

## 1 **Rehabilitation after Achilles tendon rupture**

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The best way to treat remains under debate

- Surgery or not
  - Poor predictor of functional outcome
  - Moderate predictor of symptoms (Olsson et al AJSM 2015)
- Open or percutaneous surgery (Carmont 2013)
- Immobilization or early mobilization
  - Early mobilization seem to results in better outcome (Christensen KSSTA 2014, Holm SJMSS 2014)
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Large variation in treatments, outcomes, and quality of the studies and difficult to compare the treatments and results

## 4 **Achilles Tendon Rupture**

### 6 **Possible reasons for deficits**

Tendon structure - elongation

- The tendon elongates during healing (Mortensen et al 1992)
- Similar elongation regardless of surgery or not (Schepull et al. 2012)
- Amount of tendon elongation correlates with heel-rise height deficit (Silbernagel et al. 2012)
- Tendon elongation affects (Silbernagel et al. 2012)
  - Gait
  - Ability to generate plantar flexion force
  - Correlates with degree of symptoms

Controlled mobilization phase

### 8 **Early functional mobilization**

Systematic review to try to define what early functional mobilization is (under review in BJSM)

- Included 174 published studies
- Early functional mobilization most commonly included weight-bearing (95%) followed by range of motion (73%)
- Weight-bearing typically initiated within 1 week
- Exercises initiated in week 2

### 10 **Exercises in Controlled mobilization phase**

Exercises

- Limit amount of DF
  - Isometric PF in boot
  - Seated heel-rise
  - Theraband
  - Foot intrinsics and extrinsics

### 11 **Early rehabilitation phase**

6-11 weeks

- This is when the patient starts to walk without brace
- Starting to strengthen the calf muscles
- If the patient is allowed to walk it is safe to perform double-leg heel-rise
- Remember that the speed of loading affects the tendon load
- The greatest risk for rerupture is during this phase

### 12 **Early rehabilitation phase Exercises**

### 13 **Alter g**

Use of the Alter-G Treadmill

14  **Expected outcomes at 3 months**

- 50% of the patients were able to perform a one-legged heel-rise (Olsson et al 2012)
- No difference between surgical or non-surgical group
- Heel-rise ability correlated with fear

15  **Late rehabilitation phase**

Week 12-15

- Goal is to slowly progress to running and jumping
- Continue to progress by increasing external load and speed of movement
- Go from 2-leg jump to 1-leg jump
- Functional evaluations are important to determine if appropriate to starting a running and jumping program
- Knee strengthening important
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16  **Heel-rise height measurement**

Mean difference in heel-rise height is 3 cm at 12 months

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17  **Quick rebounding heel-rise**

18  **Return to sports phase**

19  **Case study – Return to Sport**

20  **Progression of Running load**

- Strike pattern (Almonroeder et al. 2013)
  - Rearfoot strike pattern loads the Achilles tendon less than forefoot or midfoot
  - Using forefoot or midfoot strike pattern added an additional load of 48 x body weight for each 1.6 km
- High braking force during running a risk factor for tendinopathy (Lorimer et al. 2014)
  - Using shorter step length could be beneficial

- Stiffer running surfaces was related to decreased Achilles tendon injury risk

21  **Fear of movement – Achilles tendon rupture**

23  **Achilles tendon rupture - Evaluation**

24  **What are realistic recovery expectations?**

27  **Predictors of function and symptoms**

- Function
  - Treatment (surgery or not) weak predictor
  - Increased age strong predictor of reduced function
- Symptom
  - High BMI strong predictor of greater degree of symptoms
  - Treatment is a moderate predictor (similar effect as 1.5 unit of BMI or 1 physical activity level)

29  **The rehabilitation**

- Some patients recover 100% so it is possible
- The rehabilitation/mobilization is crucial for outcome
- Historically we push the boundaries of rehabilitation in the surgical group first
- Up to this point the same early loading has been equally successful in non-surgical patients in the next step
- Main difficulties are:
  - To measure how much the exercises actually load the Achilles tendon
  - What muscles are activated during the exercises