

America's Pastime

Part 2: Prevention and treatment of overuse injuries in baseball and softball

By Tamara Mitchell



This is the second of a two-part article discussing baseball and softball overuse injuries. To better understand the discussion which follows, please read Part I which describes the nature of these injuries.

Many softball and baseball injuries can be prevented through appropriate conditioning and proper coaching that focuses on pitching, throwing, sliding and fielding techniques, and using equipment safely. In addition, allowing the body adequate time for recovery from the stresses of playing allows tissues to rebuild and strengthen. Another concept is "prehabilitation" where a physician examines a player to identify weaknesses and flexibility deficits before the season so that preventive exercise and conditioning can begin before injury occurs.¹ Anyone over 40, diabetics, smokers, or those with a physical disability should see a family physician before getting out to play.²

General Overuse Injury Prevention Guidelines:

- ❖ Participate in a comprehensive pre-season conditioning program to develop flexibility, endurance and strength. Cross-training reduces injury and promotes total fitness.³
- ❖ Don't be a weekend warrior. Maintain a moderate level of activity throughout the week.³
- ❖ Begin new activities or resume old ones gradually.³ Overuse injuries occur when an athlete performs too much, too soon by increasing the volume, duration and/or intensity of activity too quickly.³ This does not permit adequate recovery time or allow tissues to adapt to a new activity level.
- ❖ As we get older, we need to accept that we may not be able to perform at the same level we did 20 or 30 years ago.³
- ❖ Warm up with cardiovascular exercise at 60-80% of maximum heart rate.³
- ❖ Proper form can reduce your risk of overuse injuries such as tendinitis and stress fractures.^{3,4} Consider working with a coach to improve your pitching or throwing techniques or your batting stance and swing to prevent improper techniques from becoming habits.
- ❖ Don't play if you're in pain. If pain persists, have the injury examined by a professional. Adequate treatment and full rehabilitation should be completed before resuming play.¹ There should be no pain, no swelling, full range of motion, and normal strength before returning to play.¹
- ❖ Facilitate tissue repair between games with rest and body therapy, if needed. Give yourself at least one day after playing a game before exercising to allow muscles and body tissues to recover.⁵
- ❖ Wear safety gear.³

Drills are a good way to get teams in shape for the season. They can provide the multiple components of conditioning, building skills, coordination, and agility. A few good drills are described on these websites.

- ❖ Livestrong.com's softball conditioning drills: <http://www.livestrong.com/article/272354-softball-conditioning-drills/>
- ❖ Active.com's softball conditioning drills: <http://www.active.com/softball/articles/5-softball-conditioning-drills-879677>
- ❖ Stack Performance Center baseball conditioning drill videos. (Click on the tab for baseball): <http://bcove.me/w77qjn7f>

Dynamic exercises are an excellent way to warm up the body before playing and they increase the range of motion.^{6, 7} Although research has shown that basic stretching is not beneficial in reducing injury rates⁸, they do often feel good and can improve range of motion if you find that your body is not flexible enough to play the sport. If you have time for only one thing focus on dynamic exercises rather than stretching and never stretch before your muscles are warm.⁸ Stretching before a game is not advised.⁷

- Sprints should be the first exercise to warm up.⁷ Sprint the distance from first base to second, then walk back to first. Repeat 5 to 10 times. This warms up the core and increases circulation to the muscles.⁷
- The most effective dynamic exercises mimic softball/baseball movements.⁶ For instance, to warm up for swinging, use a medicine ball and, in batting stance, grasp the ball with both hands behind one shoulder swing the ball forward and across your body, just like a bat. Then swing the ball from the other shoulder back to the first side.¹
- Other warm-up exercises are described in Reference 7 and include Forward Bends, Trunk Rotations, Knee Lifts, Squats, Walking Lunges, Drop Lunges, Arm Crosses, and Arm Circles.⁷

Conditioning is important because softball and baseball are one-sided sports.⁹ In other words, since players swing and throw using primarily one side of their body, muscle imbalances occur that can lead to overuse injuries.⁹ Doing specific conditioning exercises that ensure that both sides of the body are equally strong and have good range of motion is very important.⁹ Conditioning and workouts for softball and baseball need to also focus on developing speed and agility, arm strength, core strength for transferring energy from the legs and hips to the bat during hitting as well as improving throwing strength.⁵ The exercise plan should contain elements of cardio, weight training, sprint drills, and agility drills.⁵ The conditioning videos on the website below are excellent.

- ❖ Stack Performance Center baseball conditioning videos. (Click on the tab for baseball, then select videos from the right column): <http://bcove.me/w77qjn7f>

A *balanced diet* is important to build a strong, lean body, to fuel the body, and to facilitate muscle recovery.⁵

Shoulder and elbow injury prevention and treatment.

Injury prevention measures should include strengthening of the shoulder and elbow muscles, 10-15 minutes of cardiovascular warm-up at 60-80% of maximum heart rate prior to playing, and endurance conditioning of the shoulder and elbow muscles to enable throwing repeatedly throughout a game, especially for pitchers.¹⁰

Care must be taken when engaging in stretching exercises to prevent injury. Since pitchers put tremendous stress on the anterior (front) structures of the shoulder, stretching of these tissues should be avoided. Also, stretching of the elbow should be approached cautiously since many

throwers and most pitchers have some permanent flexion contracture (inability to straighten the elbow) that will be aggravated with arm extension during stretching.¹⁰ Forceful stretching may result in loose bodies within the joint by breaking off some of the bony growth within the joint.¹⁰

Coaches should limit the number of pitches per week for each player, make rest periods between pitching mandatory, and teach proper pitching techniques.⁴ 105 pitches per game with 2 games per week maximum is recommended.¹ It is best not to pitch more than one softball game per day or on consecutive days, and rest adequately between pitching engagements.¹⁰

Pitchers experiencing pain in the windup should take a few days off before returning to pitching.¹ Pay attention and seek medical care for arm pain that doesn't go away.¹

Treatment of shoulder and elbow injuries involves reducing inflammation, relative rest from aggravating activities, and rehabilitation of the injured musculotendinous structures.¹⁰ Rehabilitation should begin with range-of-motion exercises and progress to strengthening, endurance exercises, and coordination training. There should be no pain, no swelling, full range of motion, and normal strength before returning to play.¹ Return to a throwing program should be gradual and the number of throws should be longer if the time away from playing has been longer.¹

It is critical for the athlete to work with the physician, therapist, and coach to address problems with throwing techniques and biomechanics.¹⁰ It is often difficult to determine if a thrower's mechanics are poor due to compensation for an inherent weakness, or whether the poor throwing mechanics lead to weakness, fatigue and injury.¹⁰ For this reason, the health professional and coach should work together to assess the causality.

It is extremely important to identify any underlying pathology and instabilities and to correct them to prevent further injuries.¹⁰ Full-thickness rotator cuff tears are generally seen only in players over 40 years of age and they usually require surgery to correct.¹⁰

Glenohumeral instability is often the underlying pathology in throwers (mis)diagnosed with impingement or tendinitis. If the instability is recognized early and rehabilitation is applied, approximately 95% of athletes can return to their prior level or play without surgery.¹⁰

In the case of nerve impingement, treatment involves identification of the cause of impingement and treatment of this cause. Strengthening of the rotator cuff muscles should be a first step in treatment, however labral injuries which interfere with throwing are usually treated surgically.^{10,11} Conditioning of the shoulder muscles and connective tissues can reduce the probability of overuse injuries.

Shoulder Strengthening and Balancing for Baseball/Softball players:⁹

- Blackburn series for shoulder/scapula conditioning (10 reps of 6 seconds): <http://youtu.be/jVoXO1n8UN8>
- Scapula pushups (3 sets of 10-20 reps): <http://youtu.be/5YHZnEsE9hA>
- Sleeper stretch to maintain internal rotation of the shoulder (3 sets of 30 seconds): https://www.youtube.com/watch?v=6-tgZa_J8Dk

Lower body and back injury prevention and treatment.

Hips. The hips of a throwing athlete can lose mobility, especially the pitchers' stride leg.⁹ It's important to maintain and improve internal hip rotation to avoid stress on the front of the shoulder and elbow when throwing as the kinetic chain of motion is affected.⁹

- Knee-to-knee stretch (3 sets of 30 seconds before and after throwing): <https://www.youtube.com/watch?v=sh19ZGE7pqI>

Ankles and Feet. Conditioning the ankles to improve stability is very important in baseball and softball for balance, speed, agility, quickness, and changing direction.

- Ankle stability drills: <http://www.stack.com/2006/09/01/drills-to-develop-ankle-stability/>
- Ankle and foot stability/balance improvement conditioning: <http://youtu.be/LEynxS9lpSQ>
- Calf raises strengthen the muscles and connective tissue around the ankle: <http://www.stack.com/2013/02/19/ankle-sprain-strategies/>

Players unfamiliar with wearing cleats or spikes should wear them on a limited basis until they get used to the feel of how they engage the turf.² If they cause any pain, discontinue wearing them for two to three days. If problems continue, see a podiatrist specializing in sports.²

Catchers are especially prone to arch pain, plantar fasciitis, and heel spurs.² Proper warm-up can reduce strain to the ligament. Altering their stance to vary weight displacement throughout the game can help reduce the risk of plantar fasciitis.²

There is a lot of controversy regarding proper shoe type for prevention and treatment of plantar fasciitis.^{12,13} The traditional approach is to recommend shoes with lots of support for the foot, especially the arches.¹⁴ The minimalist movement is finding that too much support is possibly the core of the problem.^{12,13} By providing too much support throughout our lives, the foot muscles have become weakened to the point that they cannot prevent repetitive strain injuries to the feet when we run and play more strenuous exercises.¹² The jury is out on what the best approach is, but once the plantar fascia is inflamed, it is advisable to take time off, work to reduce the inflammation, start stretching the thick band of tissue that runs from the ball of the foot to the heel, and calf stretches, which relaxes the calf muscles, the Achilles tendon, and helps to prevent overpronation of the foot.¹⁵

Knees. Avoid bending the knees past 90 degrees when squatting.³ Avoid twisting knees by keeping the feet as flat as possible.³ When jumping, land with your knees bent.³

Achilles tendons. Adequate warm-up before, and stretching of the calf muscles after the game will help minimize pain and stiffness.²

Low back problems. The repeated rotation of the spine required in such movements as swinging the bat and throwing the ball may lead to spasms of the muscles in the back as well as injuries to the spine, vertebrae, spinal discs, or ligaments of the spine.¹⁶ Incorporate trunk-stabilization exercises into your conditioning program.¹⁰ Athletes who have highly developed abdominal muscles, but poorly developed lower back strength are more prone to lower back spasms.¹⁶ Lower back spasms can be very painful, but generally respond well to a conditioning program where the muscles of the lower back are strengthened so that core strength is balanced.¹⁶ Warming up the muscles of the lower back prior to play is also important to prevent lower back spasms.¹⁶

Dynamic core exercises are an excellent way to strengthen muscle groups that work together. Try these:

Basic baseball core strength: <http://bcove.me/knpgc0v0>

Core strength for hitting and throwing: <http://youtu.be/7eBQ2vmQtLE>

Baseball core strength with fitness ball: <http://youtu.be/uo-lfW0HrzI>

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