treatment

Delmares Eric
MKDE MARSEILLE
France escalade
* Pulley: 30% hands injuries
  Bollen 1990, SCHÖFFL 2015

* Crimp grip position + fall and catch up

* A4>A2
  SCHÖLFF 2015


GABL 1998

* immobilization: 2 weeks palmarly cast covering every long fingers and forearm, until pain decreasing

* 4 weeks: neighboring fingers in palmarly applied soft cast (finger tip to the proximal palmar crease)

* After 6 weeks physiotherapy

14 days: palmar orthosis + anti-inflammatory

Functional therapy:
Finger gymnastics with pulley protection thermoplastic/soft-cast ring

41% significant decrease in range of motion in the PIP joint
67% of patients recovering their previous climbing level (Schöffl et al., 2006)

45 rock climbers / 47 pulley ruptures (December 2007 => May 2013)

2 months splint Soft climbing at 4 weeks

Finger range of motion and finger strength: No difference between treated and controlateral sides

* 38/43 previous climbing level: 8.8 months

* Tendon-phalanx distance was reduced in all patients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Diagnosis</th>
<th>Follow-up</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2 pulley</td>
<td>4.4 (±1.0)</td>
<td>2.3 (±0.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>A4 pulley</td>
<td>2.9 (±0.7)</td>
<td>2.1 (±0.5)</td>
<td>&lt;.001</td>
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</tbody>
</table>

* Result/ 39 to be good and 4 very good

MOUTET 1993

* 12 climbers no bowstringing effect

* 45 days Ring splint

* stop climbing

* Preventive treatment

Conservative treatment

45 days ring splint 24/24
Conservative treatment

3 goals:

* Cicatrize
* proprioception
* Decrease pain
Day 0 to Day 30

Glide tendon against phalanx to preserve injured pulley

* Active exercise

* Extension and flexion soft postures

* DIP
Day 0 to Day 30

* Illusory movements

* Don’t stop training
Conservative treatment

- Cryothérapy
- TENS
- Dry Needling
- stretching...
After 45 days

- All ROM PIP JOINT
- Muscular training step by step
- Progressive resistance
- Climbing specific reprogramming training
Slope grip position => crimp grip position
Come back = avoid climbing maladjustment

* Cinematic relearning

* Coordination: coach, physio climber

* last rehab session at climbing place
Stability drills: grip drills on the floor

training large foot hold

Next: training at low rating grade
# Training Program

<table>
<thead>
<tr>
<th>Grade on sight</th>
<th>S1 à S3</th>
<th>S4 à S6</th>
<th>S7 à S9</th>
<th>S10 à S12</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 à 50%</td>
<td>50 à 70%</td>
<td>70 à 90%</td>
<td>90 à 100%</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Training/week</th>
<th>2</th>
<th>3</th>
<th>3</th>
<th>4</th>
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</table>

<table>
<thead>
<tr>
<th>Time training</th>
<th>1h</th>
<th>1h30</th>
<th>2h</th>
<th>2h</th>
</tr>
</thead>
</table>

MOUTET F, GNECCHI S; Escalade : pathologies de la main et des doigts; SPRINGER; 2010
No difference in pulley tearing force with or without taping.

Prevention

Hydration

Stretching flexor tendon and interosseous

Warm-up

Avoid crimp grip

Avoid specific drills and diversify training
Bassa MAWEM

* Speed French climber
* 28 november : Tournefeuille Olympic qualification tournament
* Partial left pulley A2 F3 rupture during training in september
* Stop climbing 5 days
* Training with pain speed : open crimp grip position
* Pain leads and boulder


VIGOUROUX L, QUAINÉ F, LABARRE-VILA, MOUTET F ; Estimation of the finger muscle tendon tensions and pulley forces during specific sport-climbing grip techniques; JOURNAL OF BIOMECHANICS ; 2006, 39 : 2583-2592


MOUTET F, GNECCHI S ; Escalade : pathologies de la main et des doigts ; SPRINGER ; 2010
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