

Flattening the Curve in Fast Pitch Softball Injuries

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Although fast pitch competitors continue to experience a substantial rise in injury, there remains a limited body of knowledge currently available on this sport. Even moderate attention to the environment and player development, however, by both coaches and parents should decrease the number and severity of trauma.

Overall, the type of injuries experienced by athletes is oftentimes influenced by practice or game situations. Approximately 34% of practice injuries consist of musculotendinous strains and incomplete tears, followed by contusions, incomplete ligamentous tears and sprains, and tendinitis and inflammation. Fractures, torn cartilage, hyperextensions and concussions have also been reported, as have a minimal number of lacerations, AC joint separations, neurological traumas and stress fractures.¹ In sharp contrast, during games, approximately 45% of injuries involve contusions, complete and incomplete ligamentous tears and sprains, complete and incomplete musculotendinous tears and strains, and limited fractures. Less frequently reported injuries include concussion, inflammation, laceration, abrasion, hyperextension, and joint subluxation.¹

Of great concern is the repetitive training and excessive competition we see today, resulting in what is referred to as overtraining syndrome (OTS). The increasing incidence of OTS leading to musculoskeletal compromise has been attributed to a lack of knowing how much training is enough, the ease of missing subclinical signs of injury, the low vascularity of connective tissue, and the inability of bone to remodel at a rate to match the demands of the sport.^{1,2} Tournament play often leads to an excessive number of innings played compared to the amount of recovery between starts. With an extensive schedule of batting practice, and a week full of double headers, it is common for pitchers to compete after only 2 days of rest or rotation.³ The tremendous forces and torque produced by the underhand windmill pitching motion, along with poor pitching mechanics and overuse, routinely leads to arthralgia and instability in the arm, shoulder and lower back regions, chronic NSAID use and time loss injuries in 45-50% of pitching staff during a single season.^{1,4}

Fortunately, the majority of fast pitch softball injuries are avoidable. Specific attention to a safe playing environment, player education, and sport-specific training and conditioning, especially with younger athletes should be foremost prior to the season.

Injuries occur in both the infield and outfield areas, necessitating that equal attention be given to all playing surfaces. Prior to practice, check for field hardness, grass cutting height, and areas of excessive wear. Indoor facilities are problematic, whether it be a turf surface or an actual gym floor during inclement weather. The limited floor space, harder gym surface and poorer ball visibility and contrast contribute to increased occurrences of blunt trauma from player collisions, falls and greater ball speed and bounce than observed with normal field conditions.¹ Coaches should ensure maintenance of padding of walls, backstops, rails and dugout areas. Low-profile or breakaway bases can reduce the trauma during base sliding.

Emphasis on player education significantly reduces the frequency of injury in softball. Pay attention to poor player techniques or mechanics.¹ Be cognizant and minimize the signs and symptoms of OTS,² by varying day-to-day training routines to decrease repetitive musculoskeletal stress on the same joints. Pitchers with a seasonal history of pregame arm pain, muscular fatigue, diminished performance or exhibiting sudden changes in pitching biomechanics to alleviate discomfort are

demonstrating hallmark signs of overt orthopaedic trouble.⁴ Breaking the repetitive cycle of overuse and minimal recovery time is essential to reduce career-ending joint instability.

During the season, coaches should emphasize attention to motor skills, with equal focus on speed and efficiency of movement in the field and on the base path. Drills that reinforce sport-specific, decision making processes lead to less mental mistakes and reduce the number of player collisions.

Lastly, as the game become faster and more physical, it is imperative to design softball-specific conditioning programs that emphasize a combination of power, acceleration, flexibility, technical skill, functional capacity aligned with injury prevention. During the off-season, enhance speed-endurance through high intensity interval training, as well as conditioning that improves softball-specific arm and back strength, leg power, explosive movement and full ROM. Training volume, intensity, recovery, and duration should be closely managed. Vary the program components as the athlete progresses from general preparation through basic strength, functional strength, power, maintenance and active rest, concentrating on closed-chain development of functional power in the trunk and in the upper and lower extremities. Ultimately, the goal is to combine careful planning of practices, player rotation, and enhanced sport-skill technique with adequate rest, resulting in a lower incidence of significant time-loss cases.

¹ Meyers MC, Brown BR, Bloom JA. Fast pitch softball injuries. *Sports Med.* 2001;31(1):61-73.

² Hollander DB, Meyers MC, LeUnes AD. Psychological aspects of overtraining: implications for youth sport coaches. *J Sport Behav.* 1995;18:3-20.

³ Skillington SA, Brophy RH, Wright RW, Smith MV. Effect of pitching consecutive days in youth fast-pitch softball tournaments on objective shoulder strength and subjective shoulder symptoms. *Am J Sports Med.* 2017;45(6):1413-1419.

⁴ Yang JS, Stepan JG, Dvorack L, Wright RW, Brophy RH, Smith MV. Fast-pitch softball pitchers experience a significant increase in pain and fatigue during a single high school season. *HSS J.* 2016;12(2):111-118.