

# Achilles Tendinopathy Assessment Guide

## Subjective

**Risk Factors:** Previous Injury, Age 30+-, Gender, Menopause, Strength deficits, Flexibility deficits, Obesity, Carrying a loaded rucksack, Rheumatoid Arthritis, Diabetes, Fluroquinolone antibiotics.

**Pain Behaviour:** Morning Stiffness and Pain, Diffuse or Focal, Mid or Insertional, Chronic or Acute, Sudden pain/sensation, Pain increase with recent loading, VISA-A if time allows.

**Loading History:** Increase or rapid fluctuations, Frequency, Intensity, Type (shoes/sport/surface), Time.

1. Any indication of a partial or full rupture?
2. Is morning stiffness and pain present?
3. Insertional or mid substance?
4. What stage; Reactive, Dysrepair, Degenerative?

## Objective

**Observation:** Posture, Muscle bulk, Tendon thickening.

**Loading:** Single leg heel raise performed slowly, progress to single leg hops if appropriate.

**Lower Limb Function:** Squat x3, One leg squat x3 R+L, Gait analysis (walking).

**Joint testing:** Dorsi+Plantar flexion range?

**Examination:** Plantar fascia to Gastrocnemius, Pain location, muscle tone/bulk/trigger points.

**Special tests:** Simmonds-Thompson, Posterior impingement, Plantaris is medial more superior, Sural nerve lateral AT, Flexor hallucis longus, Tibialis Posterior, Accessory soleus medial, foot posture.

**Gait Analysis:** Change in running style towards a forefoot strike pattern, recent switch to minimalist footwear bounding with large vertical displacement.

## **Analysis:**

- Stage: Reactive, dysrepair or degenerative?
- Has the loading or training history identified contributing factors?
- Are there any strength or functional deficits?
- What risk factors were identified?

## Achilles Tendinopathy Rehabilitation Guidelines

### **Stage 1 (pain reduction)**

- Time frame: up to 4 weeks
- Frequency: daily – determined by pain reduction and daily activities.
- Aim: To settle the tendon by reducing elastic loading, maintain regular load, reduce pain and sensitivity.
- Education is also highly important for adherence and regime success.
- Exercises: Inner-range isometric contractions of the calf musculature using a moderate and tolerable load for 30-60 seconds for one to three repetitions.
- Two to three times per day depending on the length of pain reduction following each exercise.
- Link the exercise to normal daily tasks ie. Brushing teeth, making a drink, on the phone.
- This exercise should offer rapid and sustained pain relief.
- Adjunctive treatments: Analgesic options can be utilized. Avoid interventions that stimulate the tendon during the initial reactive phase.

Note: The stages are not protocols and should be interpreted for patients on an individual basis. Stage 1 & 2 may be implemented together in a dysrepair or degenerative tendon.

### **Stage 2 (increase strength)**

- Time frame: from 4 to 6 weeks and performed in conjunction with the above pain reduction exercises.
- Frequency: Twice per week for beginners and in-season, 3-4 per week for strength trained individuals, 4+ for highly active individuals.
- Aims: To increase the maximal capacity of the plantar flexor muscles and stimulate structural changes with the musculotendinous unit.
- Exercises: three to four sets of 6 to 10 repetitions performed at a slow pace to avoid any stimulus of the elastic energy storage capacity of the tendon. A range of motion that avoids excessive dorsiflexion should be taught. A rest period of approximately 1 minute between sets.

#### **TIPS**

- Add load not reps or sets. Aim for 75 to 85% 1RM.
- Hold a wall or rail to avoid challenging balance.

### Stage 3 (Functional Strength)

- Time frame: Based on symptomatic and functional assessment following stage 1+2.
- Frequency: Every other day.
- Aims: To continue to apply sustained loads to the tendon with the addition of more functional training.
- Re-introduce running with specific form training. 2 to 3 times per week.
- Exercises: Progress the exercises by gradually increasing the load.

#### TIPS

- Increase the range of motion.
- Increase the resistance.
- Do not progress too rapidly.
- Monitor and manage total training volume.

### Stage 4 (Develop speed)

- Time frame: Based on symptomatic and functional assessment following stage 123.
- Frequency: Every two to three days. Keep strength training on the non-speed training days.
- Aims: To introduce functional speed and begin stressing the stretch-shorten capability of the tendon.
- Exercises: Use exercises akin to the individuals sporting function. Ensure that the range of motion does not stress the enthesis by controlling any risk of excessive dorsiflexion.

#### TIP

- Begin with short sessions using a low load.
- Partial weight bearing is an option.

### Stage 5 (Athletic function)

- Time frame: Based on symptomatic and functional assessment following stage 1234
- Frequency: Athletic function days will be incorporated into a weekly programme containing the strength and speed exercise days. The week should consist of a small cycle of **high, medium and low loading days**.
- Aims: To combine the development of strength and speed into usable athletic function in preparation for full training.
- Exercises: Advanced running form drills, Propulsion activities, acceleration/decelerations, eccentric, concentric turnarounds, SAQ style training drills.

### **Advice & Monitoring:**

- Pain during activity does not correlate well with the clinical outcome or pathology.
- The careful monitoring of morning pain and stiffness using a diary should be used to ascertain the appropriate speed of the programme progression.
- Remember the cellular response to loading usually takes around 24+ hours.
- Consider programme start and end point.
- Guide not recipe - consider ADL's and adapt the programme accordingly.
- Recovery speed can fluctuate.
- Cycle high, low, medium days.

## Patellar Tendinopathy Assessment Guide

**Risk Factors:** Jumping or running activities, Previous patella tendon ACL graft, Age 30+, Menopause, Strength deficits, flexibility deficits, Obesity, Increased weight bearing, leg length discrepancy, Rheumatoid Arthritis, Diabetes, Fluroquinolone antibiotics.

**Pain Behaviour:** Stiffness and Pain in the morning or after prolonged sitting, Focal pain below the apex of the patella, Complete VISA-P if time allows.

**Loading History:** Jumping activities, Increase or rapid fluctuations in Frequency, Intensity, Type (shoes/sport/surface) and Time.

Consider:

1. Do the symptoms indicate patellofemoral pain or patellar tendinopathy?
2. Is stiffness and pain present?
3. What recent changes has the patient made to their exercise regime?
4. What stage; Reactive, Dysrepair, Degenerative?

### Objective

**Observation:** Posture, quadriceps muscle bulk.

**Loading:** Squats, single leg squats, step down, single leg hop. Repeat 3 times if asymptomatic. Perform a single or double leg decline or standard squat recording pain free range and board decline setting.

**Joint testing:** Ankle dorsi+plantar flexion range, hip joint range.

**Examination:** Tibial tuberosity to Rectus femoris origin, pain location over apex of patella, muscle tone/bulk/trigger points, quadriceps and hamstring flexibility, leg length discrepancy, foot posture.

**Special tests:** Knee extensions to test the infrapatellar fat pad. Patellar glide to test for reduced patellofemoral pain during resisted flexion.

**Gait analysis (running):** Over striding, slow step-rate, large vertical displacement, excessive heel strike pattern.

**Analysis:**

- Which stage: Reactive, Dysrepair or Degenerative?
- Does the loading and training history identify any contributing factors?
- Were there any strength or functional deficits?
- What risk factors were identified?

## Patellar Tendinopathy Rehabilitation Guidelines

### **Stage 1 (pain reduction)**

- Time frame: up to 4 weeks
- Frequency: daily – determined by pain reduction and daily activities.
- Aim: To settle the tendon by reducing elastic loading, maintain regular load, reduce pain and sensitivity.
- Education is also highly important for adherence and regime success.
- Exercises: Ski squat with knees above 60° for 30-60 seconds and repeat if tolerated. Attempt; one leg static squat, adding decline 15°-25° or using a leg extension/leg press if available. Exercise start point determined by personal ability and athletic level.
- Two to three times per day depending on the length of pain reduction following each exercise.
- The exercises should not challenge balance and the focus should be on the consistent tendon loading
- This exercise should offer rapid and sustained pain relief.
- Adjunctive treatments: Analgesic options can be utilized. Avoid interventions that stimulate the tendon during the initial reactive phase.

Note: The stages are not protocols and should be interpreted for patients on an individual basis. Stage 1 & 2 may be implemented together in a dysrepair or degenerative tendon.

### **Stage 2 (increase strength)**

- Time frame: from 4 to 6 weeks and performed in conjunction with the above pain reduction exercises.
- Frequency: 2 session per week for beginners and in-season, 3-4 for strength trained individuals.
- Aims: To increase strength and endurance capacity of the whole musculo-tendinous unit.
- To improve tendon structure and stiffness.
- Exercises: Squat based exercises to 60° knee flexion three to four sets of 6 to 10 repetitions performed at a slow pace to avoid any stimulus of the elastic energy storage capacity of the tendon. Rest for approximately 2 minutes between sets.

#### **TIPS**

- Add load not reps or sets.
- Use a resistance 75-85% of 1RM

### Stage 3 (Functional Strength)

- Time frame: Based on symptomatic and functional assessment following stage 1+2.
- Frequency: Every other day.
- Aims: To continue to apply sustained loads to the tendon with the addition of more functional postures. Improve landing mechanics and gait re-education.
- To progress the retraining of motor pattern deficits.
- Re-introduce running with specific form training. 2 to 3 times per week. Short sessions, avoid running down hill.
- Exercises: Include a larger variety of squat and lunge variations.

#### TIPS

- Encourage balance and stability of the whole body when supported by the lower limb.
- Increase the resistance while continuing to focus on endurance.

### Stage 4 (Develop speed)

- Time frame: Based on symptomatic and functional assessment following stage 123.
- Frequency: Every two to three days. Keep strength training on the non-speed training days.
- Aims: To introduce functional speed and begin stressing the rapid loading capability of the tendon.
- Exercises: Jump squat, split squat, power cleans.

#### TIPS

- Begin with just body weight or a barbell.
- Practice repetitive movement patterns first.

### Stage 5 (Athletic function)

- Time frame: Based on symptomatic and functional assessment following stage 1234
- Frequency: Athletic function days will be incorporated into a weekly programme containing the strength and speed exercise days. The week should consist of a small cycle of **high, medium and low loading days**.
- Aims: To combine the development of strength and speed into usable athletic function in preparation for full training.
- Exercises: Running form drills, Jumping activities, acceleration/decelerations, eccentric, concentric turnarounds, SAQ style training drills.

### **Advice & Monitoring:**

- Pain during activity does not correlate well with the clinical outcome or pathology.
- The careful monitoring of morning pain and stiffness using a diary should be used to ascertain the appropriate speed of the programme progression.
- Remember the cellular response to loading usually takes around 24+ hours.
- Consider a programme start and end point.
- Guide not recipe - consider ADL's and adapt the programme accordingly.
- Recovery speed can fluctuate.
- Cycle high, low, medium days.
- Re-assess running form regularly to avoid technique regression.



# Hamstring Tendinopathy Assessment Guide

## Subjective

**Risk Factors:** Previous hamstring muscle or tendon injury, middle to long distance running, hill running, deep squatting, lunging activities, poor hamstring strength or flexibility, Obesity, Rheumatoid Arthritis, Diabetes, Menopausal, Fluroquinolone antibiotics.

**Pain Behaviour:** Gradual onset of deep buttock pain. Possible posterior thigh referral. Increases with prolonged sitting and hip flexion under load, pain may increase with up-hill running. Referred pain of sciatic distribution. VISA-H if time allows.

**Loading History:** Introduction of hill running, repetitive deep squats or lunging, sustained hip flexion positions.

1. Tendinopathy or muscle strain? – Based on pain location, onset and behavior.
2. Buttock pain with prolonged sitting, with or without sciatic distribution?
3. What stage; Reactive, Dysrepair, Degenerative?
4. Any contributing risk factors?

## Objective

**Observation:** Anterior pelvic tilt.

**Loading:** Maximum Voluntary Contraction (MVC) test. Single leg long lever bridge test.

**Lower Limb Function:** Squat, deadlift, straight leg deadlift.

**Joint testing:** Lumbar spine, Hip extension & SIJ

**Examination:** Hamstring muscle and proximal attachment, Pain location, muscle tone/bulk/trigger points. Piriformis.

**Special tests:** Modified Slump, hamstring-stretch, H-test. Lasletts SIJ tests, Prone hip extension.

**Gait Analysis:** Over-striding, poor hip extension.

## **Analysis:**

- Stage: Reactive, dysrepair or degenerative?
- Is there sciatic nerve involvement?
- Does the loading or training history identify any contributing factors?
- Were strength and functional deficits identified?
- What Risk factors are evident?

## Hamstring Tendinopathy Rehabilitation Guidelines

### Stage 1 (pain reduction)

- Time frame: Immediately and on-going during the subsequent stages
- Avoid: Prolonged sitting on a hard surface, sitting or squatting with the knees above the hips, over striding when walking or running, hill walking.
- Aim: Reduce symptoms and reduce risk factors.
- Isometric exercises: prone leg curl hold, long lever bridge holds, Static straight leg deadlifts. Two to three times per day depending on the length of pain reduction following each exercise. Isometric exercises should offer rapid and sustained pain relief.
- Gait re-education: Identify and modify any gait related causes.
- Joint restrictions: Improve hip extension range and power.
- Adjunctive treatments: Analgesic options can be utilized. Avoid interventions that stimulate the tendon during the initial reactive phase.

Note: The stages are not protocols and should be interpreted for patients on an individual basis. Stage 1 & 2 may be implemented together in a dysrepair or degenerative tendon.

### Stage 2 (increase strength)

- Time frame: from 4 to 6 weeks and performed in conjunction with the above pain reduction exercises.
- Frequency: 2 session per week for beginners and in-season, 3-4 for strength trained individuals.
- Aims: To increase hamstring strength, flexibility if required. To improve hip extension muscle patterning.
- To improve tendon structure and stiffness.
- Exercises: Long lever bridge, Straight leg deadlift (half range) Gluteal hip extension exercises. Rest for approximately 2 minutes between sets.

#### TIPS

- Increase the load not the reps or sets.
- Use a resistance 75-85% of 1RM
- Avoid excessive hip flexion

### **Stage 3 (Functional Strength)**

- Time frame: Based on symptomatic and functional assessment following stage 1+2.
- Frequency: Replace approximately half the exercises from phase 2 with more functional phase 3 exercises.
- Aims: To continue to apply sustained loads to the tendon with the addition of more functional movement patterns.
- To progress the retraining of motor pattern deficits.
- Re-introduce running with specific form training. 2 to 3 times per week. Short sessions, avoid running up hill.
- Exercises: Include a larger variety of squat and lunge variations.

### **Stage 4 (Develop speed)**

- Time frame: Based on symptomatic and functional assessment following stage 123.
- Frequency: Every two to three days. Keep strength training on the non-speed training days.
- Aims: To introduce functional speed and begin stressing the rapid loading capability of the hamstring.
- Exercises: Sprint drills, kicking drills, Weight training - power cleans.

#### **TIPS**

- When weight training use just body weight or a barbell.
- Begin sprint and kicking drills at a sub-maximal pace.

### **Stage 5 (Maintenance programme)**

- Time frame: Based on symptomatic and functional assessment following stage 1234
- Frequency: Specific exercises from the previous stages should form part of a short maintenance session to be performed 2 to 3 times per week.
- Aims: To maintain strength and flexibility gains. To maintain positive changes to running form.
- Exercises: Specific strength training exercises, functional exercises, gait assessment and feedback.

### **Advice & Monitoring:**

- Pain during activity does not correlate well with the clinical outcome or pathology.
- The careful monitoring of morning pain and stiffness using a diary should be used to ascertain the appropriate speed of the programme progression.
- Remember the cellular response to loading usually takes around 24+ hours.
- Consider a programme start and end point.
- Guide not recipe - consider ADL's and adapt the programme accordingly.
- Recovery speed can fluctuate.
- Cycle high, low, medium days.
- Re-assess running form regularly to avoid technique regression.

# Gluteal Tendinopathy Assessment Guide

## Subjective

**Risk Factors:** Age 40+, Female/Male = 4:1, Menopause, Low activity levels, seated exercise habits, endurance running, Hip adduction stance, Poor lower limb muscle strength, Trendelenburg sign, coxa-vera, Hip OA, Obesity, Fluroquinolones antibiotics.

**Pain Behaviour:** Lateral hip pain with possible lateral thigh referral, Pain may increase with; adducted hip in standing, sitting cross legged, sleeping side lying, standing from a seat, stairs ascent & descent, running and walking can be painful in severe cases. VISA-G if time allows.

**Loading History:** Changes in training, recently beginning a running programme.

## **Consider:**

1. Can they flex forward to tie their shoelaces? No indicates OA hip.
2. Is gluteal weakness and hip instability present?
3. What stage on the continuum; Reactive, Dysrepair, Degenerative?
4. Are there any risk factors that can be easily modified?

## Objective

**Observation:** Habitual postures such as standing in hip adduction, sitting cross legged, trendelburg gait.

**Lower Limb Function:** Side lying hip abduction, One leg squat, Gait analysis (walking).

**Joint testing:** FABERS (differentiating test for OA)

**Examination:** TFL to posterior gluteal muscles, Pain location, muscle tone/bulk/trigger points.

**Special tests:** 30-second single leg stance test, resisted de-rotation test, modified trendelenburg part 1 & 2.

**Gait analysis** (walking & running): Over-striding, slow step-rate, heavy heel strike, poor hip extension, high vertical displacement, trendelenburg gait.

## **Analysis:**

- Osteoarthritis or Gluteal Tendinopathy or both
- Which stage: Reactive, dysrepair or degenerative?
- Were there any identifiable training errors?
- Were any deficits identified in the hip and lower limb stability?
- Were any risk factors identified?

## **Gluteal Tendinopathy Rehabilitation Guidelines**

### **Stage 1 (pain reduction)**

- Time frame: Immediately and on-going during the subsequent stages
- Avoid: Hanging on the hip – Standing habitually on an adducted leg, sitting with legs crossed, over striding when walking or running, sitting in low chairs.
- Aim: Reduce symptoms and reduce risk factors.
- Isometric exercises: Abductor wall push, double abductor hold, side lying isometric hip adduction. One to four sets of 30-60 seconds performed two to three times per day depending on the length of pain reduction following each exercise. Isometric exercises should offer rapid and sustained pain relief.
- Gait re-education: Identify and modify any gait related causes. Which may include; Overstriding, slow step-rate, heavy heel strike, poor hip extension, high vertical displacement, trendelenburg gait.
- Adjunctive treatments: Analgesic options can be utilized. Avoid interventions that stimulate the tendon during the initial reactive phase.

Note: The stages are not protocols and should be interpreted for patients on an individual basis. Stage 1 & 2 may be implemented together in a dysrepair or degenerative tendon.

### **Stage 2 (increase strength)**

- Time frame: from 4 to 6 weeks and performed in conjunction with Stage 2.
- Frequency: 2 session per week for beginners and in-season, 3-4 for strength trained individuals.
- Aims: To improve hip stability – specifically hip abductors to reduce hip drop during walking, running and single limb tasks.
- Exercises: Clam, Side lying hip abduction, band walk, kneeling hip stability.
- Rest for approximately 1 minute between sets.

#### **TIPS**

- Increase the load not the reps or sets.
- If possible use a resistance 75-85% of 1RM which should allow 6-10 repetitions for the initial set.
- Performing inner range muscle action may aid the shortening of elongated muscles.

### **Stage 3 (Functional Strength)**

- Time frame: Based on symptomatic and functional assessment following stage 1+2.
- Frequency: Continue to perform exercises from stages 1 & 2 with the addition of 1 or 2 modified functional exercises.
- Aims: The addition of more functional movement patterns – modified to stimulate the hip abductors through a functional range.
- To progress the retraining of motor pattern deficits.
- Re-introduce walking or running with specific form training focusing on reduced leg adduction and reduced stride length. 2 to 3 times per week. Short sessions, avoid hills and off-camber surfaces.
- Exercises: Squat and deadlift activities with added abductor resistance using a band around the knees.

### **Stage 4 (Advanced Rehabilitation)**

- Time frame: Based on symptomatic and functional assessment following stage 123.
- Frequency: 3 to 5 times per week in addition to chosen exercises and techniques from the previous stages.
- Aims: To instill corrected movement patterns using a combination of analgesia, risk factor avoidance, strengthening, gait re-education and education.
- Exercises: One leg squat and deadlift if the patient has a suitable fitness level. Utilize the previous exercises alongside gait re-education with real-time (mirror) and post training feedback.

#### **TIPS**

- Short, high quality and regular training sessions will provide the best results.

### **Advice & Monitoring:**

- Pain during activity does not correlate well with the clinical outcome or pathology.
- The careful monitoring of morning pain and stiffness using a diary should be used to ascertain the appropriate speed of the programme progression.
- Remember the cellular response to loading usually takes around 24+ hours.
- Consider a programme start and end point.
- Guide not recipe - consider ADL's and adapt the programme accordingly.
- Recovery speed can fluctuate.
- Re-assess walking and running technique regularly to avoid technique regression.