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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.

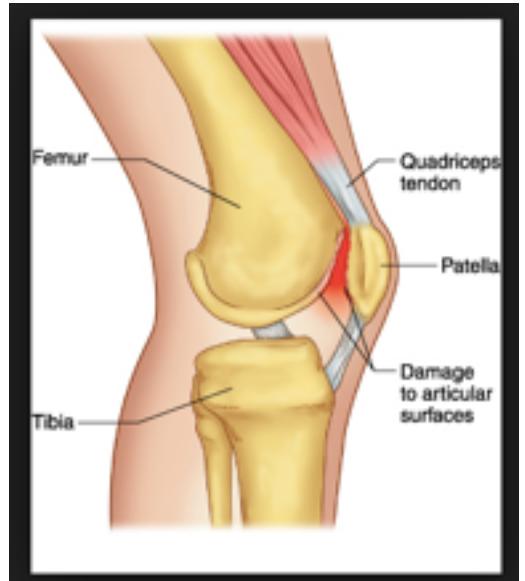
The force, or pressure, with which the patella pushes against the femur is 1.8 times body weight with each step when walking on a level surface. When climbing up stairs, the force is 3.5 times body weight and when going down stairs it is 5 times body weight. When running or landing from a jump the patellofemoral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



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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. Nelson 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.

1. Straight Leg Raise- Lay flat on back, unaffected knee bent to 90 degrees. Keep involved leg straight and raise it so that your thighs are equal. Hold for count of 6. Perform 3 sets of 15 reps. Add 1-2 pounds to your ankle until you can reach your goal weight of 10-15 pounds.



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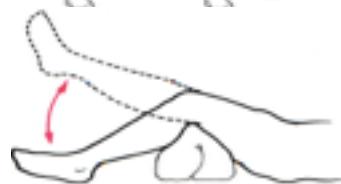
2. Side laying Hip adduction- Lay on side that is affected. Keep your ankle, knee, hip and shoulder in a straight line. Raise the affected leg so that your foot is just past midline. Hold for a count of 6 and repeat 3 sets of 15 reps. Add weight just like #1 until you reach the goal weight of 10-15 pounds.



3. 1/4 Squats-Stand with your feet shoulder width apart. Toes pointing straight ahead. Look down at your feet, Lean with your butt first and squat down slowly until your knees pass over your toes then stand back up to start position. Perform 3 sets of 15 repetitions. You may hold dumbbells to add resistance.



4. Short Arc Knee Extension- Place 2-3 towels rolled up under the knee to the affected knee. This will have the knee bent to 30 degrees. Bring the leg up into full extension. Hold for a count of 6 and repeat 3 sets of 15 repetitions. Add weight just like #1 until the goal weight is reached of 10-30 pounds.



5. Quad Sets- Isometric exercise. This can be done where ever the knee is straight. (laying in bed, standing, or reclined in the lax-y-boy) Tighten up your thigh muscle as tight as you can make it. Hold for a count of 10. Relax and repeat 3 sets of 15 repetitions.



6. Wall Squats- Put your back flat against the wall. Stand with your feet shoulder width apart. Heel approximately 18 inches from the wall. Toes point straight ahead. Slide down the wall until your knee is at a 60 degree angle. Stay in this position for a count of 30. Return to start position. Repeat 3 sets of 15.



7. 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 fifteen to twenty seconds and repeat three to five times.



8. Quadriceps Stretch- This stretch is performed in the position illustrated at the right. Lean gently backward as if bringing you heel toward the buttock. When a stretch is felt in the front of the thigh and knee, hold fifteen to twenty seconds for three to five repetitions.

