

## Strengthening and Rehabilitation Exercises for the Quadriceps

Initially start with basic strengthening exercises of the quadriceps and hips. Implement cross training (by utilizing a stationary bike or exercising in the pool, including walking and aqua jogging) as long as the activity doesn't increase your pain. Focus initially on reducing swelling and regaining full motion in the knee without pain. As your strength improves, then progress to the more difficult exercises. Be mindful of how the injury is feeling as you taper up the exercises. If an exercise increases your pain, it may be too advanced or you may be performing it incorrectly. Discontinue the exercise until it can be performed without increasing your symptoms.

As you master the following exercises, implement a strength training protocol including back squats, front squatting, dead lifts, straight leg dead lifts, and lunges. Be sure to follow a graded exercise program and closely monitor the injury as you progress back into heavier weight training.

### **Straight Leg Raise – Starting Position**

Lie on the ground with your affected leg straight. The other leg will be bent. Be sure to rotate your leg outward slightly to gain a better activation of the medial (inner) side of the quadriceps.



### **Straight Leg Raise – Leg Laterally Rotated**

Raise your leg parallel to the bent leg. Don't arch your back. Keep your abdominals engaged. Another variation is to perform this with your toes straight into the air. You could also add an ankle weight to increase the difficulty level. Perform 2 sets of 15 repetitions on each leg once a day. (When you can easily perform this exercise for at least 30 repetitions, discontinue and continue with the other exercises.)



### Bridge Exercise – Starting Position

Lie on your back with your knees bent to prepare for the bridge exercise.



### Bridge Exercise with Straight Leg Raise

Keep your pelvis level as you lift your hips/pelvis and buttocks into the air. Pause, extend your leg. Hold for 3-5 seconds, then return the leg to the ground and repeat with the opposite leg. Return your buttocks to the ground and rest when you can no longer keep your pelvis from wobbling or your buttocks from dropping downward. Perform on both legs.

Perform 2 sets of 10 repetitions on **each** leg once per day.



### Wall Squat – Starting Position

Stand with your pelvis, back, and head touching a wall. Your feet will be approximately hip width apart and far enough out from the wall. When you slide down, your knees will make a 90 degree angle. Make sure your knees track your feet, and you can see your toes. Try to have the knee track toward your second toe to insure proper alignment of the knees.



### Wall Squat

From your starting position, slowly lower your body down and hold for time. As you improve, lengthen the amount of time you hold the wall squat. Be sure to keep your pelvis, back, and head against the wall. Keep the movement pain free.

(A **variation** to increase activation of the VMO would be to squeeze a ball between your knees as you perform the exercise. Typically the ball would be about 12 inches in diameter.)

Perform 3 sets of 15-20 seconds holds once per day.



### Wall Squat with Leg Raise

From your starting position, slowly lower your body down and hold for time. Extend your knee. Hold for 3-5 seconds initially.

As you improve, lengthen the amount of time you hold the wall squat and knee extended position. Be sure to keep your pelvis, back, and head against the wall. Keep the movement pain free.

Perform 2 sets of 10 repetitions once per day. Progress the time held up to 10-15 seconds per rep.



### Plank Exercise Raise

Keep your chin tucked down so you're looking straight into the ground. Your thighs, buttocks, stomach and back muscles are all engaged. Your elbows should be directly under your shoulders. Keep your body straight, do not tilt.

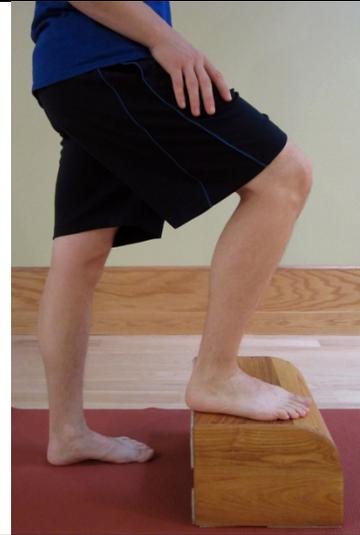
Perform 2 sets of 30-60 seconds once per day.



## Step Ups

Start with a box height that is comfortable for you to step up on. Be sure to keep your knee in alignment with your second toe. Step up and keep your pelvis level and your knee in alignment. Be sure to engage the buttocks muscles and fully lock out the knee. Return slowly back down to the ground. The focus should be on the slow eccentric (lowering) back to the ground for 1 second up and 3 seconds down.

Perform 2 sets of 15-20 repetitions once per day.



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