

PITCHING IN YOUTH BASEBALL: TOO MUCH OF A GOOD THING?

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INTRODUCTION

The popularity of youth baseball continues to increase in the United States and worldwide. It is estimated that approximately nine million children aged six to seventeen participate in youth baseball in the U.S. An unfortunate byproduct of this popularity has been an increased incidence of injury to the throwing elbow in the adolescent athlete. Most of these appear to be misuse/overuse injuries, and include osteochondritis dissecans, traction apophysitis, medial epicondylar avulsion, and injuries to the ulnar collateral ligament.

The increasing incidence of injuries to the ulnar collateral ligament (UCL) of the elbow in the adolescent pitcher is particularly disturbing. Once an injury rarely seen before the college or professional levels of baseball, injuries to the UCL have become commonplace at the high school level. The data of Dr. James Andrews involving athletes with UCL injuries significant enough to require reconstruction (the "Tommy John Operation") confirms this alarming trend. From 1995 to 1997 an average of four high school-age athletes (aged 18 and under) per year underwent UCL reconstruction. During the next three years (1998-2000) the average increased over fourfold to 17 per year, and in 2002 that number grew to 26. In the first nine months of this year (2003) Dr. Andrews has already performed 43 UCL reconstructions in teen-age athletes.

Why are these injuries being seen with increasing frequency in the adolescent pitcher? Some of this increase can be accounted for by improved recognition resulting from recent advancements in diagnosis. However, overuse and misuse appear to be primarily responsible. Overuse of the adolescent pitcher's elbow may be estimated by quantifying pitching volume (pitch counts per game, innings per week, and weeks of play per year),

and appears to be on the increase in youth baseball. Misuse comprises poor pitching mechanics and technique due to improper or inadequate coaching and training, but also includes the current increased emphasis on the breaking ball (curve ball or slider), generally considered to produce more stress on the throwing arm than the fastball. (This is believed truer of the slider than the curveball.) These trends toward increased pitching volume and increased emphasis on the breaking ball at a younger age need to be examined and evaluated.

STUDY DESIGN AND RESULTS

To characterize current coaching practices in youth baseball, anonymous surveys were sent to 100 Little League coaches in the metropolitan Atlanta area; 41 were completed. Respondents indicated they believed the appropriate age to teach and allow the young pitcher to throw the curveball is 13.5 years (average). However, they admitted that the actual age the young pitcher begins to throw the curveball is 11.6. They believed slider should be allowed at age 14.5. They agreed with current Little League restrictions on the number of innings per week a player may pitch (six). Although the coaches believed there should be a restriction on the number of pitches thrown per game, only 63% of them counted pitches.

To further define current practices and recent trends in youth baseball, tapes of Little League World Series (LLWS) games (which involve youngsters of maximum age twelve) in 1991, 1996, and 2001 were reviewed and analyzed, and pitch counts and types of pitches thrown were calculated. The percentage of breaking balls (curveballs and sliders) thrown increased from 23% in 1991, to 31% in 1996, to 37% in 2001. More successful teams threw more breaking balls. High pitch counts were common, with the percentage of starting pitchers exceeding 75 pitches per game increasing from 25% in 1991, to 50% in 1996, to 58% in 2001.

Interviews were also conducted with professional baseball pitchers (30 major league and 71 minor league) to characterize coaching practices that they experienced in their youth, as compared with current coaching practices. The average age these professional pitchers

first threw a curveball was 14.0 years, and the average age they first threw a slider was 17.8 years. These pitchers recalled that high pitch counts (greater than 75 pitches per game) and reports of arm injuries were rare in their youth. Year-round baseball was uncommon and most participated in other sports. When asked what practices they would follow should their children become involved in youth baseball, the pitchers said they would not allow their sons to throw a curveball until they were 14.8 years old (average), and a slider until they were 17.

DISCUSSION

The increasing incidence of elbow injuries in the adolescent pitcher is of concern, particularly since it is likely related to overuse and misuse. Information obtained from surveys of Little League coaches and professional pitchers and review of LLWS tapes indicates that over the past 10-15 years there have been marked increases in overall pitch counts and in the number of breaking balls thrown by youth pitchers. This study suggests that most youth pitchers today throw breaking balls before age 12. The pressure to win is an obvious reason for “allowing” these young athletes to throw breaking balls before age 12.

Information from the professional pitchers’ survey indicates that a pitcher does not need to throw a breaking ball before age 12 to have a successful career. In fact, this data suggests that delaying the use of the breaking ball until a later age may help protect the young arm against future injury, and promote optimal development of pitching skill and strength.

Based on this information and on my experience, risk factors for arm injuries in youth baseball can be identified and general recommendations regarding pitching made.

The following are risk factors for injury in youth baseball:

1. Throwing the breaking ball at an early age
2. Throwing too many pitches per game or innings per week
3. Participation in more than one youth baseball league simultaneously

4. Participation in year-round baseball
5. Poor pitching mechanics due to faulty coaching/instruction
6. Poor practice and conditioning habits due to substandard coaching practices
7. Genetic make-up not optimal for baseball participation

Of these risk factors, athletes, coaches and parents have control over all but the last. Not all children have the body make-up and athletic skills to be good baseball players. When these, and indeed any youngsters, are pushed beyond their physical capabilities, injuries often result.

Following are recommendations regarding youth baseball pitching:

1. Age to begin throwing curveball: 14.5 years old
2. Age to begin throwing slider: 18 years old
3. Age to begin throwing changeup (not considered any more stressful on the arm than the fastball): 11 to 12 years old, or when sufficient velocity and control are developed with the fastball
4. Maximum pitches per game
 - Ages 8-10: 50 pitches
 - Ages 11-14: 75 pitches
 - Ages 15-18: 90- 100 pitches
5. Maximum innings per week
 - Ages 14 and under: 6 innings
 - Through high school: 10 innings

The Little League Baseball governing body restricts the number of innings per week a player may pitch; however they have not defined the maximum pitches per game or the ages at which breaking balls may be thrown, or made other recommendations regarding coaching practices to protect the health of young athletes. The emphasis on overuse injuries in youth baseball must be on prevention rather than treatment, and it is incumbent on youth baseball governing bodies to formulate and enforce sensible and safe youth pitching and playing guidelines. Coaches, parents, and participants must be educated and

willing to sacrifice short-term success for long-term health and optimal development of the young athlete. Governing bodies of youth baseball organizations must take leading roles in the education of players, parents and coaches, and in promulgating regulations that will ensure the long-term health of these athletes.

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