



*Gymnastics requires athletes to train hard, stay conditioned, and safely perform technical skills. No weekend warriors for this sport! Top gymnasts practice from 30 to 40 hours per week consisting of 700 to 1300 elements per day. Given the demands of the sport, it is no wonder the rate of injury in gymnastics ranks with contact sports such as football and other contact sports. Hospital emergency departments treat more than 25,000 injured gymnasts under age 15 each year. The number 1 injury seen in gymnastics are ankle sprains. With the help of sports medicine professionals, gymnasts such as Kerri Strug, Blaine Wilson, Mary Lou Retton, Shannon Miller, and Courtney Kupets were competitive at the Olympic level following debilitating injuries that required surgery.*

**1. Tendon injuries:** Tendonitis, tendon ruptures, muscle strains, and apophysitis are traction injuries that can occur from overuse, trauma, or a combination of both. Tendons are cordlike bands that attach muscle to bone. Tendonitis is an inflammation of those tendons that often occurs when athletes increase the duration or intensity of their training. Shin splints are a common version of tendonitis that can be caused by muscle imbalance, poor conditioning, and abnormal foot mechanics.

**Apophysitis** is a condition that often occurs following a growth spurt where the bone lengthens faster than the muscle putting excessive stress on the tendon attachment at the bone. It is characterized by pain at the muscle insertion and sometimes there is a bump where bone has deposited. **Osgood-Schlatter** (patellar tendon insertion), **Sinding-Larsen-Johansson** (patellar tendon origin), and **Severe's** (calf insertion at heel) are examples of terms specific to the location of the apophysitis. Initial treatment of tendonitis, muscle strains, and apophysitis are ice and relative rest and active Physical Therapy. Talk to your sports medicine team about appropriate exercises and bracing.

Due to the forces experienced with certain gymnastics skills, tendon ruptures may occur. Although tendon ruptures typically require surgery and lost time from gymnastics, return to sport is possible with the right treatment. Courtney Kupets (Achilles tendon) and Blaine Wilson (biceps tendon) both experienced tendon ruptures within the year prior to competing at the 2004 Olympics.

**2. Fractures:** Classic fractures of bone usually result from a single traumatic event and are characterized by severe swelling, pain, and limited ability to move the affected body part. However, stress fractures and growth plate (Salter) fractures are more common in gymnastics and result from chronic stress.

When muscles become fatigued they lose their ability to absorb shock that can lead to stress fractures. Stress fractures are one of the most common injuries in sports, usually occur in the lower leg, and are associated with "the female athlete triad" – eating disorders, amenorrhea, and osteoporosis. **Spondylolysis** is a stress fracture in one of the bones (vertebrae) that make up the spine that can present as diffuse low back pain and tight hamstrings. Relative rest from the activities that initiated the stress fracture is usually necessary to allow healing, a process that can take as long as 6 to 8 weeks. For instance, hyperextension of the back is often the culprit that must be avoided with spondylolysis.

The growth plate at the end of long bones is the last to harden in children, leaving it weaker and susceptible to injury. Girls ages 11 and 12, and boys age 14 are the most vulnerable. Growth plate (Salter) fractures are graded as Salter I – V depending on the extent of injury. Treatment for Salter fractures range from immobilization to surgery. Prompt attention is required due to the risk of developing unequal or crooked limbs.

**3. Sprains and Strains:** A sprain is a stretch or tear of a ligament, while a strain is a stretch or tear of a muscle or tendon. Ligaments attach bone to bone and tendons attach muscle to bone. In gymnastics, sprains often occur at the wrist and ankle and strains often occur to the hamstrings and low back.

Most sprains and strains respond to **RICE** (rest, ice, compression, elevation). The amount of rest depends on the extent of injury. Some debilitating sprains/strains require comprehensive Physical Therapy & Rehabilitation and occasionally surgery.

It is important to differentiate minor sprains/strains from other conditions. For instance, tears of the cartilage (triangular fibrocartilage complex – TFCC) that cushions impact between the forearm and wrist bones should be distinguished from wrist sprains.

4. **Osteochondritis dissecans (OCD):** Compression of the elbow may result in irregular joint cartilage. Symptoms include decreased movement, swelling, locking, catching, or tenderness of the elbow and pain with weight bearing on the arm. Patients with OCD are typically between 13 and 16 years of age. Younger gymnasts (ages 7 to 12) tend to develop a similar condition called Panner’s disease. Treatment of OCD and Panner’s disease involve rest, splinting and Physical Therapy until symptoms resolve and there is radiographic evidence of healing (3-6 weeks). Surgery may be required to remove detached fragments of bone or cartilage. Return to gymnastics is permitted only after full motion and strength are demonstrated.

5. **Patellofemoral (PF) Syndrome:** Rapid deceleration as the knee flexes upon landing and then immediate acceleration as the knee extends to perform the next skill places the knees at risk for overuse injuries. Gymnasts with lower leg misalignment or muscle imbalance are especially vulnerable. Athletes with the overuse injury of PF syndrome present with diffuse anterior knee pain. Complaints may be bilateral and result in pain with stair climbing, standing on a flexed knee (plie’) and standing from a seated position (theatre sign). Treatment is aimed normalizing knee mechanics and possibly orthotics. Strengthening should address muscles of the abdominals and pelvis, as well as, the knee. Ice and bracing can promote initial healing of the irritated tissues. Bracing the knee may also correct maltracking of the patella. PF syndrome should not be confused with traumatic conditions of the knee, such as **anterior cruciate ligament (ACL)** and meniscal tears, that may occur from landing on a hyperextended knee or from rotating or twisting moves.



#### 6. ***Prevention, Prevention, Prevention!!***

- Participate in a conditioning program to build muscle strength and endurance
- Warm-up and stretch prior to gymnastics practice and competition
- Never attempt new or advanced skills without an experienced coach to spot
- Know the appropriate use of mats, belts, pits, and trampolines
- Eat a well-balanced diet, minimizing sweets
- Avoid rapid increases in skill difficulty and training load
- First aid supplies should be available at all practices and competitions
- Initially treat most mild to moderate injuries with ice 15-20 minutes
- Promote early reporting of injuries
- Establish a relationship with a sports medicine team

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