

## **WELLNESS UPDATE 2002, #8**

### **ANTERIOR KNEE PAIN**

Anterior knee pain (*pain in front of the knee*) is the most common knee injury in athletes. **Anterior knee pain usually develops gradually due to the repetitive motion of the patella (*knee cap*) sliding up and down, rather than due to a single, sudden injury.** This occurs most often in sports requiring a great deal of running and jumping.

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Here is a typical progression of the symptoms of anterior knee pain:

- 1) **Sitting for an extended period of time causes an ache or stiffness**, often behind the kneecap. This pain goes away when the joint is “warmed up” and during exercise. A few hours after exercise the stiffness returns.
- 2) If nothing is done to treat the ache and stiffness, the pain usually begins to be present throughout the exercise period.
- 3) **Pain is felt when squatting, kneeling and walking down stairs.**
- 4) Movement of the knee cap and climbing stairs causes a **“crunching” sound**.
- 5) The **athlete may feel that the knee is “giving out”** when running or jumping.

The pain is often most noticeable when the athlete gets out of bed in the morning or after they have been sitting with their legs in one position for a long period. The pain usually lessens as the knee is used, or “warmed up,” during normal, everyday activity.

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Athletes may be able to prevent anterior knee pain by identifying the cause. Training errors, poor foot biomechanics, weak quadriceps (*the muscles in the front of the thigh*), a “loose” knee cap, or muscular imbalances of the hamstring and quadriceps’ muscles are the common causes of anterior knee pain.

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**Training errors** include increasing the intensity of exercise too rapidly or using one training technique too much, i.e., constantly running on the same side of the road, which puts stress on the knees. Training errors can often be corrected by slowly increasing the intensity of workouts and paying attention to training techniques that may put undue, consistent strain on the knees.

**Poor foot biomechanics** usually refer to excessive pronation of the foot (*rolling too far inward each time it strikes the ground*) which puts additional stress on the knee. Foot biomechanics can often be corrected by taping the arch or using over-the-counter or custom-made orthotic shoe inserts.

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A neoprene knee sleeve with an opening for the kneecap, or a strap to help keep the knee cap in the correct position, may help relieve some symptoms of anterior knee pain, but they will not cure the problem. A sports medicine professional can help determine whether a brace could be effective.

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**The goal in treating anterior knee pain is to restore pain-free range of motion, increase flexibility and improve functional strength & endurance.** Treatment usually begins with rest, ice, and the use of nonsteroidal anti-inflammatory medications. Rest may require the athlete to change their training routine to avoid activities which are painful, or to stop all activity for a period of several weeks, or longer. Ice should be applied several times a day, and always after doing stretching or strengthening exercises. **Medications should only be prescribed by a medical professional and should be used only as prescribed.**

**Stretching exercises should emphasize stretching the quadriceps, hamstring, and calf muscles.** All stretches should be pain-free. Stretches which require the knee to be bent more than 90 degrees may aggravate anterior knee pain. Stretching exercises that cause pain will slow the healing process and delay the return of the athlete to full participation. Stretching exercises should continue even after return to normal activity.

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**Strengthening exercises should concentrate on the quadriceps and hamstring muscles.** All strengthening exercises should be pain-free. Strengthening exercises that cause pain will slow the healing process and delay the return of the athlete to full participation. Strengthening exercises which require the knee to be bent 90 degrees, or more, may aggravate anterior knee pain. If one exercise causes pain,

another may be substituted in its place. **If all strengthening exercises cause pain, only pain-free stretches should be done.** When performing strengthening exercises, a ratio of 2/3:1/3 should be maintained between quadriceps and hamstring muscle strength. Low weight, and high repetition exercises are the best. Weights which are too heavy will cause pain and slow the healing process. **Consultation with a sports medicine professional is recommended for specific treatment guidelines.**

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**Maintaining cardiovascular fitness while treating anterior knee pain is very important as the athlete may miss several weeks of participation.** The use of a stationary bicycle, treadmill, elliptical machine, swimming, and walking may be beneficial. If using a stationary bicycle use only medium pedal resistance and adjust the seat so the knees are bent slightly when the pedals are closest to the ground. Cardiovascular exercises must be done in a way that causes no knee pain.

Questions and comments regarding anterior knee pain or any other area of student-athlete wellness are welcomed and encouraged. They should be directed to Alan Beste, ATC, Administrative Assistant for the Iowa High School Athletic Association, PO Box 10, Boone, IA 50036. (515)432-2011, <abeste@iahsaa.org>

Sources: "Adolescent Anterior Knee Pain," American Academy of Pediatrics web site <[www.orthoinfo.org](http://www.orthoinfo.org)>, January 2001; American Academy of Orthopaedic Surgeons, Athletic Training and Sports Medicine, Chicago, 1999; American Academy of Orthopaedic Surgeons, Care of the Young Athlete, Chicago, 1999; Arendt, Elizabeth, MD. "Common Musculoskeletal Injuries in Women," The Physician and Sports Medicine, July 1996; "Anterior Knee Pain Syndrome," Johns Hopkins Bayview Medical Center web site <[www.bayviewortho.com](http://www.bayviewortho.com)>, 1998; Arnheim, Daniel D., ATC. Modern Principles of Athletic Training, Times/Mirror/Mosby College Publishing, St. Louis, 1989; Campbell, Yvan, MS, CSCS, CFA. "Reconditioning Program For Patellar Tendinitis: Jumper's Knee," Performance Conditioning for Volleyball, Volume 2, Number 5, 1994; Case, William, S. PT. "Relieving Anterior Knee Pain," The Physician and Sports Medicine, Volume 23, Number 5, May 1995; Cipriani, Daniel, PT & Griest, Jennifer. "The ABC's of PFD (Patellofemoral Dysfunction)", Training and Conditioning, April 2002; Johnson, Rob, MD. "Patellofemoral Knee Pain," Sports Medicine Tip Sheet, Gatorade Sports Science Institute; Paluska, Scott, MD & McKeag, Douglas, MD. "Using Patellofemoral Braces for Anterior Knee Pain," The Physician and Sports Medicine, August 1999.