



# Anterior knee pain in young athletes

*Anterior knee pain describes chronic pain in any part of the extensor mechanism of the knee, including the quadriceps, patella, patella tendon and knee joint. This distinguishes it from structural knee pain, which is an acute, traumatic injury of the knee and implies damage to the knee's internal structure i.e. (acute damage to bone, ligaments and cartilage). The syndromes of the anterior knee pain include Osgood-Schlatter disease, patellofemoral pain syndrome, jumper's knee, Sinding Larsen Johansson syndrome and others. Because acute injury can occur in an athlete with underlying chronic knee pain, proper diagnosis is important as well as proper treatment regime. Despite their different etiologies, anterior knee pain syndromes share some of the same historical, physical examination and radiologic features. In addition, they also share the same initial non-operative approach to management.*

### ANTERIOR KNEE PAIN

#### HISTORY

1. Pain is usually of a gradual insidious history before the injury onset. There is sometimes a history of exacerbation with recent injury, but usually a history of pain before the injury can be elicited.
2. Pain is often associated with some preceding factor, such as recent rapid growth, hyperpronation of the foot, recent change in exercise intensity or duration, or recent change of equipment, shoes, running surface, etc.
3. The pain is worst at the start and completion of exercise and usually relieved with rest.
4. Pain worsens with use of stairs, hills, and keeping knee at 90° (theatre sign).
5. There is no history of true locking although a history of "giving way" is sometimes found.

#### EXAM

1. All can give some mild swelling, but true effusion is very rare.
2. Tenderness is often present at the tibial tuberosity or inferior pole of the patella or with patellar compression. Pain may be vague in character.
3. There is no loss in range of motion
4. Hip range of motion should be normal. All cases of knee pain in children require careful evaluation of the hip, because referred hip pain can be a cause of knee pain.

#### X-RAY

Radiography is usually only needed if osteochondritis dissecans is suspected or pain does not resolve with conservative treatment.

#### Treatment of Anterior Knee Pain

- Rest, ice, NSAIDS until pain free (for initial symptomatic relief).
- Encourage cross training (swimming, biking, water running, etc.) to maintain cardiovascular fitness.
- Stretching of the quadriceps, hamstrings, calves and iliotibial band.
- Strengthening of quadriceps via quad set and straight leg raises.
- Consider physical therapy for modalities, (electrical stimulation, ultrasound, etc), soft tissue treatment such as mobilizations and taping or bracing in certain situations.
- Evaluate gait dysfunction and consider gait assessment for foot orthotics or proper footwear.

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Sports Shorts is provided by the Home and School Health Committee of the Ohio Chapter, American Academy of Pediatrics.*

### STRUCTURAL KNEE PAIN

#### HISTORY

1. Usually presents as acute pain in a previously normal knee, or a significant exacerbation or change in quality of ongoing knee pain.
2. Pain is associated with an acute injury, sometimes with a history of hearing or feeling a "crack" or "pop."
3. Pain starts at the time of injury. It is often continuous pain that is not relieved with rest.
4. Pain usually precludes keeping the knee flexed or going up and down stairs.
5. Occasionally, true locking occurs (often a sign of osteochondritis dissecans, meniscus injury, or ligament tear). "Giving way" or an unstable feeling of the knee is also common.

#### EXAM

1. Persistent or recurrent knee effusion can be present (often a sign of patella dislocation, an ACL tear, or intra-articular fracture).
2. Tenderness can be present anywhere (especially deep) in the knee and is often present at the site of underlying pathology. Tenderness of the femoral condyles or the joint line, with the knee flexed to 90°, suggests osteochondritis dissecans and demands radiographic evaluation.
3. There is loss of range of motion, painful flexion and extension.
4. Slipped capital femoral epiphysis often presents as referred pain in the knee (usually obese males during early adolescence 8-14 years of age).

#### X-RAY

Radiography is usually needed to rule out fracture or an epiphyseal injury.

#### Reason for Orthopedic Referral

1. Symptoms are consistent with structural knee pain.
2. There is persistent or recurrent knee swelling.
3. There is locking, instability, or restricted joint motion.
4. There is no improvement in 4-6 weeks of rehabilitation.

#### Patient may return to activity if:

1. Pain during activity is gone by next morning.
2. There is no limping during running (tested in office).
3. No ice or pain medication is needed *before* activity.
4. There is no swelling.
5. Comfortable in a squatting (catcher's) stance shows a full range of motion.



This information is available on the Ohio Chapter, American Academy of Pediatrics' website at [www.ohioaap.org](http://www.ohioaap.org)

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Rehabilitation activities are an essential part of therapy for the relief of knee pain and return to athletic activity. Rehabilitation involves several important parts.

### Pain relief

It is very important to relieve the initial knee pain for comfort and to enable the performance of other rehabilitation exercises. Ice is effective in controlling pain and swelling after sports and after rehabilitation exercises. A bag of ice chips or frozen vegetables can be placed over the knee for 10 to 20 minutes, or water can be frozen in a paper cup, and a portion of the cup can be torn away to rub the ice over the knee. Ibuprofen can help ease pain and inflammation, and can be used in the short term for pain relief after activity. Elevation of the knee above the level of the heart can also relieve swelling after activity.

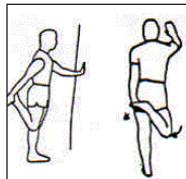
### Stretching

Knee pain often results from a decrease in flexibility in the quadriceps (front of the thigh), hamstring (back of the thigh), and calf (lower leg) muscles. Stretching these muscles is essential to help prevent or decrease future knee pain. Stretching should be done after warming the muscles with gentle exercise or soaking in a warm tub. Stretching should not be forced.

**Standing Hamstring:** Place one foot on a secure table or object 6-12 inches tall. Slowly lean upper body forward, keeping leg straight and toes pointing up. Do not "hump" back and maintain curve in lower back. Hold 10 seconds, and repeat 3-5 times for each leg



**Quad Stretch:** Stand with involved knee bent. Gently pull heel toward buttocks, feeling a stretch in the front of the leg. Keep upper body straight, do not lean forward. To increase the stretch, pull with enough pressure to cause the involved knee to pass behind the uninvolved knee. Hold for 10 seconds, repeat 3-5 times.



**Calf Stretch:** Stand facing a wall, with one foot in front of the other. Lean forward with your hands on the wall. Bend the front leg while keeping both heels on the floor. You should feel a gentle stretch in the back of your lower legs. Hold 10 seconds, repeat with the other leg forward. Repeat 3-5 times for both legs.

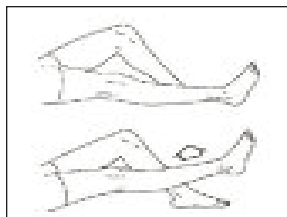


**Table IT Band Stretch:** Lie on back near edge of table. Let leg stretch over edge of table so that there is a full stretch on outside of the hip and side of leg. Bend leg being stretched to 90° angle at the hip and keep knee straight. Place arms out to the side to maintain balance. Hold for 30 seconds, repeat on other side. Repeat 3-5 times for each leg.



### Strengthening

Knee pain can be associated with a decrease in the size and strength of the quadriceps, and this muscle must be strengthened to all return to optimal activity. Strengthening should be done several times a day and should not cause much pain.



### Straight Leg Lift

1. Sit with your legs straight out in front of you.
2. Bend the knee of the non-injured leg to a 90 degree angle and keep your foot flat on the floor.
3. Slowly lift the injured leg six inches off the floor while contracting the thigh muscle.
4. Hold for 5 seconds then slowly lower the leg.
5. Repeat 10 times and perform 3 sets of 10.

### See your doctor if:

1. The pain is a result of a sudden injury during activity. If your doctor is unavailable, don't hesitate to go directly to an emergency department.
2. You have persistent pain lasting until the morning after activity.
3. There is a lot of swelling, or a limit to range of motion of the knee.
4. True "locking" of the knee (unable to straighten it) occurs.
5. There is no improvement after the first four weeks of therapy, or worsening during the first two weeks.

### You may return to play if:

1. Pain during activity is gone by the next morning.
2. There is no limping or gait abnormalities.
3. You can bend and straighten the knee completely.
4. There is no noticeable swelling
5. No ice or pain medication is needed before activity.

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