

Knee Exercises 2

Please read the entire Knee Exercises page before attempting the exercises further down the page. If you are experiencing knee pain, ask your doctor or physical therapist what exercises are appropriate.

Exercises Can Prevent Injury

Strengthening the muscles that support the knee with knee exercises is most important in protecting your knees from injury and knee pain.

Weak or fatigued muscles cannot adequately support the knee joint or absorb shock before it gets to the knee and the extra stress placed upon the knee can cause injury to the structures of the knee. Strengthening exercises can make the muscles tight, so follow strength exercises with stretching exercises.

Stretching the muscles that support the knee with knee exercises is also important in preventing injury. Flexible muscles are not as easily injured as tight muscles. Tightness of muscles connected to the knee can also pull the knee out of alignment.

When doing stretching knee exercises, be careful to go slowly and not to overstretch. You do not want to tear a muscle.

You need to increase the duration of your knee exercises gradually to avoid overuse injuries and knee pain. Be patient. You will see results.

Strength must be built up gradually. When muscles, tendons or ligaments are stressed slightly beyond their limits, microscopic tears occur. This is normal, and as these tears heal the muscles actually become bigger, firmer and stronger. These microscopic tears must be given adequate time to heal or chronic problems can develop. Try not to exercise the same muscle groups two days in a row to give your body a chance to recover. Doing strengthening knee exercises three or four times a week is enough. Stretching knee exercises can be done more often.

The goal is to prevent injury and knee pain, not cause it.

Don't ignore pain. Pain is your body's way of protecting you from hurting yourself further. It is not unusual to experience mild stiffness and aching of the muscles that lasts up to a day after exercising. But hardly being able to move for a few days after exercising means you have overdone it. It's difficult to know when to quit when you doing knee exercises. Often, the pain doesn't set in until a day or two later. It happens. If it does, you will have a greater understanding of your body's limitations.

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When you have overdone your knee exercises.

Rest is important for inflamed muscles/tendons. Applying ice wrapped in a cloth can help reduce inflammation and pain and speed up healing. Knee pain should be completely gone before fully resuming your knee exercises program, however, lightly exercising the sore muscle may help decrease muscle soreness.

If you are currently experiencing knee pain and/or have a very limited range of motion, or are not sure which knee exercises are safe for you to do, see a physical therapist (physiotherapist). A doctor or physical therapist can assess your condition and give you a customized treatment / exercise plan.

Main Muscle Groups Affecting Knee Stability

Several muscle groups support the knee. The two main muscle groups that control knee movement and stability are the quadriceps and the hamstrings.

THE QUADRICEPS is a four-part powerful muscle that run along the front of the thigh and attach to the front of the shinbone, just below the knee. **The quadriceps control the straightening of the knees and movement of the kneecap.** The quadriceps is used to extend the leg, and is essential for standing up, walking upstairs, walking uphill, and running.

THE HAMSTRINGS are muscles that run make up the back of the thigh, and attach to the back of the shinbone, just below the knee. The hamstrings are used to bend the knee and are also needed when you are pushing against something.

Other Muscles Affecting Knee Stability

Other muscles that affect knee stability, to a lesser degree than the quadriceps and hamstrings are the calf muscles, the hip abductors located on the outer thigh, and the hip adductors located on the inner thigh. The body functions as a unit (remember - the hip bone's connected to the knee bone) and even muscles not near the knee can contribute to knee stability.

The iliotibial band (fibrous tissue on the outer thigh, extending front the hip to below the knee) also affects knee stability. The glutes (back of hip muscles / buttocks) inserts into the thigh bone and iliotibial band and also help stabilize the knee.

**It is important to do strengthening exercises for all the muscles that support the knee. For example, if you concentrate on strengthening exercises for the quads, and neglect strengthening exercises for the hamstrings a muscle imbalance can be created.*

Imbalances in Muscles Supporting the Knee

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A physical therapist (physiotherapist) can help determine if you have a muscle imbalance in the muscles supporting the knee and create a personalized exercise program.

Imbalance of the quadriceps is common, especially in women - The quadriceps is divided into 4 divisions. If the inner division is weak, the stronger outer division tends to pull the kneecap toward the outer side of the leg. Tightness of the quads can also pull the knee towards one side so stretching as well as strengthening of muscles that support the knee is important.

In some cases, the quadriceps is significantly stronger than the hamstrings. (The quadriceps should only be about 25% stronger than the hamstrings). This can cause weakness of the knee. If this is the case, concentrating on strengthening exercises for the hamstrings, and stretching exercises for the quadriceps are very helpful.

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Stretching exercises may be done daily. Strengthening exercises should be done about every second day (for the same muscle group) - the days off give your body a chance to recover.

Knee Exercise Samples

Knee Strengthening Exercises

Balancing Exercises

Knee Stretching Exercises

***NOTE: Only do one strengthening exercise per muscle group on the same day. There are several exercises to choose from for some muscles.**

Strengthening Knee Exercises

If you are a beginner to exercise, start with five repetitions of each exercise - or less if the exercise is difficult. If you do not have post exercise pain, slowly add a couple of repetitions each week until you reach 10 - 15 repetitions. To increase endurance add a second set of 10 -15 repetitions after you can handle one set. When two sets become easy to do, you can add a third. Most strengthening exercises should only be done about every second day to allow healing and to avoid overuse injury.

WARM UP first! Warming up with 5 minutes of low-impact aerobics, such as walking or riding a stationary exercise bike, increases blood supply to the muscles to help prevent injury.

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Quadriceps Strengthening

Note: Only do one quad strengthening exercise on the same day - with the exception of the quad strengthening contractions, which can be done additionally.

Quad Strengthening Contractions:

Sit in chair. Move forward so that you are sitting at edge of chair. Extend legs, heels to floor. Keep knees straight (or as straight as possible if you have arthritis.) Tighten thigh muscles. Hold for count of 10. Relax for count of 3. Do 10 repetitions. You can do this several times throughout the day. You can build up to 2 or 3 sets of 10 repetitions at a time.

Quad Strengthening Leg lifts:

Lie flat on back. Bend left knee at 90-degree angle, keeping foot flat on floor. Keeping the right leg straight, slowly lift it until right foot is the height of the left knee. Hold for a count of 3. Repeat 10 times. Switch sides. Work up to 10 sets of 10 over several weeks.

Safety Tip:

Leg lifts: Lifting both legs at the same time causes excessive stress on your lower back so only lift one leg at a time; the opposite leg should be kept slightly bent with foot on floor.

Quad Strengthening Short-Arc Leg Extensions:

Sit or lie on floor. Place a rolled up towel under your thigh for support. Keep you leg straight and raise your foot about six inches off the floor. Hold for 5 seconds. Slowly lower your foot, bending your knee. Do 10 repetitions. Switch sides.

Quad Strengthening Knee Dips:

Stand with knees slightly flexed. Point your toes straight ahead.

Make sure your kneecaps are also pointed straight ahead.

Lift one leg up and balance on the other leg. Slowly lower yourself up and down ONLY a few inches. Keep the knee of the leg you are balancing on slightly flexed. Your knees must remain pointing straight forward. Do not let them turn inward. Stand straight, do not lean you body to one side. Do 10 dips. Switch sides.

If you feel pain in your knees, start with fewer dips.

Quad Strengthening Partial Squats:

Double leg partial squat: Stand. Keep Back Upright. Knees pointing straight ahead - inline with feet and hips. Slowly lower yourself. Don't bend your knees beyond a 90-degree angle, if 90 degrees is too difficult bend even less. Do ten squats. Stop if you feel pain in your knees.

Safety Tip: Make sure your knees do not extend beyond your toes when doing partial squats. Keeping your weight behind your knees reduces the pressure on the knee joint during the squat. Bending the knees beyond 90 degrees (a right angle) places excessive strain on the knee.

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Hamstring Strengthening

Note: Only do one hamstring strengthening exercise on the same day.

Seated Hamstring Strengthening Contractions:

Sit in chair, with knees bent to 45 degrees and heels on floor (toes lifted up). Don't move heels but pull back on them, digging heels into floor. You will feel tension in you hamstrings. Hold for count of 5 - 10 seconds. Relax for count of 3. Do 10 repetitions.

Lying Hamstring Strengthening Contractions:

Lie on back, knees bent about 45 degrees. Dig heels into floor. You will feel tension in your hamstrings. Hold for count of 5 - 10 seconds. Relax for count of 3. Do 10 repetitions.

Hamstring Strengthening Curls:

Lie on stomach. Place left foot onto the back of the right heel. Slowly pull your right heel toward your buttocks - resisting with the left leg. This contracts the hamstrings. Hold for a count of 10. (Keep pressing your left foot and right heel against each other) Hold for a count of ten and relax for count of 3. Do 10 repetitions.

Walking backwards helps to develop the hamstrings. When walking backwards, your weight is distributed more evenly, resulting in less strain on your knees.

Other Strengthening Exercises for Knee Stability

Hip Adductors (Inner Thigh) / groin muscle and inner quad muscle (VMO) Strengthening:

Sit in chair, put fist between knees, squeeze together knees. Hold for count of 10. Relax for count of 3. Do 10 repetitions.

Lie on floor on your right side, shoulder and hips aligned. Use your right hand to prop up your head. Place the left hand on floor in front of you to help balance yourself. Bend left leg and bring it to the floor in front of you. Slowly raise your right leg about 10 inches off the floor then, hold for a second, then slowly lower leg to ground. Lift 10 times on each side.

Hip Abductors (Outer Thigh) strengthening:

Lie on floor on your right side, shoulder and hips aligned.

Bend right leg (leg on floor) to 90 degrees.

Slowly raise you left leg about 18 inches, hold for a second, then slowly lower leg.

Do 10 repetitions. Repeat on other side.

Glutes Strengthening Backward leg swing:

Hold onto back of chair for support. Swing leg back at a diagonal until you feel your buttocks tighten. Tense muscles as much as you can and swing leg back a couple more inches. Return leg to floor. Repeat 10 times.

Switch sides. Do 10 repetitions. Repeat on other side.

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Knee Exercise Samples.

Balancing Knee Exercises (helps in knee stability)

Hold onto back of chair or counter top for support. Stand on one leg for one minute. Switch sides.

As your balance improves, use one hand only for support. Next use one finger only for support, then progress to letting go, but keeping your hands within a couple of inches above chair in case you lose your balance. Do not lean your trunk to one side.

To increase difficulty, shift weight onto the ball of the foot.

Knee Exercise Samples.

Stretching Knee Exercises

For stretching exercises, the stretch should be held for a total of about 60 to 90 seconds. Holding a stretch for 30 seconds only requires 2 or 3 repetitions. Some people prefer to do more repetitions of 5 - 10 second stretches or just a 60 second stretch. Stretching exercises may be done daily.

WARM UP before stretching with 5-10 minutes of low-impact aerobics (e.g. walking, stationary bike). Warmed up muscles are more responsive to stretches and less likely to tear.

Stretches should be performed without any bouncing and in a slow & controlled fashion

Calf Muscles Stretch:

Step back with left, forward with right, lean forward with hips. Do not roll foot out to side. Keep heel flat, foot forward. Bend knees for alternate stretch. Hold 30 - 60 seconds.

Quad Muscle Stretch:

Stand. Bend one knee and bring heel to buttocks with hand. Keep knees together. Do not arch back. Do not let leg go to side. Point knee toward floor. Tighten buttocks and tuck tailbone under to increase stretch. Hold for 30 seconds. Repeat on other side.

Hamstring Stretch:

Standing position

Keep one leg on ground; put one foot on chair with leg straight. Bend forward at the hip. Do not attempt to touch your toes as this will stretch your back, and the goal of this exercise is to isolate your hamstring muscles in the leg that is being supported by the chair.

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Sitting in chair hamstring: Straighten one leg, keeping heel on floor. Lean forward at hips, keeping back straight. Don't try to touch your toes. Hold for 30 seconds. Relax and Repeat. Repeat on other side.

Iliotibial Band Stretch:

Standing position:

Stand up. Cross right leg behind left leg moving crossing knee beyond the midline of the body. Lean from the hips to the left, the stretch being felt on your right hip, side of the leg and knee. Hold for 30 seconds. Repeat on other side.

Sitting position: Sit in chair: Bring right foot to outside of left leg, bringing knee towards opposite shoulder so that the knee crosses the midline of the body. Hold for 30 seconds. Repeat on other side.

Hip Adductors (Inner Thigh) Stretch:

Standing: Step off to the side with the right leg. Then lean away from the leg (bending your left knee)

Sitting position: Sit on floor, spread legs into a v position. Slowly lean forward from your hips, keeping your back straight, until you feel the stretch. Do not bounce. Then lean towards the right, foot then left foot. Hold each position for 30 seconds.

Hip Abductors (Outer Thigh) Stretch:

Sit on the floor, legs extended in front of you.

Bend right leg and place right foot on floor on outside the left knee.

Twist upper body to right and use left elbow to gently push against outside of right knee until you feel a gentle stretch in the right hips, buttocks, and lower back.

Hold for 30 seconds. Repeat on other side.

Hip flexors (front of hips) Stretch:

Tightness in these muscles can affect the alignment of the knee bones.

Standing Exercise: Step forward with the right leg, bending right knee (to increase the stretch, take a larger step). Keep left knee slightly bent with heel off the ground. Keep back upright. This stretches the front of the hip on the left side. Push the left hip forward to increase the stretch.

Hold for 30 seconds. Repeat on other side.

Gluteal Stretch (back of hips / buttocks):

Stand in front of chair, about two feet away from chair. Place left foot on chair, leg bent.

Bring your chest towards your knee, keeping back straight. Hold for 30 seconds. Repeat on other side.

***Of all the above knee exercises**, the quadriceps strengthening contraction is probably the easiest, safest and most important exercise you can do to prevent knee pain and injury.

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Those who have trouble fitting in exercises into their schedule can always do this exercise while watching television.

Knee Exercise Samples

Knee-Safe Aerobics. Low-impact exercises with minimal risk to the knee joint.

