

Injury in Baseball: Food for thought... where are we headed

By Mitch Dahl, Sport PT, ZONE Sports PT, ZONE Performance Baseball

Baseball injury is certainly a “hot-button” topic lately. Particularly given the dramatic increase in the number of elbow ulnar collateral ligament (UCL) injuries – both at a professional level, as well as at college and high school levels – and subsequent elbow reconstructive surgeries (ie. Tommy John surgery).



I have opinions on several points, but I am also open to what new evidence and research have to teach us regarding baseball athlete health, performance, and injury prevention. Many baseball player development and training techniques have been passed down simply because they’ve been done for decades, not because there is actual evidence that they are effective or beneficial. The great thing about baseball is that it has well over a century of history and tradition... that said, the bad thing about baseball is that it has well over a century of history and tradition, some of which is antiquated and no longer applies. More recently, technology (ie. 3D motion capture, video analysis, etc) has allowed biomechanical studies to more accurately reveal what is actually happening when we throw a ball, rather than what we “think” is happening. In turn we have a better understanding of the forces/loads placed on the body (ie. bone, joint, ligament/capsule, muscle/tendon, etc).

Throwing, in itself, is not abnormal, in fact it is a valuable component in a physically literate movement toolbox. Throwing, or pitching a baseball more specifically, with max effort in frequent sessions (every 3-5 days) for multiple repetitions (60-110 pitches) over a relatively short timeframe (2 hrs), begins to blur the line of “normal vs abnormal”. Biomechanical studies have shown each pitch can often approaches the max load tolerated by the UCL. Repetitive stress and load at this level can certainly lead to microtrauma and eventual failure of the UCL. Think of constantly red-lining a car, or repeated bending a twig to its max excursion... something is going to give.

The elbow is just one example of the many links in the movement chain that can be impacted. Shoulder, back and hip structures are also common areas of dysfunction and discomfort. The key is not only diagnosing the injury (ie. UCL tear), but determining the actual problem that resulted in the injury. For example: limited lower half strength; limited lower half involvement in the delivery; overstriding; understriding; limited thoracic spine or hip mobility; limited core/torso strength; limited scapular stability... all of these, and more, can result in the athlete using the “arm” to *produce* force, when it is designed to *deliver* the force. Look at the size of your arms/shoulders versus your legs/torso... use big muscles to do big jobs, use smaller muscles to do smaller jobs. The arm (shoulder/elbow/etc) will inevitably break down if we try to use it as a primary source of force production.

As such, we need the proper physical foundation to produce optimal mechanics. If we have a physical deficit in mobility or strength (ie. weak link in the movement chain), it will be very difficult to develop optimal mechanics until that deficit is resolved. I say “optimal” mechanics, rather than “proper” mechanics, because there will be subtle differences in the mechanics of each athlete based on their specific physical traits. There is not one delivery that applies to every athlete, but each athlete will have their own optimal or perfect delivery. It is our job as coaches, physiotherapists, and trainers to help them find it based on individualized assessment, individualized training, and individualized coaching.

The recent increase in elbow injuries and surgeries is a significant concern. There is more to it than pitch counts, or innings counts. I believe it is a multi-factorial problem resulting from several systemic factors:

Year round baseball competition

Note, I did not say training. A balanced training program is certainly viable year round - including a break from throwing. But year round competition is different. The crop of MLB players currently having previously unheard of numbers of elbow injury and surgery is essentially the first generation of players that has grown up with year round competition. Much of the travel and showcase ball events really expanded in the late 1990's and early 2000's. Coincidence... I think not. But more research and evidence is needed.

The games love affair with the radar gun and MPH

For example: does a high school pitcher that can throw 90+ need that to shut down most players he will face in HS? No. But he will continue to throw 90+, even when it is not required to be effective in a game, for fear that scouts will view him as inconsistent, injured, etc. There are a multitude of successful pitchers over the years who simply threw hard enough to effectively master location, command, movement, and change of speeds without max effort on every pitch... they also tended to have lengthy careers. This does not infer that they did not pitch with significant effort. Efficient effort may be a better term. And do not get me wrong, velocity is a wonderful tool to possess, but care must be taken in its application. Great to have a 95+ MPH FB in your toolbox when needed, but the loads/forces on the pitcher's body are very large. The percentage of players that can tolerate years of max effort pitching with large structural loads are few... outliers.

Workload is a factor

Games, practices, and other overhead sports participation (ie. football, volleyball, tennis, etc) all play a role. Workload is also a product of many contributing factors including physical fitness and preparation, mechanical efficiency, injury history, and genetic potential. Pitch count just happens to be a convenient way to measure and control workload. It is not a perfect solution, but it does prevent blatant overuse, especially in tournament scenarios and overlap of club, high school, and travel/showcase teams. In addition, the unbalanced ratio of games to practice in youth baseball (and many other sports) limits the development of skill proficiency and quality reps. Long term development is sacrificed for immediate competition. We need to consider the big picture.

Early specialization in a single sport at an early age

As is well stated in Long Term Athlete Development (LTAD) guidelines, and supported by performance evidence of elite players, baseball is a late specialization sport (ie. players peak performance is approximately age 23-29). The same can be said for basketball, football, hockey, and soccer. More and more evidence is supporting the approach that multi-sport involvement as a child/teenager results in more physically literate (ie. athletic) young adult and adult athletes, as well as less burnout mentally and physically. Therefore, develop well-balanced, talented athletes... outstanding baseball players will follow.

Summary

The prevalence of injury has stimulated discussion and debate at all levels of the game. More resources and time are being dedicated to research into both injury prevention and athlete development. There is much work to be done, and many questions to be answered. Fortunately there are plenty of dedicated leaders in the baseball and sports medicine communities who are committed to effective player/athlete development. There is tremendous opportunity for growth in the game of baseball locally and nationally. Keeping players healthy and engaged in the game will hopefully result in further growth in baseball participation, as well as success at the elite level.