

# Preventing Shoulder and Elbow Injuries in Youth Baseball Pitchers

## An Update on Where We Are in 2007

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As the weather turns warm once again, it's time for the kids to trade the snow gloves for baseball gloves, get outside, grab some buddies, and head down to the local sandlot to play ball – right? Well, not exactly. Gone are the days of carefree pick-up games limited to weekends and summer vacation. Instead, today's young athletes have the opportunity to play on numerous organized teams, train at specialty camps or clinics, and enjoy year-round baseball playing. Unfortunately, today's young baseball pitchers are also experiencing an alarming incidence of injuries. In fact, in 2001, a study by Lyman *et al* reported that over one quarter of baseball pitchers experienced elbow pain and one-third experiences shoulder pain. The severity of injuries to youth pitchers is also increasing. Most injuries are a result of overuse and even seemingly more traumatic injuries, such as avulsion injuries and ulnar collateral ligament sprains, often can be found to have originated from overuse. Treatments such as ligament reconstruction (aka "Tommy John surgery") do allow some injured players to eventually resume pitching, but it is extremely rare to see an elite adult pitcher who suffered a significant elbow injury during youth.

Identifying a problem and providing solutions are two very different things. Previously, most injury prevention strategies were based on anecdotal evidence by experts in the field (coaches, team physicians, etc.) and from studies based on adult pitchers. Recently, more research is being done on youth pitchers which is confirming some beliefs and disputing others. It is important for parents, coaches, and medical professionals to be aware of the risks to young pitchers and try to promote an environment that limits such risks.

The USA Baseball Medical and Safety Advisory Committee released an updated position statement on youth baseball injuries in 2006. Although many of the recommendations were previously reported by Dr. Barry Goldberg in a 2004 SportsMed article, the original guidelines and new additions are worth noting:

- 1) *A youth pitcher who complains or shows signs of arm pain should be removed immediately from the game. Pain not resolved within four days warrants evaluation by a physician.*
- 2) *Pitch counts should be monitored and regulated. Recommended limits for youth pitchers are:*

<i>Age (years)</i>	<i>Pitches / game</i>	<i>Pitches / week</i>	<i>Pitches / season</i>	<i>Pitches / year</i>
<i>9-10</i>	<i>50</i>	<i>75</i>	<i>1000</i>	<i>2000</i>
<i>11-12</i>	<i>75</i>	<i>100</i>	<i>1000</i>	<i>3000</i>
<i>13-14</i>	<i>75</i>	<i>125</i>	<i>1000</i>	<i>3000</i>

*Pitch count limits pertain to games and do not include throws from other positions.*

*Backyard pitching after a game should be discouraged.*

- 3) *A pitcher should not return to the mound in a game once removed as a pitcher.*
- 4) *Pitchers should not pitch for more than one team at the same time.*
- 5) *Baseball pitchers should compete in baseball not more than nine months per year to allow time for rest and recovery. For at least three months, they should avoid baseball, throwing drills, and other overhead sports (competitive swimming, football quarterback, etc.).*
- 6) *Showcases should be de-emphasized unless given appropriate time to prepare. Showcases may give players an opportunity to demonstrate their skill for scouts, but risk to the player may occur if the he is overthrowing to impress the scouts or if the showcase occurs at the end of a season when players are fatigued.*
- 7) *Pitchers should develop proper body mechanics as early as possible and include more year-round physical conditioning as their bodies develop.*
- 8) *A period of rest is now mandatory.*
  - a. *Pitchers league age 16 and under must adhere to the following rest requirements:*
    1. *If a player pitches 61 or more pitches in a day, three (3) calendar days of rest must be observed.*
    2. *If a player pitches 41 - 60 pitches in a day, two (2) calendar days of rest must be observed.*
    3. *If a player pitches 21 - 40 pitches in a day, one (1) calendar days of rest must be observed.*
    4. *If a player pitches 1-20 pitches in a day, no (0) calendar day of rest must be observed.*
  - b. *Pitchers league age 17-18 must adhere to the following rest requirements:*
    1. *If a player pitches 76 or more pitches in a day, three (3) calendar days of rest must be observed.*
    2. *If a player pitches 51 - 75 pitches in a day, two (2) calendar days of rest must be observed.*
    3. *If a player pitches 26 - 50 pitches in a day, one (1) calendar days of rest must be observed.*
    4. *If a player pitches 1-25 pitches in a day, no (0) calendar day of rest must be observed*

*The guideline regarding proper body mechanics is of particular importance*

and interest at the Center for Motion Analysis at CCMC. In 2002, researchers at the American Sports Medicine Institute (ASMI) reported that youth pitchers who throw curveballs and sliders have an increased risk of shoulder and elbow pain. Based on this statement, many experts discourage pitchers from throwing these types of pitches until high school. The question remains whether it is the curveball or slider itself that increases the risk of injury or whether it is that youth pitchers who sustain pain are throwing such pitches incorrectly. In a study of collegiate pitchers, Fleisig *et al* concluded that resultant joint loads were similar between the fastball and curveball. Unpublished data by the Center for Motion Analysis (CMA) at the Connecticut Children's Medical Center (CCMC) supports this finding and shows that the major differences between properly thrown curveballs and fastballs occur at the wrist rather than elbow. Therefore, research suggests that technique may be more important than specific pitch type for preventing injury.

Recent studies at CMA have shown that individual youth pitchers are very inconsistent with regards to their technique. Some pitchers "square to the plate" earlier than others and the timing between pelvic rotation and spine rotation may affect elbow stresses. Those who rotate their spines earlier demonstrate faster ball velocities, but they also experience greater peak medial elbow stresses. Additionally, those who lean their trunk away from their pitching arm experience greater elbow varus moments, thus potentially increasing their risk of elbow injury. Core body strength and proper trunk positioning,

therefore, are felt to be of great importance.

With another season of baseball upon us, it is important for us to focus on the need to protect our youth players from injury. Any pitcher who is playing in pain or who has lost the ability to fully extend his elbow is at serious risk of a career-ending injury and should not be allowed to pitch until cleared by a medical professional. Since overuse injuries are felt to be due to the body's inability to fully recover from stress prior to being re-exposed to the same stress, it seems reasonable to limit pitchers' exposure by limiting pitch counts. As for pitch types, there are still many unanswered questions. Emphasis should be on proper technique from the start. Only after developing accuracy and control should pitchers be expected to add variety to their regimen.

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