

## Quads Knee Strengthening Exercises

These are the muscles at the front of the thigh that straighten the knee. Weak quadriceps are one of the most common causes of knee pain.

### 1) Quad Clenches

**Purpose:** Maintain and strengthen the Quads without moving the knee, enable full straightening of the knee

**Starting position:** Lying flat on your back or sitting up. Leg and knee straight



**Action:** Tighten the muscle on the front of the thigh by pushing your knee down. You should feel your thigh muscles clench. Hold for 3 secs. Aim to keep heel on the floor.

**Repetition:** Repeat 10-20x every 3-4 hours

**Variations:** If you are struggling to get your knee to straighten fully, place a rolled up towel underneath the ankle so that your leg is lifted slightly on the bed. Then do the exercise as described. Lifting the knee up slightly lets gravity help the knee to straighten

### 2) Short Arcs

**Purpose:** Strengthen the quads muscles without much knee movement

**Starting position:** Lying flat on your back or sitting up with your leg horizontal on a flat surface such as a bed. Place a rolled up towel (approx 10cm diameter) under the knee.

**Action:** Pull your toes towards you and clench your thigh muscles. Slowly lift your foot up off the bed until your knee is straight (keep your knee resting on the towel). Hold for 3-5 secs and slowly lower

**Repetition:** repeat 10-20 times, 3x daily



**Progression:** 1) Increase the size of the towel under the knee 2) Add a weight eg by wearing a shoe, or using a light ankle weight. Progress further by using a heavier weight

# Knee Strengthening Exercises

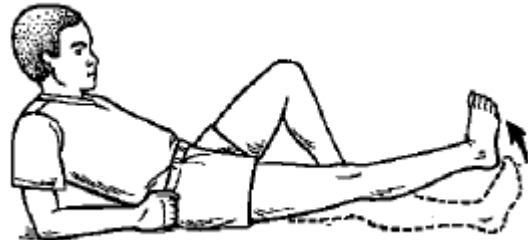
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## 3) Straight Leg Raise

**Purpose:** Strengthen the Quads muscles without bending the knee NB Do not do this if you feel pain in your back. Stop or lower the height that you lift your leg.

**Starting position:** Lying flat on your back. Leg and knee to be worked straight, other leg bent

**Action:** Pull your toes towards you and tighten/clench the muscle on the front of the thigh, locking your knee straight. Lift your foot up about 6 inches off the bed. Hold for 3-5 secs and slowly lower. Ensure your knee stays straight the whole time



**Repetition:** repeat 10-20 times, 2x daily

**Progression:** 1) Add a weight eg by wearing a shoe, or using an ankle weight.

## 4) Long Arcs

**Purpose:** Strengthen quads, increase knee mobility, great to do anytime sitting for prolonged periods (30mins+) to stop the knee getting stiff

**Starting position:** Sitting on a firm chair with your knee bent and your foot on the floor

**Action:** Lift your foot up and straighten your knee as much as possible. Hold for 3-5 secs and slowly lower

**Repetition:** 5-20 times, 3xdaily

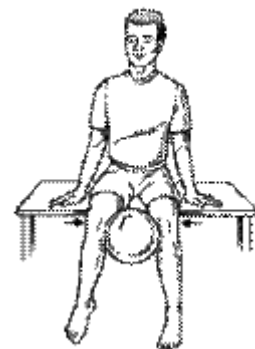
**Progression:** Strengthen further by adding a weight either by wearing a shoe or ankle weights.

## 5) Knee Squeezes

**Purpose:** Medial quad strengthening.

**Starting position:** While sitting, put a rubber ball between your legs just above your knees.

**Action:** While squeezing the ball between your legs extend one leg out. Hold the squeeze for 5 to 10 seconds, returning your leg to the starting position.



**Repetition:** Do this exercise 5 to 10 times with both legs. (Again if you don't have a ball use your hands or fists between your knees and then squeeze.)

# Knee Strengthening Exercises

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## 6) Knee Marching

**Purpose:** Increase Quads strength without putting weight through the knee joint

**Starting Position:** Sit in a chair with your feet on the floor

**Action:** March your legs up and down one at a time. Lift your knee and foot up and then back down

**Repetition:** Repeat for about 1 minute, 2x daily and any time you are sitting for more than 20 minutes to stop your knee getting stiff

**Progression:** Add a weight eg by wearing shoes or using ankle weights

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## Hamstring Strengthening Exercises

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The Hamstrings are the muscles on the back of the thigh that bend the knee.

### 1) Hamstrings Clenches

**Purpose:** Strengthen the hamstrings muscles without having to move the knee

**Starting Position:** Sit in a chair with your heel against the leg of the chair and your feet firmly on the floor

**Action:** Press your heel firmly backwards into the chair leg feeling the back of your thigh tightening/clenching. Hold for 3-5 secs

**Repetition:** Do 10-20x, 2x daily

**Note:** The foot shouldn't move during this exercise

### 2) Buttock Kicks

**Purpose:** Strengthen hamstrings without any weight going through the knee joint, increase knee mobility (flexion), aid circulation

**Starting position:** Lie on your tummy (on the floor or bed) with your legs straight

**Action:** Lift your foot off the floor and bring it towards your bottom as far as you can. Slowly return to the starting position



# Knee Strengthening Exercises

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**Repetition:** Repeat 10-25x, 3x daily

**Notes:** 1) You are aiming to get your heel all the way to your bottom 2) Make the exercise easier by hooking your good leg underneath the bad and using it to help lift the bad leg up

**Progression:** Add a weight (eg a shoe or ankle weight)

## 3) Kick Backs

**Purpose:** Improve the strength of hamstrings and mobility of the knee

**Starting Position:** Stand up straight holding on to something stable eg chair or table

**Action:** Lift your foot up as far as you can towards your bottom, bending the knee. Hold for 3-5 secs



**Repetition:** Do 5-25 times, 2x daily

**Progression:** Add a weight eg shoe or ankle weight

**Note:** 1) Don't bend forwards - keep your body upright 2) keep your knees in line with each other- don't let your thigh come forwards

## 4) The Bridge: Stage 1

**Purpose:** Excellent knee strengthening exercises for the hamstrings, quads and buttock muscles

**Starting Position:** Lie on your back with both knees bent about 90° and your feet on the floor/bed

**Action:** Clench your buttocks and lift your bottom off the bed as high as you can without arching your back. Hold for 3-5 seconds and slowly lower

**Repetitions:** Repeat 10-25 times, 1-2x daily

**Note:** 1) Keep your back straight – don't let it arch as you lift up, it should be your bottom doing the work 2) Don't hold your breath – keep breathing normally



### Glutes Knee Strengthening Exercises

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These are the buttock muscles, vital for ensuring the forces go through the knee evenly. The glutes are often forgotten about in knee strengthening exercises. Virtually everyone who suffers from knee pain has weak glutes, so they are well worth doing.

#### 1) Buttock Clenches

**Purpose:** Maintain and strengthen the Glutes without the knee moving

**Starting position:** Lying down or sitting up.

**Action:** Clench your buttocks together and hold for 3 seconds. You should feel yourself rise up slightly

**Repetition:** Repeat 10-20x every 3-4 hours

#### 2) The Clam

**Purpose:** Strengthen the glutes to help support the knee and prevent excessive weight going through the inner side of the knee – a must for anyone with knee pain!

**Starting position:** Lie on your side with your hip and knees bent approx 90°, feet together.

**Action:** Keeping your feet together, lift the top knee up as high as you can. Hold for 3 seconds and slowly lower

**Repetition:** Repeat 10-25x on each side, 2x daily

**Note:** Do not let your top hip roll backwards



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## Calf Strengthening Exercises

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The calf muscles can be found on the back of the leg between the knee and the ankle. They move the foot and ankle, and help support the knee.

### 1) Heel Raises

**Purpose:** Strengthen the calf muscles to help support the knee

**Starting position:** Stand with your feet slightly apart, weight equally distributed, holding onto something solid for balance eg kitchen worksurface or wall.

**Action:** Rise up onto your toes lifting your heels as high as possible. Keep your body upright (don't bend forwards). Hold for 3-5 secs and slowly lower

**Repetition:** Repeat 10-30 times, 2x daily

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## Combination Knee Strengthening Exercises

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Here you will find knee strengthening exercises that work 2 or 3 muscle groups at the same time.

### 1) Sit to Stand

**Purpose:** improve knee mobility, strengthen quads and glutes, improve general fitness

**Starting position:** Sit in a firm chair, feet on the floor

**Action:** Lean forwards, lift your bottom and stand up straight and then sit back down

**Repetition:** Repeat 10-30x

**Notes:** 1) You can make this exercise easier by pushing up through your arms too 2) The higher the chair, the easier the exercise

**Progression:** 1) Don't use your arms 2) Use a lower chair 3) Increase the speed you do the exercise at 4) Hold a heavy weight – eg bag of books during the exercise

## Balance Retraining

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Balance / proprioception is really important to prevent knee injuries, and is often reduced with knee arthritis. As a quick test to see whether you would benefit from this exercise try standing on 1 leg with your eyes closed. If you can't do it for 1 minute, you would benefit from this exercise. This exercise helps your body learn the subtle adjustments needed for good balance.

### 1) One Leg Standing: Stage 1

**Starting position:** Standing near a wall or chair for support

**Action:** Lift up your good leg and stand on one leg for as long as you can. It is normal to wobble a bit

**Repetition:** Spend 5 minutes doing this 2x daily eg when brushing your teeth

**Progression:** 1) Close your eyes and perform the exercise as above - you'll be surprised how much harder it is



As your muscles get stronger, you will be able to increase the number of repetitions of each exercise.

You will probably need to do knee strengthening exercises at least 4 times a week for about a month before you notice much change in your knee pain.