

Closed Chain Exercises for Legs and Knees

Chains are links of body parts, such as foot, ankle, knee, and hip during walking. In a closed chain the end of the chain farthest from the body is fixed, such as a squat where your feet are fixed and the rest of the leg chain moves. In open chains the end is free, such as in a seated leg extension.

Closed and open chain exercises provide somewhat different benefits. Closed chain exercises tend to emphasize compression of joints, which helps stabilize the joint, such as your knee during the upright stance phase of squats. Open chain exercises tend to involve more shearing force, parallel to the joint; for example, during a leg extension your knee is never under compression forces. Closed chains tend to involve more **muscles and joints** than open chains and lead to better coordination around each structure, which improves overall stability.

The best known closed chain exercises for your knees and legs are **squats** and lunges. Here is a selection of less well known exercises for an all-round leg workout that you can add to your routine, especially if you are **recovering from a knee injury**.

Standing weight Shift.

Stand with your feet shoulder width apart, weight equally distributed, and knees slightly flexed. Shift your body weight so that it is all on your right leg, although you keep both feet on the ground. Hold five seconds, then shift so your weight is transferred to your other leg and hold for five seconds. Shift back and forth, and continue for one or two minutes.

Quad Dips.

Stand with your feet shoulder width apart, using a door frame or counter top for balance, at first. Slowly flex your knees about 20 to 30 degrees and hold for 10 seconds. Then straighten up to full extension. As you flex and go into bent knee positions, be sure you keep your knees straight out in front over the top of your foot, and not allow your knee to bend inward toward your big toe. Start with a few reps and build up as much as you can tolerate. As your strength improves gradually shift your weight so that most of it is on your weaker side, while you use the other one primarily for balance.

Wall Sits.

With your feet about 18 inches from a wall and under your shoulders, lean your back against the wall and slowly slide down the wall until your knees are about 45 degrees flexed. Hold as long as you can then return to your starting position.

One-Legged Quad Dips.

Repeat the above quad dip exercise, but lift your stronger leg off the floor and perform the exercise with all your weight on the weaker leg. Initially you may need a hand hold to help your balance. Eventually, though, you should progress so that you develop better balance without help.

Lateral Step-Ups.

Place a four to six inch block, or a phone book, on the floor, place your foot on the weaker side on the block and lift the toes on your stronger side so that you don't push off with them, then slowly step up on the block and then slowly step down, touching the ground with the heel of your stronger side first. You should do most of the work with your weaker leg, and repeat as you can tolerate and slowly build repetitions.

Stork Stand.

Stand on your weaker leg, holding the other leg in the air and your arms by your sides. Close your eyes and hold your balance as long as possible. Repeat several times.

Together with squats and lunges, you should find these closed chain exercises for knees and legs very helpful for building strength, and can aid your rehabilitation from injury.