



Dr. O'Meara's

Anterior Knee Pain
(PatelloFemoral Syndrome)
Rehabilitation Protocol
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Anterior Knee Pain **(PatelloFemoral Syndrome)** **Rehabilitation Protocol**

Hamstring Stretching & Strengthening
Adductor Stretching & Strengthening
Quadriceps Stretching & Strengthening
Heel Cord Stretching & Strengthening
Bicycling & Low Impact Aerobic Training

Anterior knee pain is a very common problem among people who are active in sports and recreation. The condition is usually caused by an irritation and inflammation of the extensor mechanism of the knee either at the attachment to the tibial tuberosity, in the patella tendon, in the cartilage on the back of the knee cap (patella), or at the attachment of the quadriceps muscles to the patella.

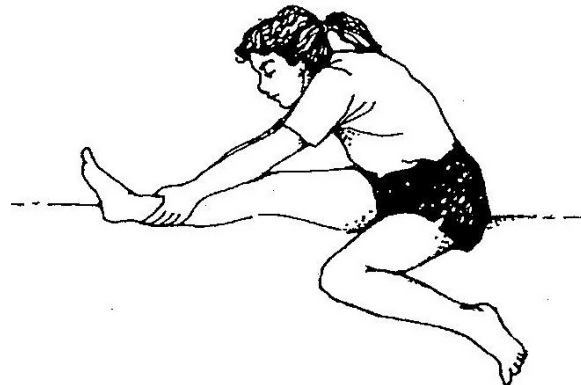
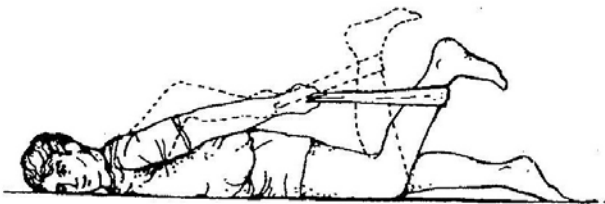
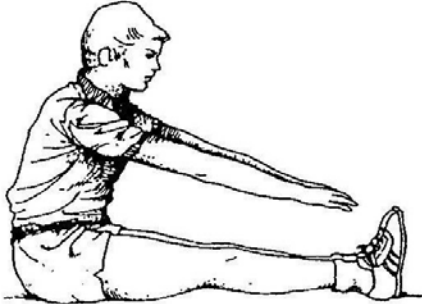
The exact location where the problem develops is often determined by the age of the patient. People under 14 years of age generally develop the problem at the attachment of the patella tendon on the bone of the tibia (Osgood-Schlatter's Disease). This area is near a growth plate in that age group and it is the most sensitive area to the stress of activity.

People between 15 and 30 years old tend to experience the problem in the patella tendon or at the end of the quadriceps tendon (Jumper's Knee, Patella Tendonitis). The tibial tuberosity growth plate has solidified and the tendons become the most sensitive structures to stress in that age group.

In people over the age of 30 years old, anterior knee pain generally originates from the cartilage behind the patella (Chondromalacia Patellae). The patella glides up and down in a groove in the femur (thigh bone) during motion of the knee. The increased joint tension imposed during activities can bruise or injure the cartilage in the patellofemoral joint. The accumulation of wear and tear over decades of activity can eventually wear down and erode the cartilage and cause Arthritis.

Stretching

It is important to stretch every day for 20 – 30 minutes. Better results are obtained if you stretch before and after you have warmed your muscles (e.g. bicycling). Try not to bounce when you stretch; instead, stretch to your maximum, hold for a count of 10, relax, and then repeat.



Strengthening

Anterior knee pain is often the result of an imbalance of muscle strength around the knee. This muscle imbalance creates excessive force on the patella and/or improper tracking of the patella. This strengthening program is designed to improve the muscle balance between the hamstring and quadriceps muscles.

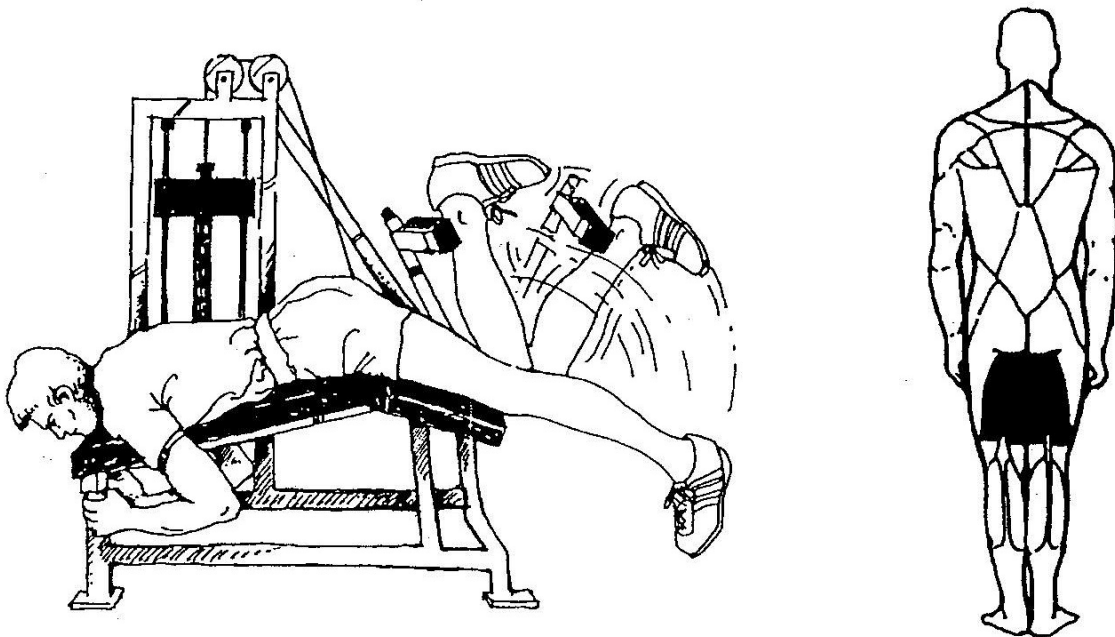
Each exercise should be performed as 3 sets of 15 repetitions, every other day. The amount of weight should be increased once you are able to complete a full 3 sets of 15 reps. The strength training should involve gentle smooth repetitions. No jerking or yanking!

In the third set of each exercise, try to “exercise to fatigue”. The most effective strength training and rehabilitation programs include at least one set of the maximum number of repetitions possible for each exercise performed (“exercise to fatigue”). Higher numbers of repetitions (15 – 20) favor increased muscle endurance while building muscle strength as well; so use a lighter weight that will allow at least 15 repetitions in a normal set.

Three sets of 15 – 20 reps performed every other day is an optimum strengthening and rehabilitation program. However, during the first month of strengthening, a single set program, every other day, is adequately effective at improving muscle strength and endurance.

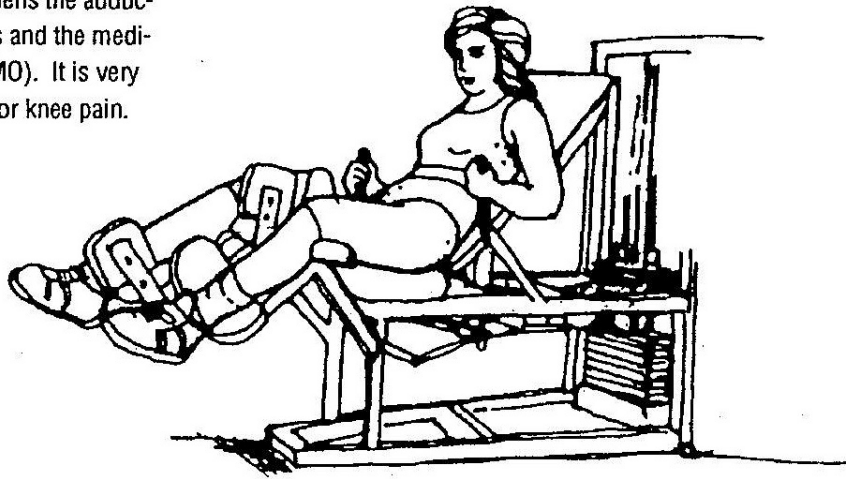
Hamstring Strengthening

The hamstrings are the primary dynamic stabilizers of the knee. Anterior knee pain is often the result of “Extensor Mechanism Overload”. This occurs when the quadriceps muscles become excessively stronger than the hamstring muscles. Strengthening the hamstrings improves the muscle balance between the quads and hams, increases knee stability, and helps to prevent injury.



Adductor Strengthening

The adductor muscles are located on the inside of your thighs. This exercise strengthens the adductor muscles, the medial hamstrings and the medial quadriceps (vastus medialis - VMO). It is very effective in helping to relieve anterior knee pain.



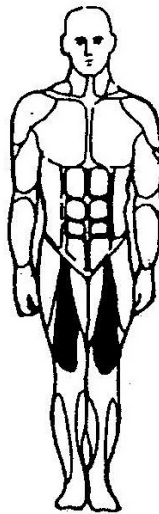
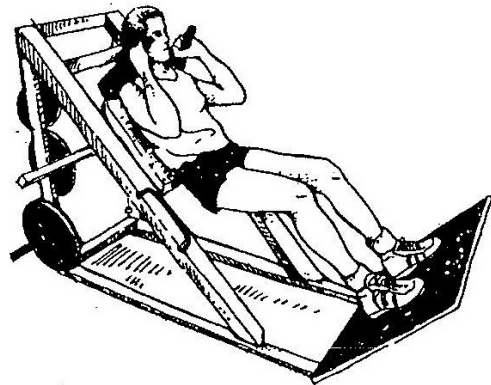
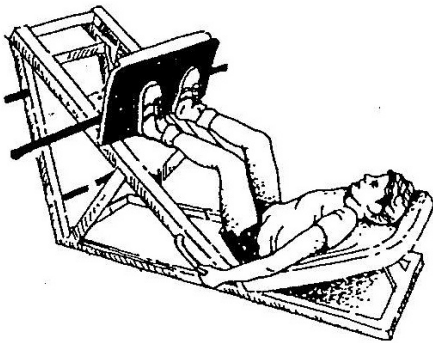
Adductor Squeeze

Lie comfortably on your back on the floor with your hands behind your head. Squeeze a pillow as hard as you can between your knees and hold for 6 to 10 seconds. This motion strengthens the muscles of the inner thigh and helps pull the kneecap into line. Repeat 10 times.

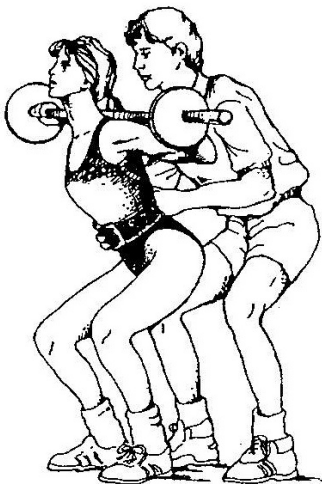
Quadriceps Strengthening

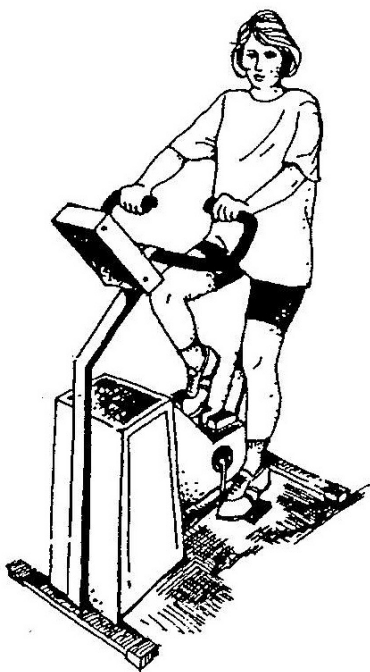
During the acute phase of anterior knee pain, quad exercises may exacerbate your pain. Therefore, no quad strengthening should be performed until your symptoms start to diminish. The quad consists of 4 muscles; the most important one is the Vastus Medialis (VMO) which controls the tracking of the patella in the PF joint.

When using the leg press machines, do NOT flex your knees more than 90 degrees.
When performing half-squats, do NOT bend your knees more than 60 degrees.



The leg extension machine should **never** be used because it will significantly aggravate your PF pain and can cause severe ligament injury.





Bicycling

Bicycling is an excellent rehabilitative exercise. It provides aerobic training to the quads and hams and it provides low-stress quad strengthening. A stationary bicycle or street bicycle may be used. Place the seat in the highest comfortable position in order to minimize the PF forces. Try to use a bike that is equipped with toe clips or toe cages so that the hamstrings also get a work-out. Cycle 15-45 minutes every day and increase the resistance as you can tolerate it.

