Baseball Pitching

Understanding the Mechanics of Throwing a Baseball May Help Protect the Shoulder and Elbow

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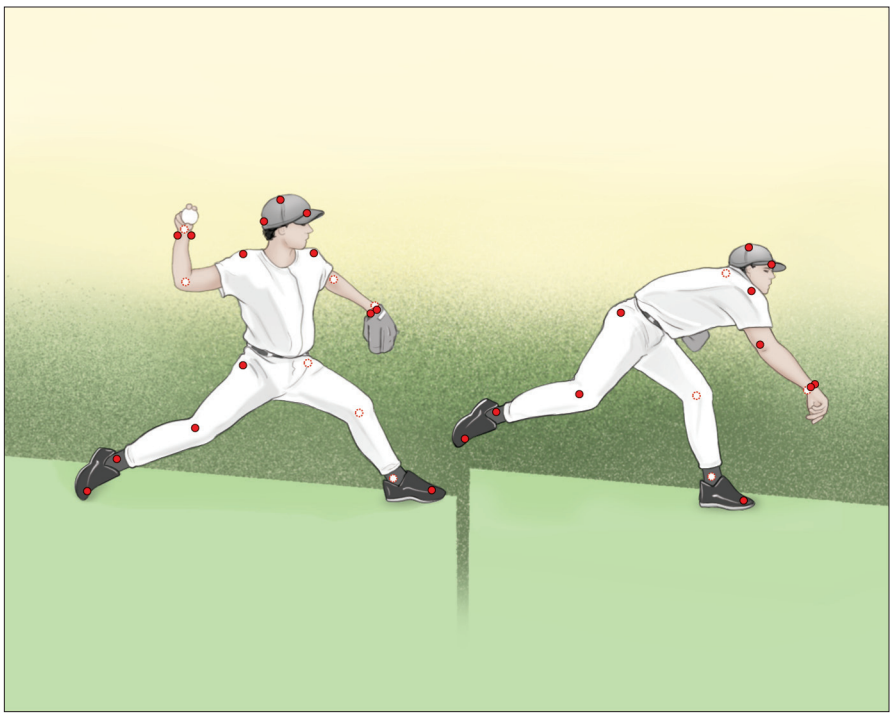
Whether you are the pitcher, coach, or concerned parent, the health of the athlete's throwing arm is very important. Each year nearly 6 out of 10 young pitchers hurt their elbows. These injuries can affect pitchers later in their lives; 15% of college-level pitchers say that troubles in their current performance are based on injuries they received when they played youth baseball. Prevention is important. Baseball pitching guidelines try to improve safety by limiting the pitch counts per week, per game, or per practice, based on the athlete's age and skill level. A better understanding of the forces that occur during different types of baseball throws could lead to improved guidelines, helping to boost performance while preventing injuries. A study published in the May 2011 issue of *JOSPT* provides new insight into the forces placed on the shoulder and elbow during flat-ground and long-toss throws.



FLAT-GROUND THROWS AS WARM UPS FOR RECOVERING PITCHERS. Flat-ground throws of 120 to 180 ft can be used as warm-up or conditioning exercises for college-level pitchers. To collect the long-toss and pitching data, reflective markers (indicated by red dots) were placed on each pitcher and tracked with an 8-camera, automated motion-tracking system. The 2 positions of most interest captured with the motion-tracking system were when the pitcher cocked his arm back (first position) and released the ball (second position).

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NEW INSIGHTS

The researchers measured 17 college-level baseball pitchers while they threw 10 fastball pitches from a mound (60.4 ft, 18.4 m). The fastball pitches were compared to flat-ground throwing at distances of 120 ft (37 m), 180 ft (55 m), and a maximal distance of 262 ft (80 m). The throwing motions for the flat-ground throws were similar to those of the fastball pitches. But, as pitching distances increased, the pitchers tended to lean farther forward, increasing the forces at the elbow and shoulder. These greater forces occurred in positions that are known to place the elbow and shoulder at more risk for injury. For injured athletes, these increased forces may further stress healing tissues and delay return to sport. Coaches or physical therapists experienced in analyzing movement patterns can help retrain athletes to use safer pitching movement patterns and progress pitching in a way that helps recovery and limits future injury.

PRACTICAL ADVICE

Short distance throws from flat ground are similar to fastball pitches. Thus, flat-ground throws of 120 to 180 ft can be used as warm-up or conditioning exercises for college-level pitchers, and appear to be safe for recovering pitchers. Maximum-distance throws create the most force, speed, and motion at the shoulder and elbow. These greater distance throws should be used carefully, because they can cause injury if used too often or too soon after injury. Supervised retraining may help pitchers recovering from a shoulder or elbow injury. For more information on rehabilitation following a pitching related injury, contact your physical therapist specializing in musculoskeletal disorders.

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This *JOSPT* Perspectives for Patients is based on an article by Fleisig GS et al, titled "Biomechanical Comparison of Baseball Pitching and Long-Toss: Implications for Training and Rehabilitation" (*J Orthop Sports Phys Ther 2011;41(5):296-303. doi:10.2519/jospt.2011.3568*).

This Perspectives article was written by a team of *JOSPT*'s Editorial board and staff, with **Deydre S. Teyhen**, PT, PhD, Editor, and **Jeanne Robertson**, Illustrator.