

America's Pastime

Part 1: Overuse injuries in baseball and softball

By Tamara Mitchell



To many Americans, summertime and baseball are synonymous. The sound of a baseball game on the radio is the soundtrack for summer picnics, washing the car, or working in the yard. The Amateur Softball Association encompasses more than 170,000 adult teams with 2.5 million participants annually.¹ It's estimated that 40 million adults in the U.S. participate in softball, and that's not counting the military service people where softball is one of the most popular recreational activities.² While softball and baseball are very similar games, there are some specific differences.¹ Softball is played on a smaller field for fewer innings.¹ The size of the softball is larger and it is heavier than a baseball.¹ The softball field does not have a pitcher's mound and the pitcher generally pitches underhand or with a windmill pitch.¹

Weekend warriors who pick up the sport again in adulthood are often not in optimum condition, are more prone to injuries, and should take it slow when jumping into the game.

To better understand how injuries occur and what treatment is most effective, we provide a two-part discussion. The first article will discuss injuries and the second will provide prevention and treatment guidelines.

We should preface this discussion by saying that this article addresses adult overuse injuries. There are some specific differences between overuse injuries to adult tissues and bones and those of children, whose bones and tissues are still growing and developing. All of the injuries mentioned here can happen to children. The consequences can be more severe when growing tissues are damaged.

Common injuries include shoulder and elbow injuries for throwers (especially pitchers), injuries from sliding into bases, collisions between players or with a fixed object like a fence, and being hit by the ball or bat.^{2,3,4} Most of these injuries are sudden, traumatic, acute injuries rather than overuse injuries and this type of injury will not be covered in this article. Most of the literature on baseball and softball injuries deals only with trauma-type injuries because the data is collected in emergency rooms or from insurance claims. Research on overuse injuries in baseball and softball is virtually non-existent and most of the available statistics are for children, not adults. Data on adult overuse injuries resulting from playing softball and baseball is difficult to obtain because adult players may go years without seeking treatment, may seek a variety of different treatments, may quit playing the sport without reporting physical problems if pain is severe, and/or may develop symptoms that are only indirectly attributable to the sport unless the person plays very seriously, many times a week, and over a period of years. It is the continuous, repetitive stresses and strains that occur without proper conditioning and without allowing time to heal that result in overuse injuries. Coaching websites have some good information on proper form, reports of overuse injuries, and prevention measures, but they are often rife with

unsubstantiated advice that can be dangerous or simply untrue, though the authors sound like authorities on their topics.

Adult Injuries by Body Part

Age ≥ 18 Years

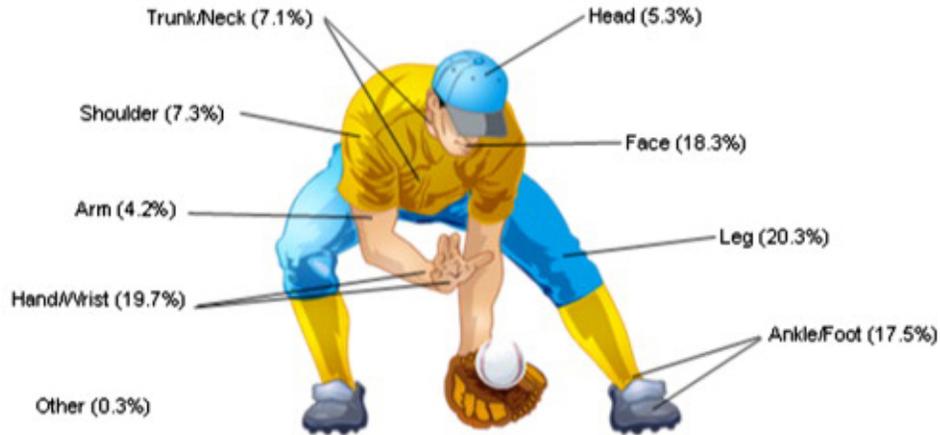


Illustration courtesy of Reference 4

Overuse injuries can occur either gradually or quickly during a brief, intense period of play. Most importantly, they can be often prevented. Many overuse injuries occur at the beginning of the baseball season when relatively unused body tissues (muscles, ligaments, tendons, and bones) are subjected to unaccustomed stress. The injuries are a result of the introduction of new skills, inadequate or poor technique, a rapid increase in training intensity, or pushing towards peak performance in the later phases of training. Also, many people think that because they play in another sport they will be in good shape for playing on a summer softball league. Unfortunately, muscles are used differently in other sports so overuse injuries are still likely to occur.

Since each position in baseball involves different movements, we will discuss the potential injuries by activity or position on the field.

Pitching Injuries

Throwing is involved in all positions on the field, but most intensely for the pitcher. Throwing injuries may be caused by physical factors of the player such as decreased range of motion, impaired joint mobility, and decreased strength, or by external factors such as training errors and improper throwing mechanics. Leagues do not usually have pitch count regulations. One pitcher often pitches double headers and may throw 1,200 to 2,000 pitches in a single tournament weekend greatly increasing the risk of overuse injury.¹

Underhand/Windmill Pitching

In the overhand pitch, the elbow is extended during delivery, while in the windmill pitch the elbow is flexed and the biceps are contracted.¹



Illustration courtesy of Reference 1

There are six phases in the windmill pitch. Of these phases, the delivery and follow-through appear to have the greatest potential for injury because of the torque, forces and velocities involved. Underhand and windmill pitching put the player at risk of developing biceps tendinitis because of the high forces on the biceps brachii muscle activation at the end of the pitch.¹

Biceps tendinitis will be painful where the tendons pass through the bicipital groove just before or during release of the ball and the tendon will be tender to the touch in this area.¹

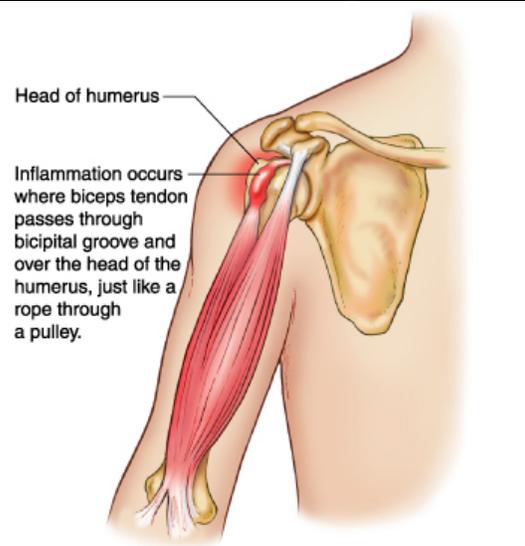


Illustration courtesy of physioworks.com.au

Baseball Pitching and overhead throwing

Both softball and baseball can utilize overhand pitching which puts pitchers at risk of overuse injuries such as rotator cuff tendinitis, strains, and impingement.¹

Shoulder/Rotator Cuff. Inflammation of the rotator cuff tendons and/or the tendon of the long head of the biceps is extremely common in throwers. Prolonged inflammation of the rotator cuff may lead to partial or full thickness tearing of the rotator cuff. Partial thickness tearing is common in athletes who use overhand motions. Full-thickness rotator cuff tears are primarily seen in players over 40 years of age and usually requires surgery to correct.³

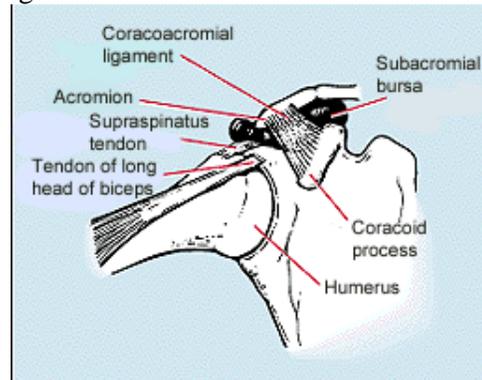


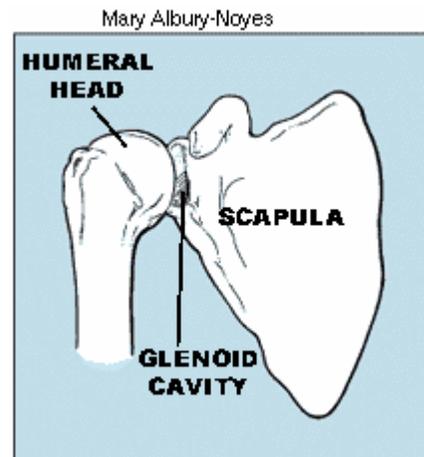
Illustration courtesy of Reference 8

There are two types of impingement disorders of the rotator cuff.

1) External impingement is a bursa-sided irritation due to decreased space between the rotator cuff and the acromion. This can be caused by bursitis, tendinitis, and acromial spurring, which all decrease the space available for the rotator cuff.³

2) There is a ring of cartilage around the glenoid cavity of the scapula into which the humeral head fits. This ring of cartilage is called the labrum.^{5,6}

Throwers with labral injuries usually complain of anterior (front) shoulder pain and a "click" is often associated with decreased range of motion.³



Elbow. The elbow is injured less often than the shoulder in throwers because of the inherent stability of the bones in the elbow joint.³ However, the elbow is subjected to extreme stress during throwing, so injuries do occur. Overuse injuries of the elbow usually involve the muscle/tendon units of the elbow. This can result from repeated throwing and cumulative microtears, or it can result from one overly forceful muscular contraction with a macrotear. If this goes untreated, it can lead to elbow joint instabilities and eventually osteophyte (bone spur) formation and/or fracture causing loose bodies within the elbow joint.³

Ankles and feet. The repetitive motion of pitching can lead to overuse injuries to the feet and ankles.¹ Pitchers need to be coached on the proper way to come off an elevated mound with their back foot and land on an incline with the front foot.¹

Outfielder Injuries

Gastrocnemius-soleus complex and Hamstring muscle group. Players in the outfield positions are required to go from a dead start to a sudden sprint.³ Tremendous stress is placed on the muscles and tendons of the lower extremities.³

Achilles tendons. The stop and start activities of baseball and softball often create pain and tightness in the calf and aggravation of the Achilles tendon.¹

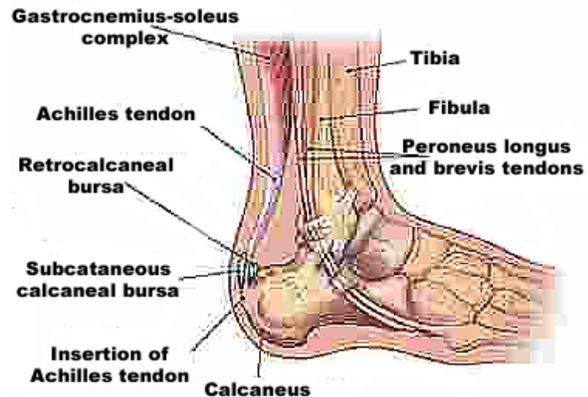


Illustration by Renee L. Cannon, courtesy of Reference 10.

Infielder Injuries

Low back injuries. The shortstop and second baseman are at risk for low back injuries.³ Their positions require leaning forward in an unsupported stance, and then over reaching or twisting.³

Gastrocnemius-soleus complex and Hamstring muscle group. As with outfielders, but to a lesser extent, infield players must go from a dead standstill to lunging or sprinting for the ball, with an associated risk to the gastrocnemius-soleus muscles and hamstrings.

Achilles tendons. Infielders may experience the same problems as outfielders (see above).⁹

Catcher Injuries

Knee Injuries. Catchers spend a great deal of time in a deep squat position which can lead to injuries of the meniscus, especially the posterior horn (back portion) of the meniscus.³

Elbow injuries. Catchers must frequently throw from their knees, which doesn't allow them the advantage of using their legs and trunk to position their upper body for the throw.³ This tends to increase the stress placed on the elbow and can lead to a higher risk for elbow injuries.³

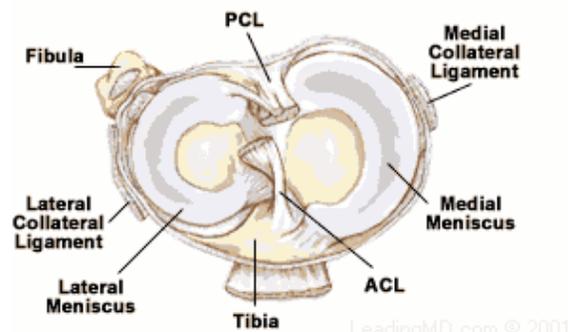


Illustration courtesy of Reference 11.

Ankles and Feet. Squatting behind home plate for extended periods of time also increase the risk of damage to the ankles and feet of catchers. Catchers are especially prone to plantar fasciitis, arch pain often resulting from inflammation on the bottom of the foot.⁷ A related condition, heel spur syndrome, causes the plantar tendon to pull at its attachment to the heel bone, sometimes leading to calcification and formation of a bone spur.⁷

Runner Injuries

Ankles and Feet. While cleats or spikes may improve traction and enhance play, they also increase the odds of ankle injuries from twists and turns.¹

Gastrocnemius-soleus complex and Hamstring muscle group. As with the other positions, base running requires a full sprint from a dead standstill. Sliding and “stopping on a dime” are also associated with gastrocnemius-soleus and hamstring injuries.

Batting Injuries

Little attention has been given to batting mechanics since it accounts for very few overuse injuries in baseball.

READ **Part 2** TO LEARN HOW TO AVOID AND TREAT THESE INJURIES.

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Revised 6/19/2014