

# How pitching changes little leaguers' shoulders

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At this year's Little League World Series, new rules for the first time forced players to limit the number of times pitchers could throw the ball, and coaches had to strategize how pitchers were used more carefully.

Under the old system, a pitcher age 12 and under could throw up to six innings per week and six innings per game. But in response to an increase in reported cases of young pitchers experiencing arm and shoulder problems, this year the Little League instituted pitch limits rather than innings limits, and required specific rest periods when a pitcher reached the threshold of pitches delivered in a day. Under the new rules, anyone who throws more than 20 pitches in a day needs to rest a day before he can pitch again. If pitchers throw 85 pitches in a day, they must rest at least three days before pitching again.

When Dr. Scott Mair and colleagues at the University of Kentucky began research into what throwing really does to young arms and shoulders seven years ago, they had many questions about those physical changes since most research until then had focused only on adult players. Now that their research is complete, Mair has those answers, along with one surprising finding.

To evaluate these adaptive changes, the study followed 32 male baseball players between 13 and 21 years of age for six years to study changes in the shoulder's range of motion and strength, along with any growth plate changes shown by X-ray images.

What the researchers found was that repeated pitching does cause changes in the upper arm bone and soft tissue in the shoulders of young baseball players, but that these types of changes generally help protect players from injury, so it's not necessarily a bad thing. Mair said these changes may actually allow for better throwing velocity and less injuries to the shoulder.

"However," he cautioned, "pitching too much and playing year-round can push those adaptive changes to the point of injury. Young men in particular may be prone to injury, because some play the game year-round, and because the bones and muscles in their arms are still growing and changing."

One surprise finding in the study was that X-rays showed changes in the growth plate in the throwing shoulder in almost all of the kids. In the past it had been thought that these types of changes only occurred when there was a problem and resulted in pain with throwing.

Overall, Mair said parents of young baseball players shouldn't be overly concerned about their children's shoulders. "Throwing is fine as long as it's in moderation and the parents and child use common sense," he said. "A 10-year-old pitcher shouldn't be throwing through pain to win a Little League game, for example."

Young players do need a break from throwing, Mair said. In the old days kids played baseball in the summer and then played basketball or football in the winter. "That was better for growing children because varying the sports used different muscles and movements," he said. "But now, some children play only baseball year-round, and that can be a problem. It can cause shoulder changes that go beyond normal adaptation, and can lead to pain and even growth plate injuries."

"Kids that are pitching in three different leagues and pitching 12 months

of the year tend to get growth plate problems that turn into a source of pain," Mair said.

Jim Madaleno, a senior athletic trainer for the UK Department of Athletics and father of a 14-year-old son who was part of Mair's study, knows all too well about the variety of pain that can come with playing sports. "Aches and pains are a part of it, but when an ache and a pain become significant enough that it alters how you're doing your everyday activity, then you should consult a physician," he said.

Now that this part of the research is complete, Mair said there's still a lot of work to be done in finding out how the growth plate responds to throwing, how to keep kids from being injured, determining pitch counts and days of rest needed, and in educating kids, parents and coaches.

Both Mair and Madaleno agree children shouldn't be pushed to play a sport just because they may be better at it than others. "There needs to be time put aside to let the kids be kids, and not just kids who are in a sport," Madaleno said.

Source: University of Kentucky

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