Rehabilitation Program
for
Achilles Tendon Rupture/Repair

This protocol is designed to assist you with your rehabilitation after surgery and should be followed under the direction of a physiotherapist

Covenant Health
Banff Mineral Springs

Banff Sport Medicine

July 2012

Achilles Tendon Rupture/Repair

This handout describes the details of your care after your Achilles tendon rupture. There are two ways to treat patients that have ruptured their Achilles tendon, non-operative management in a splint or cast, and surgery. Multiple research studies have shown that both approaches have similar outcomes at one year when rehabilitation was started early. It has also been shown that a patient's opinions about their symptoms, function, and physical activity levels at 6 and 12 months post injury are the same whether treated with or without surgery. Although no difference has been demonstrated between treatments, it has been shown that patients who have ruptured their Achilles tendon, regardless of treatment method, had decreased function in the injured leg versus the uninjured leg at twelve months.

This rehabilitation program is separated into phases and your progress will vary depending on your pre-injury function, the extent of your injury and your commitment to the rehabilitation program. The initial goals of your rehabilitation program are to control pain and swelling, allow for healing. The next step is to progress to regaining your ankle movement and strength. This rehabilitation program is the same for both surgical and non-surgical management of an Achilles Tendon Rupture.

Rehabilitation of your core and leg strength, balance and agility after an Achilles tendon injury is essential for you to return to doing all your regular activities. Your doctor and physiotherapist will be able to give you more detail about the length and intensity of rehabilitation you will need.

Risks:

Risk of Tendon Re-rupture 3-6%
Re-rupture of the Achilles tendon must be surgically repaired. It is most commonly re-ruptured by doing more than your tendon is capable of handling during the rehabilitation process. The Achilles tendon is at the highest risk of re-rupture when jumping down from a height and with explosive calf movements.

Surgical Risks

Risk of Infection: less than 1 in 100
- Intravenous antibiotics are given before and after surgery to help prevent infection.
- If an infection occurs, it will usually happen within 5-7 days of your surgery. Some minor wound infections can be treated with a short course of oral antibiotics, whereas more severe wound or skin infections may require a longer course of intravenous antibiotics.

Risk of Clot in Leg Veins (deep vein thrombosis): less than 1 in 100
- If severe calf, ankle and foot swelling occurs 3 days to 2 weeks after surgery, you could have a clot in a deep vein of your leg (DVT). See a doctor as soon as possible. Treatment for a blood clot is usually blood-thinning medication (anticoagulants) for 3-6 months.

Risk of Clot in Lungs (pulmonary emboli): less than 1 in 500

- It is possible for a blood clot to travel to your lung; this is called a pulmonary embolism. If you suddenly get short of breath or have chest pain go to the nearest emergency room or call 911. A pulmonary embolism is a medical emergency and can cause death.
- In some patients, preventive blood thinners will be prescribed for a short period of time after surgery.

Risk of Skin Numbness around Incision

- Every patient gets some numbness around their incision because some small surface nerves are cut during surgery. This can be along the incision or can affect a larger area extending into the foot. This may disappear slowly over time, depending on the patient.

Risk of delayed Wound Healing

- Because of the location of the Achilles tendon, patients are more susceptible to wound healing problems.

Exercises:

Each exercise should be done smoothly and slowly. Start with one set of each exercise. Your physiotherapist will recommend the number of exercises you should do based on your muscle strength and endurance.

Once you can comfortably do one set of each exercise, progress to 2 sets and once you are strong enough then 3 sets. Your physiotherapist might recommend for some of the exercises to be done until you fatigue or until you lose the form of the original exercise position. Make sure you so all the strengthening and stretching exercises.

**If you have any questions please contact Sarah Kerslake, Research Coordinator at:
sarah@banffsportmed.ca**

PHASE 1: Early Rehabilitation Phase

This is the initial recovery phase and it normally lasts 2 weeks. In the first week you should rest and elevate your leg for a significant amount of the time.

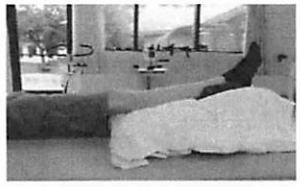
1. Control inflammation and swelling with rest and elevation
2. Gradual increase of activities of daily living
3. Commence leg strengthening exercises

Goals

BRACE
Your brace or splint should be worn at all time until it is removed by your doctor. This brace will position your ankle with your toes pointed down. With your ankle in this position the Achilles tendon is in its shortest position and has the best chance of healing.

WEIGHT BEARING
You should not put any weight through your leg for the first 2-weeks after your injury or surgery.

ELEVATION
Your injured leg should be elevated with the knee straight when resting.



Exercises:

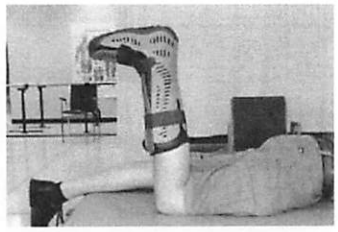
1. **Circulation Exercises**

   - To avoid blood pooling in your lower leg while you are in the splint, increase your circulation by doing toe curls, toe spreading and gentle foot exercises.

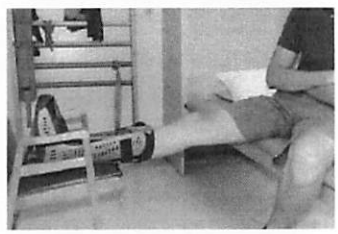
2. **Range of Motion Exercises**

Knee

- **Flexion** – Lying on your stomach, bend you knee towards your buttocks. Perform up to 20 times on each leg to keep your knee flexibility; repeat 2- 3 times daily.



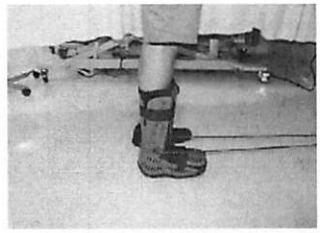
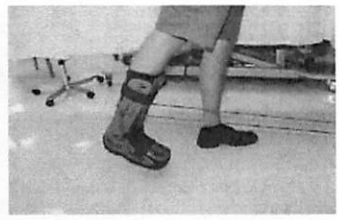
- **Extension** - In sitting, place your heel on a chair to passively (i.e. allow gravity), stretch your knee into extension. Start with 2 minutes at a time and increase as tolerated up to 5 minutes. Perform 2 or 3 times each day. It is important in this phase to be able to fully straighten your knee.



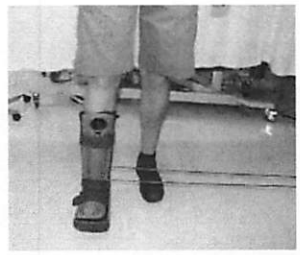
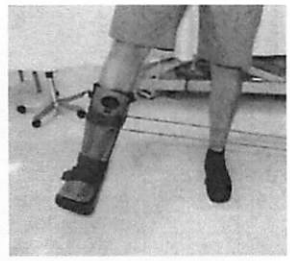
Hip

- **Flexion**: While standing, put your foot in the resistance band and turn so you are facing away from the band's anchor. Lift your leg forward to a count of three and then release it back down. Depending on comfort, your knee may be bent during this exercise.


- **Extension**: While standing, put your foot in the resistance band and turn so you are facing towards the band's anchor. Lift your leg backward to a count of three and then release it back down. Depending on comfort, your knee may be bent during this exercise.

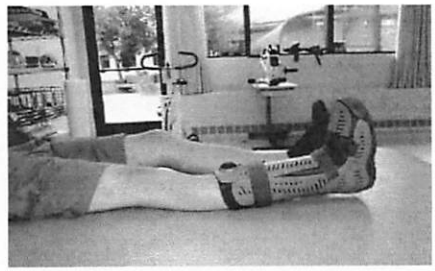
- **Abduction**: Anchor a resistance band to a stable object. While standing, loop the other end around your foot so the band crosses in front of you. Standing with your opposite leg slightly behind you, keep the banded leg straight and lift it out to the side. Lift it to a count of three, then release it back down to a count of three.

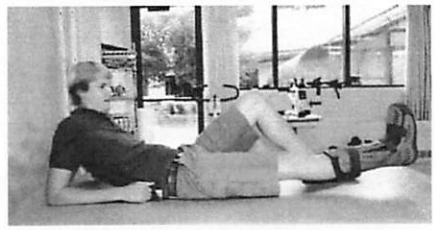
- **Adduction**: Anchor a resistance band to a stable object. Attach band to one of your ankles. Stand on a straight leg with the opposite foot and sweep the banded leg across to your body as if you are kicking a soccer ball. Squeeze your inner thigh to move it as far across the body as much as possible. Release the squeeze and move your leg back to the center.


3. Strengthening

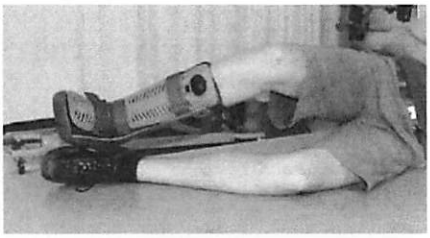
- **Quadriceps Contraction –** In sitting with your knee straight and leg supported, tighten your thigh muscle by pushing your leg downwards. Focus on tightening the muscle and avoid lifting your leg from the hip. Perform exercise 5 -10 times holding each contraction for 5 secs. Progress to 30 times holding each contraction for 10 secs, resting for 5 secs in between reps.



- **Straight Leg Raises –** In the position shown, tighten your thigh muscle while keeping your knee straight and lift your leg up 2 inches. Perform exercise 5 -10 times holding each contraction for 5 secs. Progress to 30 times holding each contraction for 5-10 secs.



- **Clam-shells-** Lie on your side on the floor, with your hips and knees bent 45 degrees. Your legs should be on top of each other with your heels together. Keeping your feet in contact with each other, raise your top knee as high as you can without moving your pelvis. Don't allow your lower leg to move off the floor. Pause, then return to the starting position.



**** Perform all exercises 2-3 times per day to build your strength and endurance. You should perform all the strengthening exercises on both legs****

Requirements for progression to Phase 2:

1. Pain levels managed to enable exercise progression
2. Patients must have their splint removed and put into a walking boot before moving to the next phase. This usually occurs at your first follow-up appointment.
3. You need approval from your surgeon before moving onto the next phase.

PHASE 2: Muscle Strength and Core Stability

This phase focuses on progressing your walking and initial strengthening and range of motion. This phase usually lasts from 2-6 weeks

1. Manage pain and control swelling by using cold therapy and elevation
2. Maintain hip and knee range of motion
3. Improve core, hip and knee strength
4. Safe crutch use with full weight bearing in Walking Boot
5. Slowly increasing dorsiflexion to a neutral position

Goals

Walking Boot

Walking Boot may come off for bathing and exercises but no weight bearing is allowed with the boot off

- 4-6 cm heel lift in walking boot for weeks 2-4
- 2-4 cm heel lift in walking boot for weeks 4-6

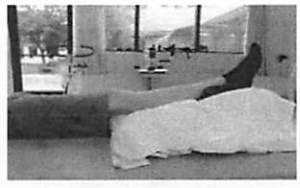
WEIGHT BEARING

Once you are in your walking boot, protected weight bearing with crutches is allowed. Your injured leg should move with the crutches, so the crutches can support your weight. Try to walk in a normal pattern putting 25-50% of your weight through your foot. Once this is comfortable you may progress to more weight bearing but you must continue to use crutches. Make sure you avoid hyperextending your knee which can happen as you compensate for the lack of movement (dorsiflexion) at your ankle.




COLD THERAPY & ELEVATION

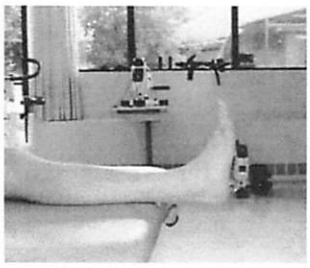
A Cold Therapy Unit or an ice pack should be used 3-4 times each day when your boot is off. Your injured leg should be elevated with the knee straight when applying cold therapy and/or when resting.



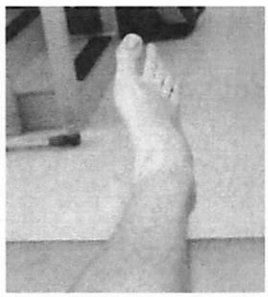
Exercises

Continue the exercises from phase 1 as well as adding the following new exercises

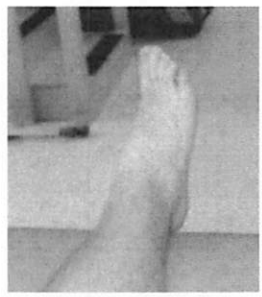
1. **Range of motion**
   Continue knee and hip range of motion exercises from phase 1 (Weeks 2-4) Passive supine plantar flexion, inversion/eversion below neutral, active plantar flextion, and dorsiflexion but only to neutral.



Neutral



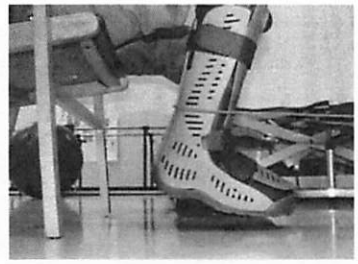
Inversion



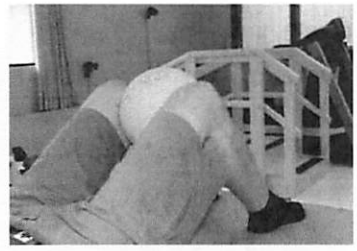
Eversion

(Weeks 4-6) Add **gentle** active dorsiflexion of the ankle to a gentle stretch of the Achilles

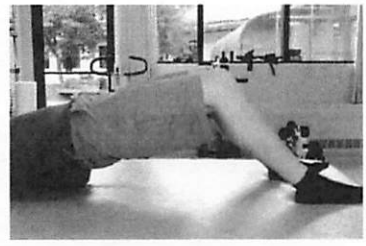
2. **Strengthening**



- Continue strengthening exercises from phase 1
- **Hamstrings –** In sitting place a resistance band around your ankle and also have it attached to a chair or table leg in front of you. Bend your knee backwards slowly against the resistance of the band using the muscles under your thigh. Start with 1 set of 10 reps and increase to 3 sets of 15 reps.

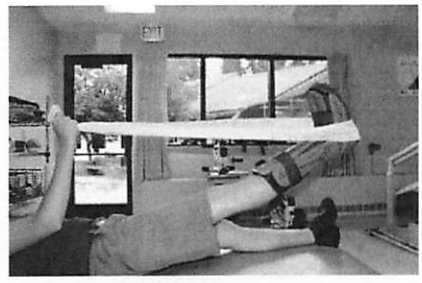


- **Hip Adduction –** In lying with your knees bent as shown, squeeze a soft ball or a pillow between your knees. Perform exercise 5 -10 times holding each contraction for 5 secs. Progress to 30 times holding each contraction for 10-15 secs, resting for 5 secs between reps.



- **Bridges**- Lying on your back with your knees bent and your arms by your sides. Squeeze your buttocks together and lift up to create a bridge. Keep equal weight on each leg with you pelvis straight. Be careful not to push down on your neck or shoulders – use your buttocks to do the work. Start with one set of 10, holdng for 5 secs and increase the number of repetitions as you get stronger. Once you can complete 20 reps holding for 10 secs each, change to single leg bridges.

3. **Core Stability**
   - Transversus Abdominis exercises
   - Bridging on ball with feet lightly against wall
   - Arm pulleys or resisted theraband diagonals
5. **Stretching**
   - Hold each stretch for at least 30 seconds and repeat 4 times.
     - **Gluteus Maximus**
     - **Gluteus Medius**
     - **Piriformis**
     - **Rectus Femoris**



Hamstring stretch (gently) – In lying, place a towel or belt around your foot and bring your leg up until a stretch is felt at the back of the thigh.

Also consider:

- Massaging your foot to decrease swelling
- Stationary bicycle while wearing Aircast boot (weeks 4-6)
- Core (plank, side planks, sit ups with physio ball, bridging with physio ball, theraband pullets for obliques)

** **Perform all exercises 2-3 times per day to build your strength and endurance. You should perform all the strengthening exercises on both legs***

Requirements for progression to Phase 3:

1) Pain levels managed to enable exercise program
2) At least 6 weeks post injury
3) Approval by your surgeon to move to the next stage.

PHASE 3: Strength and Control

This phase may start as soon as your surgeon allows you to fully weight bear. Usually lasts 8-16 weeks

1. Full Weight Bearing in Walker Boot progressing to weaning off of the Walker Boot
2. Increase core, hip and knee strength
3. Increase ankle dorsiflexion to allow splint to come off\
4. Early strengthening of calf muscles.

Goals

Walking Boot
Weeks 6-8- Discontinue heel lift in Walking Boot
Weeks 8-12-Wean off use of the Walking Boot

WEIGHT BEARING
Weeks 6-8- Weight bear as tolerated. As your Achilles comes under stretch, you may need to return to crutches to maintain a normal gait pattern.
Weeks 8-12- When the walking boot comes off, you may need to return to crutches and then wean to full weight bearing.

COLD THERAPY & ELEVATION
Manage any swelling by using cold therapy and elevation.

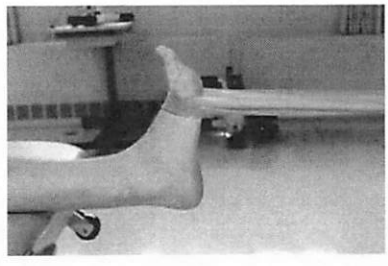
ROM
Continue to progress range of motion

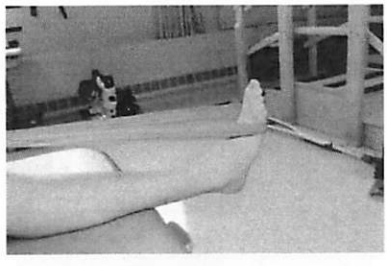
Exercises

1. **Strengthening**
- Continue phase 1 and 2 exercises

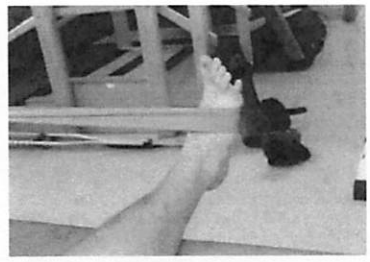
Thera-band ankle exercises

- **Dorsiflexion:** Sit on floor with both knees extended. Make a loop with the band and securely attach one end of the loop near the floor. Place exercising foot inside loop. Pull your ankle toward your head against the resistance of the tubing. Hold and slowly return
- **Plantarflexion**: Sit on floor with both knees extended. Loop the middle of the band around one foot and grasp the ends of the band. Push the foot down against the resistance of the band. Slowly return





- **Inversion**: Sit on floor with both knees extended. Make a loop with the band and securely attach one end of the loop near the floor. Place exercising foot inside loop. Pull your ankle inward against the resistance of the band. Hold and slowly return.
  TIP: Keep your knee steady; don't rotate your leg to complete the motion

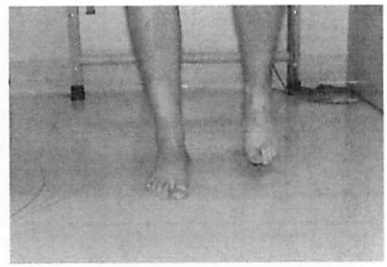


- **Eversion**: Sit on floor with both knees extended. Make a loop with the band and securely attach one end of the loop near the floor. Place exercising foot inside loop. Push your ankle outward against the resistance of the band. Hold and slowly return.
  TIP: Keep your knee steady; don't rotate your leg to complete the motion.

Calf Raises

- Double concentric to single eccentric

2. **Core Strength**
   Continue from phase 1 and 2



3. **Proprioception/Balance** (can start at 8-12 weeks)

- **Weight Shifting –** Start using some support (i.e. railing or table) and progress to unsupported. Stand without your brace on, slowly shift weight from your non-operated to your operated leg. Slowly increase the amount of weight supported through your operated leg.
- **Double leg stance on a stable surface**
- **Single leg stance on a stable surface**
- **Single leg calf raises** +/- mini squat
- **Wobble board balance and weight shift activities**

4. **Stretches**

- Continue with stretches from phase 2.

5. **Conditioning Activities**

- Stationary Bike - With heel push only (weeks 6-8)
  - Start to add tension (weeks 8-12)
- Deep water walking

6. **Other Exercises**
   - Manual full passive range of motion of the Achilles (weeks 8-12)
   - Begin to gradually increase active/ resistive exercises of the Achilles
     - Sub maximal isometrics, cautious isotonics
   - Sitting: Active planter flexion exercises, and dorsiflexion to tolerance

Requirements for Progression to Phase 4:

1) Pain levels managed to enable exercise progression
2) Full weight bearing without a limp.
3) Dorsiflexion is beyond neutral
4) Approval from your surgeon to move on to the next phase.

PHASE 4: Sport Readiness

1. Full weight bearing with no swelling or pain
2. Near full strength
3. Good proprioception in single leg support
4. Full Lower extremity strength
5. Maximum Function

GOALS

COLD THERAPY & ELEVATION

Monitor and control swelling by using cold therapy and elevating your surgical leg as needed.

Exercises

1. **Strengthening**
   - Leg Press
   - Hamstring Curls
   - Thera-Band Exercises
   - Calf Raises
   - Bridging with one foot
2. **Stretching**
   - Gluteus Maximus, Gluteus Medius, Piriformis
   - Hamstring , Rectus Femoris, Commence Gentle Calf Stretches
3. **Conditioning**
   - Stationary Bike- increasing tension
   - Deep Water Walking

New Exercises

1. **Strengthening**

Eccentric Heel-drop program-

- **Knee straight - gastrocnemius drop:** Standing on edge of step, raise onto toes using the uninjured leg and hands. Transfer to single leg, standing on injured leg, and SLOWLY control the weight down so the heel is lowered over the edge of the step. Transfer weight back onto uninjured leg to lift back up onto toes. 3 sets of 15 repetitions, twice a day, 7 days a week for 12 weeks
- **Knee Bent- Soleus drop:** Standing on edge of step, hands on banister or rail, raise onto toes using the uninjured leg and hands to help in the pushing up phase. Transfer to single leg, standing on injured leg bending the knee to 45°, and SLOWLY control the weight down so the heel is lowered over the edge of the step maintaining a bent knee. Transfer weight back onto uninjured leg to lift back up onto toes. 3 sets of 15 repetitions, twice a day, 7 days a week for 12 weeks

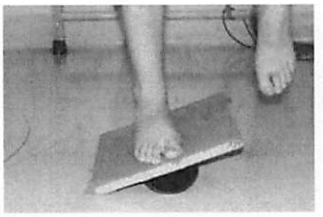
****Heel drops can/should be performed into mild to moderate discomfort (no more pain than 5/10). Pain must subside to normal level by the following morning and no increase in pain is allowed on a week-to-week basis. If no, or minimal, pain during exercise - increase loading using back pack or dumbbells (5kg increments) ****

2. **Proprioception/Balance-**

Begins as early as 3 months but may not start until 9 months postoperative.

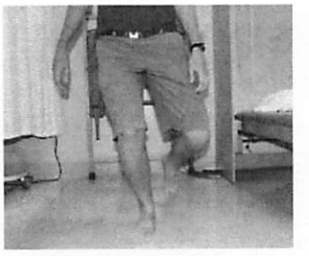
- **Single-leg stance** – Once you can comfortably shift all your weight onto your surgical leg progress to balance. Start using some support (i.e. railing or table) and progress to unsupported. Stand on your non-operative leg first and hold for 10 seconds; repeat for 5 secs on your operative leg. Slowly increase the amount of time you can balance, up to 30 seconds, 5 times each leg.

- **Single leg stance on an unstable surface** (thick carpet, camping mattress, foam pillow, BOSU)
- **Double leg squats on an unstable surface** (thick carpet, camping mattress, foam pillow, BOSU)
- **Wobble board balance and weight shift activities**




- **Single leg squats**

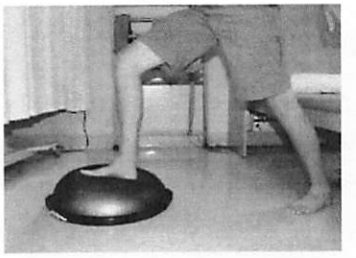
** must be able to do double-leg squats to 80° with control and without pain



Initially use a chair or railing for support. Stand on one leg and slowly bend your knee to squat. Bend as far as you can while keeping control. Start with one set of 10, holding the squat for 5 secs; increase the number of repetitions as you get stronger. Work up to performing squats without support with 'contraction' time at least double the 'rest' time on the EMS. (Up to 20 reps x 15 secs each leg).

- **Single leg calf raises** +/- mini squat

Progressions



- **Lunges on BOSU -** the operated leg can be in front first and then progress to having it at the back.

Start with 3 sets of 10 repetitions and progress as it gets easier.

- **Single leg squats on trampoline -** alternate legs.

Start with 3 sets of 10 repetitions and progress as it gets easier.

- **Single leg stance with ball toss -** alternate legs.

Start with 3 sets of 30 tosses and progress as it gets easier.

3. **Conditioning**
   - Increase dynamic weight bearing exercise, include plyometric training
     - Swimming, gait retraining, stepper
   - Start Advanced dynamic drills at 14 weeks
     - Hopping, skipping
   - Sport Specific retraining at 14 weeks

**** There is a risk of re-rupture if jumping down from a height****