

Pitching Injuries

By Caitlyn Mooney, MD

Like many youth sports, baseball has become more demanding, with more practices, more competitions and increased expectations of strength and conditioning activities after practice. Many athletes are also choosing to specialize in one sport at earlier ages. So instead of only pitching a few months of the year before moving on to a new sport, many athletes are pitching the entire year, eliminating the chance to rest their arms and increasing their risk for injury. This environment and the inherent demands of pitching have caused a rapid increase in serious shoulder and elbow injuries in youth pitchers.

Astonishingly, studies have shown that ulnar collateral ligament (UCL) tears, one of the most serious throwing injuries, have increased 20 times in the past decade in the high school and younger populations. These injuries result in lost time, require rehabilitation and occasionally require surgery. Some of these injuries can end a young athlete's throwing career prematurely.

Risk Factors for Pitching Injuries:

Factors that have been shown to increase a young athlete's risk for an overuse injury include:

- High pitch counts and throwing volumes
- Frequent bouts of pitching with less rest days between bouts
- Pitching for multiple teams
- Pitching in showcase events



- Pitching while feeling fatigued or in pain
- Lack of core and lower extremity strength and motion
- Playing multiple positions that are high volume in throwing (pitching, catching, 3rd base)

Elbow Injuries: Two of the most prevalent elbow injuries in young pitchers are little league elbow and UCL injuries. Both injuries result in pain located medially, on the inner side of the elbow. The ulnar collateral ligament (UCL) is located there and is the most important stabilizer of the elbow during throwing activities.

Pitching places an enormous amount of stress on the medial structures of the elbow. When stresses are too great, damage to these structures occur. Injuries to the UCL ligament can range from a sprain (stretch injury) to a complete tear, creating instability of the elbow joint. Young pitchers who have open growth plates at the elbow are less likely to injure the UCL and more likely to injure their growth plate, the weaker of the two structures. The spectrum of growth plate injuries ranges from inflammation of the growth plate to a growth plate avulsion, or pulling it apart.

Shoulder Injuries: The shoulder allows for an amazing amount of motion, but this mobility also makes the joint less stable. So the shoulder relies heavily on the muscles for stability while moving through pitching motions. Fatigue of these muscles alters the mechanics of throwing and can lead to injuries of the shoulder tendons, ligaments, labrum and in younger athletes, the growth plate.

The repetitive traction forces involved in throwing can lead to widening of the humeral growth plate. This injury is called little league shoulder. If left untreated, it can lead to premature closing of the growth plate, also called angulation, leading to a shorter arm and alter mechanics. Once the growth plates close, pitchers more commonly suffer from rotator cuff or biceps tendonitis, decreased shoulder range of motion, impingement syndrome and dysfunctional shoulder blade motion.

What to do if you think your child is injured: The common signs of overuse injuries are elbow or shoulder pain with throwing. Athletes may also complain of having a "dead arm", decreased velocity or accuracy of pitches. Soreness in their elbow or shoulder that lasts more than a *continued on next page...*

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few days, swelling, instability or loss of range of motion should be evaluated by a physician who has knowledge of the treatment of youth sports injuries.

Treatment of Overuse Pitching Injuries: Treatment depends on the severity of the injury and will likely include resting from throwing for two to three months. Early in treatment, physical therapy can guide athletes through core strengthening, as most power and speed is generated from the trunk and lower extremities and continues through the arms. As arm pain decreases, athletes can work on range of motion deficits, strengthening of the muscles that stabilize the shoulder blade and strengthening the rotator cuff muscles.

Once pain resolves, pitchers can progress through an **age-based interval throwing program**. This involves gradually increasing the distance, volume and intensity of pitches to get the athlete back to their full throwing load and minimizing risk of reinjury. Throwing mechanics should be assessed and corrected prior to full return. Athletes may need to decrease the number of teams played on, change positions or increase their rest time.

In some cases, especially severe injuries to the UCL, surgery may be required. Unfortunately, surgery may not be able to return the athlete to their previous level of functioning, even after extensive rehab.

How to Prevent Youth Pitching Injuries: Overuse pitching injuries are preventable. Age-based pitch counts and

appropriate rest days are available [here](#). There are also guidelines for when an athlete should start performing certain pitches. It is important that parents advocate for their children's health. Parents should educate themselves on the guidelines and keep track of their own child's pitches, staying aware of the signs and symptoms of injury. Teach your child to speak up if they are in pain or fatigued, and reiterate that their health is more important than a game or a missed season.

Additional factors that may reduce your child's risk for overuse injury include having your child participate in a pre-season strengthening program that includes core strength, shoulder stabilizing strength, rotator cuff strength and working on overall throwing mechanics. Even with appropriate strength and mechanics, an athlete can still be injured if the repetitive force across their elbow and shoulder is too high. These interventions do not cancel out the need for proper rest and limiting pitching volume.

The most important guidelines for the parents of pitchers are:

1. Follow the pitch counts recommended for your child's age. These guidelines address the number of pitches per session and the number of rest days between sessions. Injury rates increase for the shoulder and elbow when pitch counts are surpassed in a season.
2. Do not allow your child to pitch on consecutive days.
3. Do not allow your child to pitch through pain or fatigue. These symptoms have been shown to be an indicator for severe injuries.

4. Ensure that your child has breaks from baseball. Athletes should have days off during the week, and they should pitch for no more than eight months in a year. Optimally, an athlete should have three consecutive months off from pitching, taking a break from overhead or throwing sports.
5. Do not allow your child to play for more than one team at a time.
6. Ensure your young athlete plays other positions which do not have heavy throwing for their days when they are resting from pitching. The catcher is not a good alternative, as they have as many throws as the pitcher. Playing third base as an alternative may also increase risk of injury.
7. Focus on proper mechanics and age-appropriate progression of skills. Progression should be on basic throwing. Once that is mastered, the fastball should be introduced, followed by change-up.
8. Do not use radar guns – High pitch velocity can stress the young shoulder and elbow to the point of failure.
9. Do not pitch in showcase tournaments.
10. Athletes should have an appropriate warm-up prior to pitching and should include stretching, running and gradual increase in pitching intensity.

Links for Additional Information:

- [The AMSSM's Sports Medicine Today Website](#)
- [Stop Sports Injuries](#)
- [American Academy of Pediatrics](#)
- [MLB's Pitch Smart Guidelines](#)

5 Things to Ask Your Doctor about Shoulder Instability

By Daren Molina, MD

Shoulder instability is a relatively common cause of shoulder pain. It happens when the supportive structures of the shoulder joint: the rotator cuff tendons, shoulder ligaments or the labrum are injured.

There are two general types of instability, traumatic and non-traumatic. A traumatic dislocation usually occurs with a direct blow to the joint, causing the ball to come out of the socket. This injures the ligaments, labrum and

possibly causes a fracture as the bones glance past each other. Non-traumatic instability occurs either from overuse or from a genetic predisposition to "loose joints." Given the repetitive nature of sports like baseball, volleyball and swimming, these athletes are at risk for overuse injuries leading to chronic wear-and-tear on the same supportive structures. Individuals who are "loose-jointed" usually have instability problems with multiple joints and may be able to

voluntarily dislocate the shoulder.

When diagnosed with shoulder instability, there are some questions to consider discussing with your physician.

Do I need a MRI?

Patients with non-traumatic shoulder instability do not need an MRI initially. This issue can be effectively treated non-surgically by improving muscular stability with physical therapy and a home *continued on next page...*

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exercise program. If your recovery is slow (more than 12 weeks) or there is a lack of improvement with physical therapy, an MRI may be considered.

Shoulder instability following trauma will need X-rays to rule out fractures. An MRI may be ordered depending on physical exam findings and if there is a history of recurrent dislocations. If you and your physician decide to move forward with an MRI, the correct type of MRI to obtain involves an injection of contrast dye into the joint. This better visualizes the stabilizing structures.

What can I do to get this better?

The primary approach to treat instability involves avoiding exacerbating activities, using over-the-counter pain medications and improving the strength and coordination of your rotator cuff

and periscapular muscles (the muscles around your shoulder blade) through exercises. These muscles are the primary stabilizers of the shoulder joint and are very important in the treatment of all causes of shoulder instability.

Is physical therapy necessary?



Shoulder instability has multiple causes, so the best way to proceed is with an individualized treatment program based on your unique background, sport of choice and personal risk factors. Some exercises may need to be modified for your unique issue, and this is best done under the instruction of a physical therapist. While much of the rehabilitation will occur on your own, a physical therapist can guide and monitor your progress toward obtaining better control of your shoulder.

What activities can I do while I'm treating my shoulder instability?

Cardio activities, such as running, and core strengthening are not painful and are important in your recovery. Heavy lifting and overhead movements should be avoided early in your treatment. Regular visits with your physician and physical therapist will help you advance activities based on your rehabilitation progress.

How do I prevent this from bothering me in the future?

The best way to prevent recurrent shoulder pain from chronic instability is to properly incorporate rotator cuff and scapular stabilizing into your workout routine. This will maximize your stability for long-term health. In the case of traumatic and overuse-based instability, with persistent symptoms after 12 or more weeks of rehabilitation, you may require further work-up and possibly surgery.

COACH'S CORNER

Sports Specialization

By Aloiya Earl, MD

In theory, focusing on perfecting a single-sport skill set makes sense. However, such specific concentration poses risks without necessarily producing the desired results. Recent research findings suggest a common consensus: Youth sports specialization is not necessary for an athlete to become elite in his or her sport of choice, and specialization before late adolescence may lead to increased risk for injury and burnout.

Youth athletes can decrease their injury risk by aiming to become comprehensively skilled in power, speed, coordination and agility, which multi-sport participation allows. Focusing too heavily on the development of a few specific skills within a single sport or position leads to deficiencies, and imbalances in musculature and are known to increase injury risk.

Allowing athletes to take time away from their "favorite" or "best" sport can prevent early psychological burnout, too. Year-round participation is associated with physical exhaustion and overuse injuries, and it can become mentally taxing for young athletes. Sport diversification and time away from

sports during the year are thought to be protective in preventing burnout and subsequent early withdraw from participation. Moreover, it allows athletes the opportunity to socialize with different groups of teammates from each sport.

Having well-rounded athletic development is important for optimizing performance in athletes' sport of choice for specialization in the future. In 2017, 30 out of 32 NFL 1st round draft picks were multi-sport athletes in high school. Playing other sports can help balance different muscle groups and fine-tune athletic skills using varying techniques, which athletes can then bring to invest in their sport of choice. For example, running track can help with the acceleration needed for a wide receiver. Playing soccer can help in developing footwork skills for basketball. Playing golf can help strengthen core stability



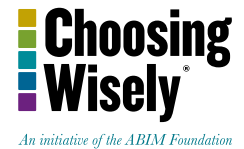
needed for pitching in baseball or softball.

If young athletes become especially talented and interested in a single sport, specialization in preparation for collegiate and/or professional goals can more safely occur in late adolescence, at which point athletes integrate the physical, social and cognitive skills which have been developed and reinforced by prior experiences in sport diversification. It is important to remember the overwhelming majority of young athletes will not participate in organized sports at a level of competition beyond high school, let alone earn a scholarship or contract to do so; the performance goals of each athlete and each team should be tailored for that sport or activity.

Youth sports participation focuses on empowering children, fostering self-confidence, encouraging team building, developing leadership skills and setting a foundation to maintain healthy physical activity habits for lifelong wellness. These important values can be effectively integrated with carefully designed and individualized performance goals keeping in mind the previous examples of sport diversification to create an overall safe, fun and rewarding athletic experience.

Choosing Wisely®: Return to Dance From Stress Fracture

By Ryan Hudson, MD



Stress Fractures in Dancers

Stress fractures are a fairly common and potentially serious injury among dancers. The most common dance-related stress fractures occur in the lower spine, lower leg and in the foot. Stress fractures happen when nutrition, hormonal health and training levels are not optimized for bone health. Hormonal health is measured by regular menstruation and is a good way to monitor if your nutritional energy intake matches the nutritional demands of dancing. When nutritional and hormonal health levels are optimized, bones have the resources to adapt to increases in activity.

Stress injuries are also more likely to occur if the dancer is under-conditioned. Proper increases in activity can protect dancers from injury, too. In addition, certain differences in joint alignment and bone structure have been identified as risk factors for stress fractures in ballet dancers. These include: bunions, overpronated feet, a longer second toe and 2nd midfoot long bone, “knock-knees” and scoliosis.

Treatment of Stress Fractures

Most stress fractures heal without complications with reduction or modification of activities to a level where pain is not present. Most stress fractures do not need to be casted, but crutches, a walking boot or a splint may be needed during the initial phase of treatment. During the recovery time, dancers should try to continue modified strength and endurance activities that do not make symptoms worse. The goal of this process is to stay under the threshold of pain because pushing through pain only prolongs the healing process and delays returning to dance.



Return to Dancing

In most cases, returning to dancing can take between six to 12 weeks and can be broken down into two phases: the rest/protect/cross-train phase and return-to-sport phase. This should be monitored by a physician with experience in managing stress fractures.

Phase I. Rest/protect and Cross Train (Usually 4-6 weeks):

- Rest from dancing and weight-bearing exercise.
- Use crutches or splinting device (such as a walking boot) for significant pain or for higher risk fractures (see below).
- For pain: Apply ice (2-3 times per day for 10-20 minutes) at the fracture site for swelling and use Tylenol (650-1000 mg) every eight hours as needed for pain.
- Cross train by stationary bike or swimming (ONLY if pain free).
- Correct any nutrition deficits to fulfill energy demands, meeting with a nutritionist may be needed.
- Consider Calcium (1500mg) and Vitamin D (800 IU) supplementation.

Phase II. Progressive Training and Return to Dance (Usually 4-6 weeks): The goal is to go slow, allowing the fracture time to heal while maintaining physical condition at the same time.

- Start slowly returning to dance as long as pain free over a four to six week period (after phase I).
- Do not add more than one aspect of training at a time, progressively increasing on a weekly basis.
- Dance every other day during the first month and alternate with stationary bike on off days.
- **If pain occurs during dance, stop and return to Phase I activities.**

Bone-healing and the time it takes to return to dance and other sports depends on several factors, including which bone is affected, severity of the stress fracture and underlying bone health. Stress fractures of some bones are termed “High Risk Stress Fractures” because they take longer to heal due to differences in blood supply and the amount of strain specific bones experience when weight bearing. High risk stress fractures are common to dancers and might include the sesamoids, proximal 5th metatarsal shaft and navicular bones of the foot. These fractures will take longer to heal and some may require surgery.

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