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)
• 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

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

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 breaking 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