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**Pitch counts may be a part of the future for young players**

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HEADLINE: Count pitches to avoid use injuries: youth baseball.

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VANCOUVER, B.C. -- Children who pitch should be followed closely with a pitch count to avoid overuse injuries, regardless of how many innings they have pitched, Dr. Tracy Ray said at the annual meeting of the American Medical Society for Sports Medicine.

Many baseball coaches and organizations, including Little League, limit the number of innings a young pitcher can spend on the mound. But an abundance of research and opinion now suggests that it is the number of pitches a child throws during an outing that matters, said Dr. Ray, a family physician who practices sports medicine in Birmingham, Ala.

As importantly, children need to rest between pitching stints, and they should take at least a couple of months off from throwing a year.

In general, an 8- to 10-year-old child should not throw more than 50 pitches per outing; a child 11-12 years old should not throw more than 75, Dr. Ray said. Moreover, children in either age group probably should not exceed 75-100 pitches a week, and if they throw 50 or more pitches in an outing they should rest for at least 4 days between outings (see table below).

Arm and shoulder injuries have become increasingly common in young pitchers as children play less street or sandlot baseball, but spend more time in competitive, organized baseball, even playing year-round in some parts of the country, Dr. Ray said. "We really feel like what we are seeing, at least in our area of the country, is an awful lot of throwing over a 4- or 5-year period,

as these kids move from Little League to high school, and some of the problems we are seeing in high school and early college can be linked back to what they were doing as 8- and 9-year-olds," he said.

This problem has been recognized for some time, and the recommendations came from an effort started in 1996 by USA Baseball, sponsor of the National Team and Olympic Team. The organization began its research by surveying 28 experienced orthopedic surgeons and baseball coaches. When asked what mattered in injury, the respondents overwhelmingly said that number of pitches and fatigue were more important than the number of innings. They were also asked to address when a player should be allowed to start throwing breaking balls. They recommended that no children should throw curve balls in competition until they are at least 14 years old; they shouldn't be throwing sliders until they are 16 years old.

To build on that information, Dr. Ray and other investigators followed 200 pitchers aged 8-12 years over two seasons (1997 and 1998), conducting interviews with the pitchers and their coaches at the start and the end of the season, and making midseason telephone calls to some participants in a study funded by USA Baseball.

They found that 50% of the pitchers reported arm or shoulder pain after pitching at some point during their 3-month season, and it seemed to correlate with having thrown more than 75 pitches an outing and/or more than 600 pitches a season.

The group refined their study for the next season, redefining pitchers studied to those aged 9-14 years who participated in spring leagues in the Birmingham area. These 476 pitchers, and their 147 coaches, completed questionnaires before the season began, after every game pitched, and after the season ended. This survey confirmed 75 pitches a game and 600 pitches a season as a threshold.

Parents often want to know if throwing mechanics can affect a child's propensity for injury. The study attempted to look at that, Dr. Ray said, despite limitations in their ability to assess the mechanics of all the pitchers. The researchers videotaped some pitchers and brought 25 pitchers into a motion lab at Dr. Ray's institution. The completed questionnaires, as well as the tapes, showed that there really was not much meaningful difference in the mechanics of the different pitchers, and the investigators concluded that mechanics do not matter.

"Intuitively, that does not make a whole lot of sense, but that is what we showed," Dr. Ray said. The study also found that pitchers who threw curve balls developed shoulder pain and pitchers who threw sliders developed shoulder and elbow pain.

The specific recommendations, therefore, do not conflict with what the coaches told them about throwing breaking balls. If a pitcher needs another pitch in addition to the fastball, "We'd encourage the change-up," Dr. Ray said.

There was a concession about the pitch count, however. Since exact pitch counts can be difficult to keep, the recommendations state that it is acceptable to count batters--10-15 per outing, or

120 batters a season, since the average number of pitches to a batter is about five.

Dr. Ray said there was also some concern that savvy coaches could abuse a 50-pitch, rule by having their batters hold their swing and take pitches in order to get the pitch count high quickly.

Practice is probably a good thing, and it is primarily the hard, competitive throwing that leads to fatigue, that leads to injury, Dr. Ray said. "We actually encourage throwing in the backyard or with a coach because we felt like there is something to be gained regarding strength and flexibility," he said.

The pitchers who were observed during 1999 are still being followed to see who eventually gets injured or requires surgery.

#### Recommended Workload for Young Pitchers

Age(years)	Maximum Pitches		Days of Rest Needed
	Per Outing	Per Week	
8-10	50	75	4
11-12	75	100	4
13-14	75	125	4
15-16	90	No recommendation	4
17-18	105	No recommendation	4

Source: Dr. Tracy Ray

#### The Tommy John Injury

Dr. Tracy Ray also discussed his study of 31 teenaged pitchers who got ulnar collateral ligament tears, the so-called Tommy John injury.

The study appeared to identify several risk factors:

\* The pitchers remembered having medial elbow pain during the late phase of cocking their arm

back to throw for some time prior to the bona fide injury.

\* Of the 31 pitchers, 69% did not get even 2 months off from

throwing during the year, 70% said they threw breaking balls early, and 73% threw pitches of more than 80 miles an hour.

\* Only one individual did not have any of these risk factors.

"Probably the most important thing is to have parents listen to arm complaints," Dr. Ray added.