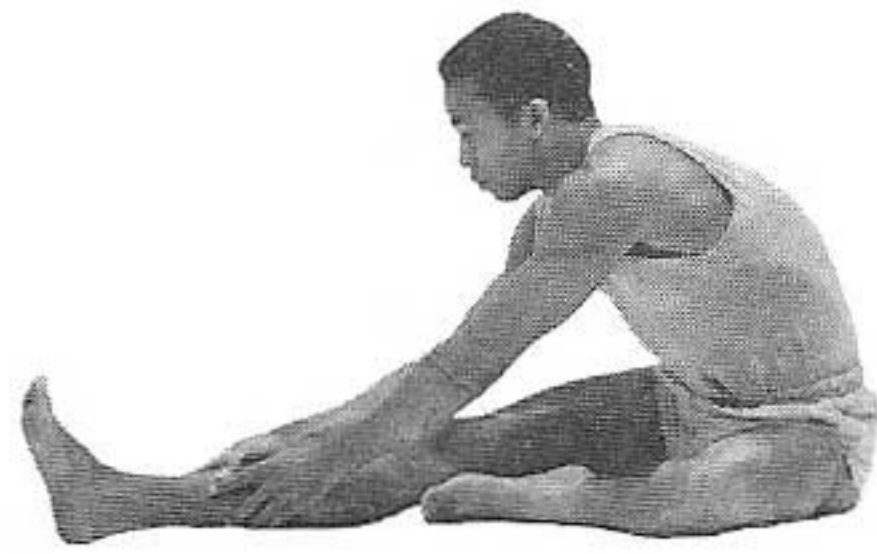**Hamstring stretch.** Either sit or stand.

Sitting. Sit on the floor as shown. With back straight, lean forward from the hip and reach down over your leg until you feel your muscles stretch. Hold ten seconds and relax.

Standing. Prop up injured leg, knee locked. Bend standing leg slightly. Place hands on lower thigh just above the knee. With back straight, bend forward from the hip until you feel a stretch under your thigh. Hold ten seconds and relax.

Repeat _____ **times,**

_____ **times/day.**

Strengthening Exercises. Stay away from exercises that require you to bend your knee or otherwise aggravate your condition.

Static Quads. Sit on the floor with a pillow under your knee. Push your thigh into the floor; as your heel rises, bend your toes toward your body and hold five seconds. Change legs or do both at once.

Repeat _____ **times,** _____ **times/day.**

"T" Exercise. With a two-pound weight around your lower leg, lock your knee and raise your leg 12 inches. Draw a "T" with your foot. Repeat with other leg. Gradually increase weight (up to five pounds) as each weight becomes easier.

Repeat _____ **times,** _____ **times/day.**

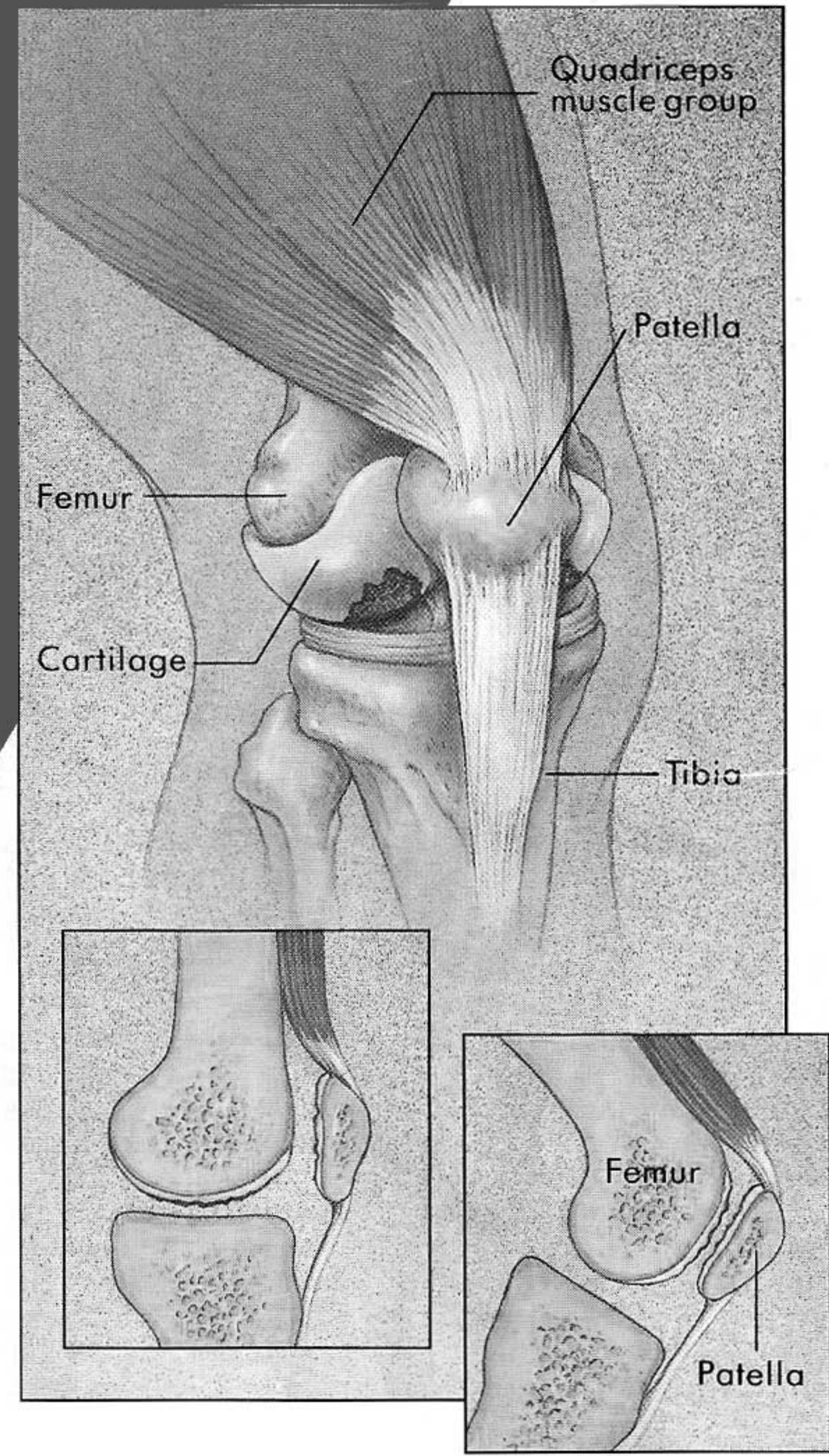# Patello-Femoral Syndrome
(Chondromalacia)

Quadriceps muscle group — Patella — Femur — Cartilage — Tibia — Femur — Patella

# THE INJURY

Knee pain is a very common problem among people who are active in sports. Studies have shown that the so-called patellofemoral pain syndrome comprises up to 50% of overuse injuries. This syndrome is caused by an irritation of the undersurface of the patella (kneecap), which is normally smooth. The irritation can lead to a roughening of the patella undersurface, a condition called chondromalacia.

The patella glides up and down in a shallow groove formed by the femur (thigh bone) and its covering ligaments. The pain is caused when increasing tension gradually increases the pressure between the patella and femur.

The irritation and roughening of the patella cause inflammation that causes pain. Patellofemoral pain syndrome and chondromalacia are not arthritis.

Contributing Factors

- When the patella is not centered in the groove of the femur, there is an imbalance that results in wear and tear. This poor alignment can be identified on special knee x-rays.
- Overuse: especially the pounding shocks absorbed during jogging, hiking, or downhill running
- Knock knees
- Abnormal twisting or rotation of the lower leg (called tibial torsion)
- Flat (pronated) feet
- Weak front and inner thigh muscles
- Previous injury to the knee
- Family tendency
- Obesity
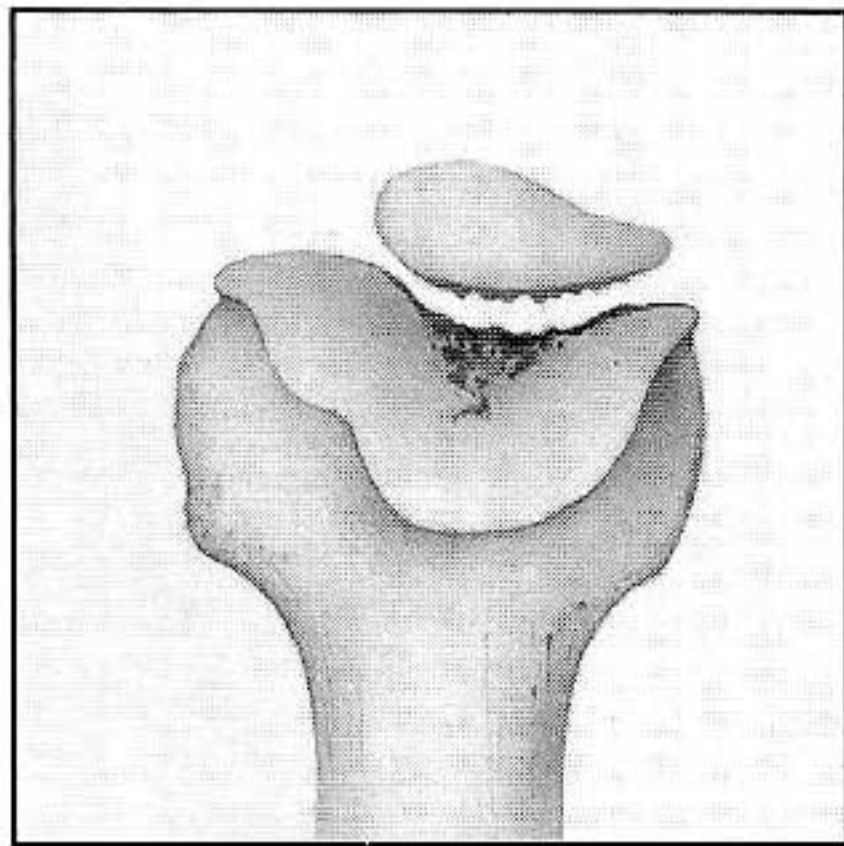
TREATMENT

Treatment has two objectives: to reduce the inflammation and to improve the alignment between the patella and the femur.

Rest. When the knee is painful and swollen, you must rest it. Avoid stair climbing, keep your leg straight while sitting, and avoid squatting. Let pain be your guide. You are aggravating the condition if you continue activities while experiencing pain. Mild discomfort or ache is not a problem but definite pain is cause for concern.

Ice. Ice your knee for 30 minutes two or three times a day and after any sporting activities—apply a plastic bag of crushed ice over a towel. This reduces inflammation and pain.

Medication. Your doctor may prescribe anti-inflammatory/analgesic medication (in tablet form) to relieve pain and reduce the inflammation.

Physical Therapy. A physical therapist or your doctor can recommend exercises to reduce the inflammation. Exercises can also be used to stretch, strengthen, and balance the thigh muscles that control the patella in the groove. When thigh muscles are strong and balanced, the patella will move through the groove accurately and with less pressure.

Surgery. In some cases surgery may be indicated. This often can be performed with an arthroscope (an instrument that allows a physician to see inside the joint with a light). In rare cases repositioning of the patella by open-knee surgery is required.

ADJUSTMENTS

Knee. Your doctor may prescribe a brace or support to help keep the patella in the track or groove.

Foot. The structure of your foot may alter the relationship between your patella and femur, and your doctor may prescribe specific shoes or occasionally orthoses (shoe inserts) to help resolve your problem. Consult your physician about new materials designed to fit into your shoe to help absorb the impact as your foot hits the ground. They are available at medical-supply and running-shoe stores.

SPORTS

Pressure between the patella and femur is minimized when the leg is straight or only slightly bent. The best activities are ones that limit the range of knee motion.

Use your judgment. When your knees hurt, avoid sports that may aggravate knee problems. Total rest may be required. When your knees get better after treatment, you should be able to enjoy many sports.

Sports that are easiest on the knees: swimming (flutter kick, knees straight), slow jogging, walking, skating, and cross-country skiing.

Sports that are questionable (may be all right for some people but bad for others): cycling (seat high; avoid hills), baseball, hockey, skiing (downhill), and tennis.

Sports that may aggravate knee problems (require deep knee bends and twists that stress the knee and are most likely to aggravate your condition): volleyball, basketball, soccer, running (sprints, downhill), football, racquetball, and squash.

EXERCISES

Exercising builds up the muscles that stabilize the kneecap. Both stretching and strengthening exercises may be helpful. DO EACH PRESCRIBED EXERCISE TWO TIMES A DAY OR AS OFTEN AS YOUR DOCTOR RECOMMENDS.

Stretches. When you stretch, always stretch slowly without bouncing, until you feel your muscles stretch moderately. You should not feel pain.

Single quadriceps stretch. Standing with your back straight, pull your foot back until your thigh muscle stretches moderately. Push down and back with your knee. Hold 15 seconds and relax. If you feel pain, discontinue.

Repeat _____ times,

_____ times/day.