A PATIENT GUIDE TO CALF INJURY REHABILITATION

Gillian Parker Student Physiotherapist
Frank Gilroy BSc MSCP
Senthil Kumar Orthopaedic Foot and Ankle Surgeon
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy of the calf muscle</td>
<td>2</td>
</tr>
<tr>
<td>How do you injure your calf muscle?</td>
<td>3</td>
</tr>
<tr>
<td>What are the symptoms and how is it diagnosed?</td>
<td>4</td>
</tr>
<tr>
<td>How is calf injury treated?</td>
<td>5</td>
</tr>
<tr>
<td>How can a calf injury be prevented from recurrence?</td>
<td>6</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>7</td>
</tr>
<tr>
<td>Initial management</td>
<td>8</td>
</tr>
<tr>
<td>Phase 1 Rehabilitation</td>
<td>9</td>
</tr>
<tr>
<td>Range of movement and stretching programme</td>
<td>10</td>
</tr>
<tr>
<td>Strengthening programme</td>
<td>11</td>
</tr>
<tr>
<td>Proprioception balance and co-ordination programme</td>
<td>12</td>
</tr>
<tr>
<td>General mobility and cardiovascular programme</td>
<td>13</td>
</tr>
<tr>
<td>Phase 2 Rehabilitation</td>
<td>14</td>
</tr>
<tr>
<td>Range of movement and stretching programme</td>
<td>15</td>
</tr>
<tr>
<td>Strengthening programme</td>
<td>16</td>
</tr>
<tr>
<td>Proprioception balance and co-ordination programme</td>
<td>17</td>
</tr>
<tr>
<td>General mobility and cardiovascular programme</td>
<td>18</td>
</tr>
<tr>
<td>Phase 3 Rehabilitation</td>
<td>19</td>
</tr>
<tr>
<td>Strengthening programme</td>
<td>20</td>
</tr>
<tr>
<td>Proprioception balance and co-ordination programme General mobility</td>
<td>21-22</td>
</tr>
<tr>
<td>and cardiovascular programme</td>
<td>22</td>
</tr>
<tr>
<td>Phase 4 Rehabilitation</td>
<td>23</td>
</tr>
<tr>
<td>Strengthening programme</td>
<td>24</td>
</tr>
<tr>
<td>Proprioception balance and co-ordination programme</td>
<td>25</td>
</tr>
<tr>
<td>General mobility and cardiovascular programme</td>
<td>26</td>
</tr>
<tr>
<td>Phase 5 Rehabilitation</td>
<td>27</td>
</tr>
<tr>
<td>Strengthening and plyometrics programme</td>
<td>28</td>
</tr>
<tr>
<td>Gym programme</td>
<td>29-30</td>
</tr>
<tr>
<td>Proprioception balance and co-ordination programme</td>
<td>31</td>
</tr>
<tr>
<td>General mobility and cardiovascular programme</td>
<td>32</td>
</tr>
</tbody>
</table>

Written and produced by G. Parker, F. Gilroy, S. Kumar for the GSSS
The calf muscle at the back of the shin bone is primarily made up of the large and powerful gastrocnemius muscle which spans from just above the back of the knee to the base of the heel bone via the Achilles tendon. Due to this muscle crossing over both the knee and the ankle it functions to bend the knee and point to foot. These two key movements of everyday life allow the foot to push off during walking and running and also provide balance and stability when landing from a jump.
HOW DO YOU INJURE YOUR CALF MUSCLE?

A common calf injury is a strain of the gastrocnemius muscle (also known as tennis leg) which most frequently occurs in sports like running, tennis and skiing but can also be injured in activities of everyday life such as climbing stairs and running for a bus.

Middle aged athletes with tight calf muscles taking part in physical activity are commonly affected by this injury, however unlucky everyday circumstances can also be responsible. It is caused when the gastrocnemius muscle is forcibly lengthened and overstretched suddenly against its own contraction.

This can happen when the ankle is abruptly dropped off a kerb or step causing a stretch up the back of the calf or when rapidly pushing off with the foot during sprint acceleration where the action of the knee straightening suddenly also causes the calf to become stretched.

Most frequently this injures the point approximately half way down the calf where the muscle fibres of gastrocnemius meet the Achilles tendon and fail to withstand the tension which causes it to strain or tear. The degree of this strain is graded from one to three.

Grade 1
- A mild strain where only a few of the muscle fibres are strained. This can take approximately up to 4 weeks for recovery.

Grade 2
- A moderate strain with more muscle fibres torn but not a complete rupture. This can take approximately between 4 and 8 weeks for recovery.

Grade 3
- A severe tear where most of the muscle fibres are torn and can cause a complete rupture of the muscle belly. This can take approximately between 8 and 12 weeks for recovery depending on severity.
WHAT ARE THE SYMPTOMS AND HOW IS IT DIAGNOSED?

A calf strain injury may cause immediate pain and the sensation of being struck or kicked on the back of the calf. An audible “pop” or “snap” may also occur and there may be bruising or swelling that develops over the following 24 hours. At the area of the injury it may be tender and rising up onto the toes or stretching out the calf may be painful. Initially walking may be difficult or too much as weight bearing on the injured leg can be painful. Continuing sports training with an untreated minor strain can cause an increase in pain leading to a more severe strain or rupture.

A medial practitioner will examine the injured leg and may ultrasound the injury site to give a better indication of the extent and degree of the strain. They will also want to rule out any more serious conditions such as deep vein thrombosis, acute compartmental syndrome and cellulitis. Once diagnosed most commonly a non-surgical conservative management programme will be prescribed. Only very rarely in complex multifactor calf strain injuries with other contraindications will surgery be considered.
HOW IS A CALF INJURY TREATED?

Depending on the extent of the injury an appropriate exercise rehabilitation programme will be prescribed and recovery can be supervised by a medical practitioner through regular appointments. More severe strains will require a longer rehabilitation and recovery time than more minor strains and will therefore require a more extensive exercise and treatment programme.

- Range of movement and gentle stretching
- Strengthening
- Proprioception, balance and co-ordination
- General mobility and cardiovascular

It is important when returning to sport that the calf has overcome the risk of re-injury as commencing regular training prematurely can worsen the injury and cause permanent damage. Therefore the rehabilitation programme aims to achieve this goal safely through ensuring strict criteria for the condition of the injured leg are met first before going back to sport safely. The timescale for this will be individual to each person and depends on the recovery rate of the calf.

The following must be met before attempting the return to sport:

- Pain free equal movement in both legs.
- Full strength in the injured leg when compared to the other leg.
- Ability to run or sprint without pain or limping.
- Ability to cope with sudden changes in direction when sprinting full speed.
- Ability to hop 50 times on injured leg without pain.
HOW CAN A CALF INJURY BE PREVENTED FROM REOCCURRENCE?

- Maintaining the strength and flexibility of the calf muscle will allow it to absorb greater forces and decrease its susceptibility to being overstretched and reinjured.
- Completing a proper warm up with calf stretches before activity will also help increase the muscle’s ability to perform and overcome re-injury.
- Allow several training sessions to gradually build up duration and intensity of sport before returning to competitions.
- Dedicate adequate time for recovery after training sessions or exercise.
- Wearing supportive footwear at all times during sport.

Written and produced by G. Parker, F. Gilroy, S. Kumar for the GSSS
This programme is just a guideline and should be done under the supervision of a trained medical practitioner. You may progress more rapidly or slowly through the programme as guided by your doctor, therapist and your pain levels.

Depending on the extent of your injury whether it is a grade one, two or three with affect each phase time scale guidelines. These are not exact as it may vary depending on the individual. Every patient’s rehabilitation can be monitored by the physiotherapist and doctor. You are advised not to return to full activity too early as doing this when the injury is not ready can risk re-rupture and further damage.
INITIAL MANAGEMENT (48 – 72 HOURS)

Goals:
- Reduce the inflammation
- Control the swelling and pain

Protection
- Protect the injury from any further damage through discontinuing sport or demanding physical exercise.

Rest
- To aid the healing process rest the leg and reduce the amount of walking until it becomes pain free.

Ice
- To reduce pain and inflammation apply ice to the site of injury for 20 minutes every 2 hours. This can be with an ice pack or pack of frozen peas wrapped in a cloth before applying to the skin.

Compression
- To reduce swelling wear an elasticated bandage support around your calf during the day and remove at night time. As pain diminishes reduce the amount of time wearing the support gradually.

Elevation
- Elevate the calf above the height of the hips in resting to reduce the blood flow to the area which in turn reduces the swelling.
PHASE 1

Goals:
- Reduce pain
- Full pain free range of movement
- Resume normal walking

Precautions:
- Avoid full weight bearing on injured leg until normal walking pattern is achieved.

Guidelines for Phase 1
- Continue using ice after exercises.
- Continue with compression bandage if support required.
- If allowed take NSAIDS as needed.
- Partial weight bearing walking with crutches and heel wedge if required.

Remember this programme is just a guideline. You may progress more rapidly or slowly through the programme as guided by your doctor, therapist and your pain.
Range of movement and Stretching programme

- **Calf Stretch**
  Sit with your injured leg straight out in front of you. Start with the knee bent slightly (gradually working towards a straight knee) and loop a towel around the base of your foot holding each end in your hands. Gently pull the towel toward yourself until you feel a stretch in your calf. This should be feeling of discomfort and not a sharp pain.
  **DO NOT OVERSTRETCH INTO PAIN.**
  *Hold for approximately 5 - 10 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Active ankle range of movement**
  Lying on your back or sitting bend and straighten your ankles gently as far as you can. Build up to completing this with your knees straight to also stretch your calf muscle.
  *Repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Ankle ABC**
  Moving only the foot and the ankle write the alphabet out using the big toe as a pencil. Build up to making the letters as large as possible.
  *Repeat 5 times and aim to complete 2 – 3 sets each day as comfortable.*

- **Knee straightening in lying**
  Lying face down on a bed with your knees and ankles to rest over the edge of the bed. Relax and allow the weight of your legs to straighten your knees.
  *Hold for approximately 5 minutes and aim to repeat 2 – 3 times a day.*
Strengthening programme

- **Knee straightening in sitting**
  Sitting on a chair pull your toes up, tighten your thigh muscle and straighten your leg. *Hold for approximately 3 – 5 seconds and repeat 10 times aiming to complete 2 – sets each day as comfortable.*

- **Towel toe curls**
  Sit or stand with your foot on a towel which is laid on a smooth hard floor. Curl your toes and crumple up the towel. Keep your heel planted in that position and use your toes to first pull the towel toward yourself and then push it away. *Repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Paper pick ups**
  Scrunch up a few pieces of paper into small balls and place them on the floor. Using your toes pick up each paper ball in turn and place it into an area off to the side. *Repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Toe Raises**
  Sit on a chair with your feet flat on the floor. Keeping your heel on the floor raise you toes up towards the ceiling as far as you can. *Hold for approximately 3 – 5 seconds and repeat 10 times aiming to complete 2 – sets each day as comfortable.*

Written and produced by G. Parker, F. Gilroy, S. Kumar for the GSSS
Proprioception, Balance and Co-ordination programme

- **Gym ball sitting balance**
  Sit on a gym ball which is supported against a wall. Start off with both feet on the floor and gently shift your body weight from one side to another while maintaining your balance. When comfortable lift your good leg off the floor and allow your injured leg to keep your balance.
  *Hold for approximately 10 - 20 seconds and repeat 10 times aiming to complete 2 - sets each day as comfortable.*

General mobility and cardiovascular programme

- **Walking with crutches**
  Place the crutches forward with the injured leg and then step through with the good leg by itself.

- **Sit to stand with crutches**
  To sit down remove arms out of the crutches and hold both on one side and sit. To stand up hold crutches on one side and rise up placing your arms through the crutches to hold.

- **Stairs with crutches**
  Going up stairs first take a step up with your good leg and then take a step up with your injured leg. Then bring your crutches up onto the step. Going down stairs first put your crutches down one step and then take a step down with your injured leg. Then take a step down onto the same level with your good leg.
PHASE 2

Criteria for progression to phase 2:
- No pain and swelling at rest
- Full pain free active range of movement
- Normal walking without crutches

Goals:
- Full pain free passive range of movement
- Normal walking pattern with varying speed and on uneven surfaces
- Pain free muscle strengthening

Precautions:
- Avoid activity that gives moderate to severe pain

Guidelines for Phase 2
- Progress from partial to full weight bearing in walking as tolerated.
- Use the crutches until normal walking pattern is achieved.
- Use a heel wedge in supportive shoes to reduce the stretch on the calf.

Remember this programme is just a guideline. You may progress more rapidly or slowly through the programme as guided by your doctor, therapist and your pain.

Written and produced by G. Parker, F. Gilroy, S. Kumar for the GSSS
Range of movement and stretching programme

- **Standing calf stretch**
  Stand with your feet hip width apart and take a step back into a lunge position. With most of your weight on your front foot gently and gradually take your weight onto your back foot stretching your heel to the floor. Keep your hips and back foot facing forwards.
  **DO NOT OVERSTRETCH INTO PAIN.**
  *Hold for approximately 20 - 30 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Standing soleus stretch**
  Stand with your feet hip width apart and take a step back with one foot. Gently take stretch your heel down to the floor while bending your knee. You will start to feel a stretch along your Achilles tendon.
  **DO NOT OVERSTRETCH INTO PAIN.**
  *Hold for approximately 20 - 30 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Hamstring stretch in lying**
  Lying on your back lift your leg up toward the ceiling keeping your upper body on the floor. Hold onto your leg below or above the knee and pull towards your chest. Try to straighten your leg and to add a further stretch bring your toes back towards you body.
  *Hold for approximately 20 - 30 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Quadriceps stretch in lying**
  Lying face down with a band or towel around your ankle bend your knee up towards your buttocks and pull the towel with both hands until you feel a stretch on the front of your thigh.
  *Hold for approximately 20 - 30 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Knee straightening with chair**
  Sit with your knee unsupported and your foot on a raise or on a stool/chair. Allow the weight of your leg to straighten the knee.
  **DO NOT OVERSTRETCH INTO PAIN.**
  *Hold for approximately 10mins and repeat 2 times a day.*


## Strengthening programme

- **Theraband dorsiflexion**
  Sit on the floor and tie the Theraband to a nearby table leg or pole making sure it is secure. Put the Theraband around your foot and pull your toes back towards your body trying to keep your knee straight. Slowly return to the starting position.  
  *Repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Theraband plantar flexion**
  Sit on the floor and hold both ends of the Theraband. Loop the band around the base of your foot and try to keep your knee straight. Point your toes away from yourself resisting this with the band. Slowly return to the starting position.  
  *Repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Theraband ABCs**
  Sit on the floor and tie the Theraband to a nearby table leg or pole making sure it is secure. Put the Theraband around your foot. Moving only the foot and the ankle write the alphabet out using the big toe as a pencil and trying to keep your knee straight.  
  *Repeat 5 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Double heel raise**
  Stand holding onto a chair in front of yourself. Rise up onto your toes with your weight evenly spread between your feet.  
  *Hold for approximately 3 – 5 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Half double leg squat**
  Stand with your back leaning against a wall and your feet about 30cm from it. Keeping your quads and hamstrings tight, slowly slide down the wall until both knees are bent to about 45 degrees or halfway down into a squat. Slowly straighten your knees and return to the starting position.  
  *Hold for approximately 3 – 5 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

Written and produced by G. Parker, F. Gilroy, S. Kumar for the GSSS
Proprioception, Balance and Co-ordination programme

- **Single leg standing**
  Standing on the one leg lift the other leg of the floor and try to balance. You can do this in front of a mirror to make sure your knee keeps in line with your big toe.
  
  **Exercise Progression.**
  1. Hold onto a wall with one hand.
  2. Fold your arms across your chest.
  3. Close 1 or 2 eyes.
  4. Place a beanbag on your head.
  5 minutes of practice and repeat 2 – 3 times each day as comfortable.

- **Lunge kneeling**
  Kneeling on the floor bring one leg in front of you into a lunge position.
  Bring your arms out to the side for balance and try to hold this position.
  **Hold for approximately 20 - 30 seconds and repeat 5 times aiming to complete 2 – 3 sets each day as comfortable.**

- **Tandem walking**
  Walking slowly along a line, placing one foot heel to toe in front of the other, as if on a tightrope, try to keep to the line.
  **Variations:**
  1. High knees
  2. Fold your arms across your chest.
  3. Tip-toe walking.
  4. Close one or two eyes.
  5. Walk backwards.
  6. Walk sideways.
  7. Place obstacles in your path and step over them.
  **Along a 10m line repeat 10 times aiming to complete 2 – 3 sets each day.**

- **Ball work against wall**
  Lying on your back place a ball under your foot just above knee height. Roll the ball under your foot up and down the wall. Progress this to rolling the ball in circles against the wall.
  **Repeat 10 times aiming to complete 2 – 3 sets each day.**
General mobility and cardiovascular programme

- **Static bike**
  With the seat at an appropriate height, cycle with no resistance gently to build up the active movement in your calf. Make sure that your leg is at no point in the revolution completely straight.
  5 – 20 minutes aiming to complete 1 – 2 times each day.

- **Aqua jogging**
  This should ideally be carried out in a hydrotherapy pool.
  Use an aqua jogger belt in the deep end of the pool. Your feet should not hit the bottom. Mimic the jogging motion using your arms and legs, keeping your back upright and straight.
  As there is no weighted resistance in the pool it allows you to work at strengthening your legs and cardiovascular system without risk of injury reoccurrence from impact. The heat from the pool also has a therapeutic effect through loosening off tight tissues and encouraging the muscles to relax.
  15 – 20 minutes once a week.

- **Step ups**
  Using a step up block place one foot onto the step and stand up onto this following with your other foot.
  Step down with your first foot and follow with your other foot to return to a standing position. Start of gently and gradually increase the pace as comfortable.
  Repeat 2 – 3 minutes aiming to complete 1 – 2 times each day.
 Criteria for progression to phase 3:
- No pain and swelling with light activity
- Full pain free active and passive range of movement
- Normal walking pattern with varying speed and on uneven surfaces

Goals:
- Begin moderate to advanced strengthening
- Pain free weight bearing strengthening
- Increase physical activity level gradually

Precautions:
- Avoid activities that gives moderate to severe pain

Guidelines for Phase 3
- Progress to normal activity.
- If able to hop 50 times on injured leg begin to walk or jog as pain allows.

Remember this programme is just a guideline. You may progress more rapidly or slowly through the programme as guided by your doctor, therapist and your pain.
Range of movement and Stretching programme

Continue with stretching exercises from phase 2. Stretch before and after exercising holding each stretch for 20 – 30 seconds.

Strengthening programme

- **Toe walking**
  Stand with the kitchen counter by your side for support if required. Rise up onto your toes and walk slowly on your toes for the length of your kitchen counter and back. 
  *Repeat 10 times aiming to complete 2 – 3 sets each day.*

- **Heel walking**
  Stand with the kitchen counter by your side for support if required. Bring your toes up into the air and walk slowly on your heels for the length of your kitchen counter and back. 
  *Repeat 10 times aiming to complete 2 – 3 sets each day.*

- **Wall double squat**
  Stand with your back leaning against a wall and your feet about 30cm from it. Keeping your quads and hamstrings tight, slowly slide down the wall until both knees are bent to about 90 degrees or into a full squat. Slowly straighten your knees and return to the starting position. Progress this to doing the squats away from the wall with your knees and toes in line, your back straight and your bottom tucked in. 
  *Hold for approximately 3 – 5 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Wall squat with heel raise**
  Stand with your back leaning against a wall and your feet wide apart. Bend your knees and put your hands on your thighs. Lift both heels off the floor. 
  *Hold for approximately 3 – 5 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*
Proprioception, Balance and Co-ordination programme

- **Single leg standing on balance cushion**
  Stand on one leg on a balance cushion or pillow. Try to keep your balance. Progress this exercise by crossing your arms across your chest or closing your eyes.
  *Hold for approximately 30 seconds and repeat 5 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Wobble board balancing**
  Stand on a wobble board with your hand out to the side for balance. Practice balancing on it and do not let the sides of the board touch the floor.
  *Hold for approximately 2 minutes and repeat 5 times aiming to complete 1 -2 sets each day as comfortable.*

- **5 point star on balance cushion**
  Stand on one leg on a pillow or balance cushion. Have 5 points marked out on the floor in a semi-circle at clock positions 12, 3 and 6 and the points equal distance between these. While balancing on one leg reach with the other leg to each of these points without touching the floor and back to the cushion.
  *Repeat 10 times aiming to complete 1 -2 sets each day as comfortable.*
Proprioception, Balance and Co-ordination programme

- **Trampoline jogging**
  Jog on a trampoline trying to keep raising your knees high. Start of gentle and increase this gradually to your regular jogging pace. 
  5 – 10 minutes aiming to complete 1 – 2 times a day.

- **Single leg squats**
  Stand on one leg holding onto a chair or a wall for support. Bend you knee to about 50 degrees with your knee and big toe in line, your back straight and your bottom tucked in. 
  Repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.

- **Lunges**
  Stand with an upright posture and your legs hip width apart. Take a step forward with your one leg and squat down slowly. Push down through the foot in front to return to the starting position. 
  Repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.
General mobility and cardiovascular programme

- **Static bike increased resistance**
  Start with minimal resistance, 60 – 80 rpm.
  Increase this resistance as tolerated.
  30 minutes aiming to complete 1 set each day.

- **Static Bike – Interval training.**
  (80 RPM x 4mins : 120 RPM sprints x 1min) x 6
- **Static Bike – Single Leg Cycling.**
  Take one leg out from the pedal and place it on the frame.
  Cycle with the leg still in the pedal.

  30 minutes aiming to complete 3 sets each week.

- **Light treadmill walking/ jogging**
  Start off walking at a comfortable pace on the treadmill and increase this when warmed up to a fast walk. Once this too is comfortable start to break into a light jog near the end of repetition. Try move this point of jogging gradually earlier in the repetition as it becomes more comfortable.
  15 – 20 minutes aiming to complete 2 - 3 sets each week.

- **Rowing machine**
  Start off gently and build up the pace gradually while avoiding full knee extension.
  15 – 20 minutes aiming to complete 1 – 2 sets each week.

- **Swimming**
  Ease into swimming building up leg kicking work. Don’t start off too vigorously, begin with gently kicking legs before increasing pace.
  20 minutes aiming to complete 2 - 3 sets each week.
PHASE 4

Criteria for progression to phase 4:
- No pain and swelling with advanced activity
- Pass score on functional return to sport test

Goals:
- Full range of movement, strength, balance and proprioception
- Prevention of re-injury
- Pain free return to sport

Discharge criteria:
- Full unrestricted or limited return to sport with no pain or swelling

Guidelines for Phase 4

• Return to sport as tolerated gradually building up intensity and duration of training sessions

Remember this programme is just a guideline. You may progress more rapidly or slowly through the programme as guided by your doctor, therapist and your pain.

Written and produced by G. Parker, F. Gilroy, S. Kumar for the GSSS
Strengthening programme

- **Single leg heel raises**
  Stand holding onto a chair in front of yourself. Stand on one leg and rise up onto your toes then slowly lower yourself back down again.
  *Hold for approximately 3 – 5 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Ski jumps**
  Stand with a line marked on the floor to one side of you. Squat down and spring up jumping across the line and let your knees bend underneath you when you land. Progress this to jumping further from line on both sides.
  *Repeat 10 times aiming to complete 2 – 3 sets each day.*

- **Leap frog**
  Stand with a long corridor or sufficient amount of space in front of yourself. Squat down and spring up jumping as far as you can in front of yourself. Land letting you knees bend underneath you to absorb the impact.
  *Repeat 10 times aiming to complete 2 – 3 sets each day.*
Proprioception, Balance and Co-ordination programme

- **Trampoline single leg standing/ hopping**
  Stand on one leg on a trampoline keeping your balance with your knee and toe in line. Progress this to gently hopping on one leg building up the height of the hop gradually.
  *Repeat 10 times aiming to complete 2 – 3 sets each day.*

- **Trampoline single leg squats**
  Standing on a trampoline bend you knee to about 50 degrees with your knee and big toe in line, your back straight and your bottom tucked in.
  *Repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Balance cushion lunges**
  Stand with an upright posture and your legs hip width apart with a balance cushion or pillow in front of you. Take a step forward onto the cushion with your one leg and squat down slowly. Try to keep your balance and then push down through the foot in front to return to the starting position.
  *Hold for 3 – 5 seconds and repeat 10 times aiming to complete 2 – 3 sets each day as comfortable.*

- **Single leg standing ball catching**
  Standing on one foot and keep your balance while bouncing and catching a ball against the wall. Alternatively throw the ball to and from a partner while balancing on one foot.
  *Repeat 30 – 40 times aiming to complete 2 -3 sets each day.*
Once it has been established that you have adequate muscle strength, endurance and control a running program as the example set out below can be established in agreement with your physiotherapist and your surgeon.

- Progress by building up your pace from ½ to ¾ to full.
- Once you are able to run for 30 minutes without pain and can manage 2km’s in under 12 minutes, the following sprint drills can be commenced, if your sport/activity or lifestyle requires it.

<table>
<thead>
<tr>
<th>Session</th>
<th>Reps</th>
<th>Walk Duration</th>
<th>Run Duration</th>
<th>Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>4min 30secs</td>
<td>30secs</td>
<td>Mon</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>4min</td>
<td>1min</td>
<td>Wed</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>3min 30secs</td>
<td>1min 30secs</td>
<td>Sat</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>3min</td>
<td>2min</td>
<td>Tues</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>2min 30secs</td>
<td>2min 30secs</td>
<td>Fri</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>2min</td>
<td>3min</td>
<td>Mon</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>1min 30secs</td>
<td>3min 30secs</td>
<td>Wed</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>1min</td>
<td>4 min</td>
<td>Sat</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>30secs</td>
<td>4min 30secs</td>
<td>Tues</td>
</tr>
<tr>
<td>10</td>
<td>30m</td>
<td>30 minutes continuous running</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Starting position should be different for each run.

Remember your running program must not be progressed if you are experiencing pain, swelling or other symptoms at any level. Remember the program is just a guideline and not everybody is expected to be at this level.
Criteria for progression to phase 5:
- Normal function during activities of daily living,
- Ability to comfortably sit on back of heels,
- Uneventful participation in low risk activities (i.e. running, swimming, golf, low impact aerobics).

Goals:
- Single leg hop 95% compared with non-operated leg
- 95% muscle power and endurance is obtained compared with opposite limb.
- No pain or swelling,
- Return to sport.

Precautions:
- Avoid returning to sport before you are physically and mentally ready.

Guidelines for Phase 5
- Return to sports specific training as agreed with your therapist and your surgeon.

Remember this programme is just a guideline. You may progress more rapidly or slowly through the programme as guided by your doctor, therapist and your pain.

Written and produced by G. Parker, F. Gilroy, S. Kumar for the GSSS
Range of movement and Stretching programme

Continue with stretching exercises from phase 2. Stretch before and after exercising holding each stretch for 20 – 30 seconds.

Strengthening and Plyometrics programme

- **Box Jumps**
  Stand in front of a secured box or platform. Jump onto box and immediately back down to same position. Immediately repeat. Jump back and forth from floor and box as fast as possible, keeping landings short.

  - **Exercise Variations:**
    - Jump sideways down to side of box. Jump back onto box then jump down to the other side of the box. Jump back onto the box and repeat.
    - Jump completely over the box from side to side as fast as possible.

  Exercise Progressions:
  - Build up to 2 sets of 30 reps.
  - Increase speed.
  - Use single leg.

  Repeat 5 – 10 times aiming for 2 – 3 sets each day.

- **Bounding**
  Stand in front of a short box or platform. Place one foot on edge of box. Jump up high and land with opposite foot on edge of box and other foot on floor. Immediately repeat.

  Variations:
  - Make the platform higher
  - Repeat without a step (skipping on the spot)

  Repeat 5 – 10 times aiming for 2 – 3 sets each day.
Strengthening and Plyometrics programme

- **Hurdles:**
  Stand facing collapsible hurdles, barriers or cones (30-90cm). Squat down and jump over hurdle with feet together using a double arm swing. Upon landing immediately jump over next hurdle. Keep landings short. Hurdles should be collapsible in case it is not cleared.
  Progressions:
  - Increase height of barrier.
  - Increase space between hurdles.
  - One legged hopping
  Repeat 5 – 10 times aiming for 2 – 3 sets each day.

- **Depth Jumps:**
  Building to 2 sets of 30 reps. Stand on top of a high box, close to the front edge facing a second box. Jump from the platform, landing on both feet between the platform and the box. Jump of the ground as fast as possible onto the box.
  Progression:
  - Increase height of platform as ability improves.
  - Use only one leg.
  Repeat 5 – 10 times aiming for 2 – 3 sets each day.
Gym Programme

- **Seated Hamstring Curl Machine**
  Start with the legs nearly fully extended. Move the heels toward the buttocks as far as possible and under control, maintaining this control, slowly extend the knee back to the starting position.
  DON’T ALLOW THE KNEES TO HYPEREXTEND.
  Exercise Progressions:
  - Increase the resistance.
  - Use just one leg.
  Repeat 15 – 20 times aiming for 2 – 3 sets each day at low resistance.

- **Quads Strengthening**
  Leg Press Machine
  Starting with the knee joints at 90 degrees, extend the legs until straight and then slowly return to the starting position.
  Exercise Progressions:
  - Increase the resistance.
  - Use only one leg.
  Repeat 15 – 20 times aiming for 2 – 3 sets each day at low resistance.
Proprioception, Balance and Co-ordination programme

- Using cones, to mark out the circuits, perform the agility drills below.
  - (8 x 20m) x10
  - (8 x 20m) x10
  - (8 x 10m) x10
  - (8 x 20m) x 10
  - (8 x 10m) x 10
  - (10 x 20m)
  - (20 x 10m)
  - (20 x 10m)

- Six cones are placed 5m apart in a straight line. The player completes a shuttle run at full pace, turning alternately to the left and to the right and sprinting backwards or forwards. This should be repeated 10 times.

- Set 4 cones in a square, each one 10m apart. Stand in the centre (0) and shuffle (side step) laterally to the cone on your right (1), shuffle back to the middle and then shuffle over to the cone on your left (2) and back to the middle, turn 90o clockwise and continue shuffling out to the 3rd cone and back in again to the middle and then onto the 4th, repeat this circuit 10 times. Variations: Perform this exercise while doing cariocas (crossed side step running).
Kicking and ball work should be introduced specific to the requirements of the sport.

Return to normal training with team or coach. Assess reaction and response.

Begin an easy low grade match against easy opposition. Assess reaction and response.

Return to full competition.