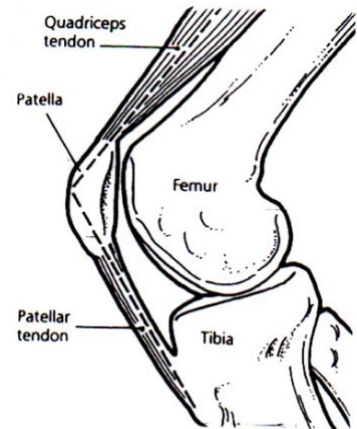


REHABILITATION FOR PATELLOFEMORAL SYNDROME (‘chondromalacia patella’)

When the knee moves, the kneecap (patella) slides to remain in contact with the lower end of the thigh bone (trochlear groove of the femur). Normally, this motion has almost no friction: the friction between these two joint surfaces is approximately 20% the friction of ice sliding against ice. If the patella and /or femur joint surface (articular cartilage) becomes softened or irregular, the friction increases. Grinding or crepitus that can be heard or felt when the knee moves is the result. This condition in which there is patellofemoral crepitus is called chondromalacia patella or patellofemoral syndrome.



The force, or pressure, with which the patella pushes against the femur is 1.8 times body weight with each step when walking on a level surface. When climbing up stairs, the force is 3.5 times body weight and when going down stairs it is 5 times body weight. When running or landing from a jump the patellofemoral force can exceed 10 or 12 times body weight.

The symptoms of chondromalacia patella are usually pain in the front of the knee that is aggravated by going up and down stairs, sitting for long periods of time with the knees bent (such as in a movie) and when doing deep knee bends.

Pressure between the patella and femur is minimized when the knee is straight or only slightly bent. Exercises and activities that require deep knee bending, jumping and landing, pushing or pulling heavy loads and stopping and starting will place very high stresses on the patellofemoral joint and the patellar tendon.

Treatment

The best treatment for patellofemoral syndrome is to avoid activities that compress the patella against the femur with force. This means avoiding going up and down stairs and hills, deep knee bends, kneeling, step-aerobics and high impact aerobics. Do not wear high heeled shoes. Do not do exercises sitting on the edge of a table lifting leg weights (knee extension).

An elastic knee support that has a central opening cut out for the kneecap sometimes helps. Applying ice packs for 20 minutes after exercising helps. Aspirin, Aleve or Advil sometimes helps.

Sports that aggravate patellar tendinitis and chondromalacia patella: volleyball, basketball, soccer, distance running, racquetball, squash, football, weightlifting (squats).

Sports that may or may not cause symptoms: cycling (it is best to keep the seat high and avoid hills), baseball, hockey, skiing and tennis.

Sports that are easiest on the knees: Swimming (especially with a flutter kick), walking (avoid up and down hills), and cross-country skiing.

Do not do the following exercises:

- lunges
- squats
- stair-stepper machines
- leg extension machine

The following exercises are OK to do if they cause no pain, grinding or swelling:

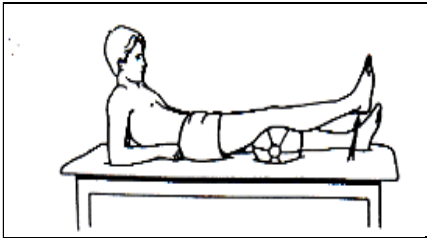
- straight-leg lifting exercises
- stationary cycle (seat high, resistance low)
- leg press (do not let the knees bend past 90 degrees)
- hamstring curl machine

The following **exercise program** should be followed as instructed by Dr. Gill or your physical therapist. For the straight leg lift and short arc lift, ankle weights can be added to increase resistance and strength of the quadriceps. Generally, after 1 to 2 weeks, ankle weights can be added (starting at 1 pound) and increased by 1 pound per week until you build to 5 pounds. The exercises should be done daily until ankle weights are added. At this time, the straight-leg lift, short-arc lift and wall slides should be done every other day and the stretches should continue daily. When you have built up to 5 pounds on the straight-leg and short-arc lifts, continue the exercises 2 times per week for maintenance.

STRAIGHT LEG LIFT

Tighten the quadriceps muscle so that the knee is flat, straight and fully extended. Try to raise the entire operated limb up off of the floor or bed. If you are able to keep the knee straight raise the limb to about 45 degrees, pause one second and then lower slowly to the bed. Relax and repeat. If the knee bends when you attempt to lift the limb off of the bed, **do not** do this exercise. Keep trying to do the quadriceps setting exercise until you can lift the limb without letting the knee bend. Repeat 20 times.



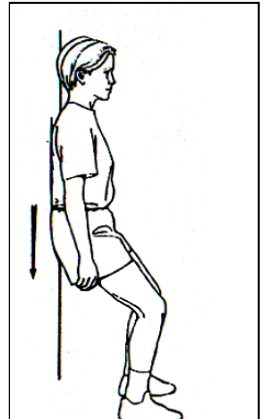


SHORT ARC LIFT

With the knee bent over a rolled up towel or blanket, lift the foot so that the knee fully straightens. Hold the knee locked in extension for 5 seconds, then slowly lower. Repeat 20 times.

WALL SLIDES

Stand upright with your back and buttocks touching a wall. Place the feet about 12 inches apart and about 6 inches from the wall. Slowly lower your hips by bending the knees and slide down the wall until the knees are flexed about 45 degrees (illustration). Pause five seconds and then slowly slide back up to the upright starting position. Doing this exercise too fast or too deep can aggravate your pain. Do not do this exercise if there is crunching or cracking at the kneecap or if it is painful. Do 3 sets of 10 to 15 repetitions.



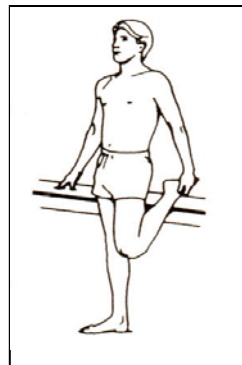
HAMSTRING STRETCH

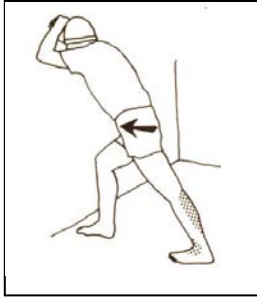
Perform this stretch in the position illustrated at the right. Bend slowly forward at the hips, keeping the knee fully extended until you feel gentle stretch in the back of your thigh and knee. Hold the stretch for 15 to 20 seconds and repeat three to five times.



QUADRICEPS STRETCH

This stretch is performed in the position illustrated at the right. Lean gently backward as if bringing your heel toward the buttock. When a stretch is felt in the front of the thigh and knee, hold 15 to 20 seconds for 3 to 5 repetitions.





CALF STRETCH

In the position illustrated, keep the heel flat on the floor and the knee fully extended. Lean forward at the hips with the arms supporting your weight. When you feel a gentle stretch in the back of your calf and knee, hold for 15 to 20 seconds, 3 to 5 repetitions.

LATERAL HIP AND THIGH STRETCH

Cross your left (right) leg over in front of the other. Lean to the left (right), bending at the waist and letting your right (left) hip jut out. When you feel a gentle stretch in the out side of hip, hold 15 to 20 seconds, 3 to 5 repetitions.

