How are Overuse Injuries Different than Other Injuries?

When athletes sustain a concussion or break a wrist, they have suffered an acute injury. An acute injury usually results from a singular event such as a hit or fall. By contrast, an overuse injury develops slowly over time due to repetitive stress on tendons, muscles, bones or joints. This is a key concept that must be understood by coaches, parents and players: overuse injuries develop over time.

Overuse injuries are difficult to diagnose because the pains caused by repetitive microtrauma often go unreported or are overlooked by the athlete during the initial progression of the injury. Many athletes ignore minor aches and pains because they are subtle and minimally affect function in the initial stages. Teaching athletes to recognize and report any small aches or pains is the first step in reversing and preventing the development of an injury. Particularly in young athletes, an undiagnosed injury often leads to a more severe injury down the road.

To better understand this concept, consider a 14-year-old female volleyball player. She is in her second year of playing volleyball at high school and plays for a club team during the off-season. She jumps anywhere from 25 to 100 times per practice, five times a week during her high school season, and two times a week during her club season. She begins to notice soreness in her shins after practice but thinks nothing of it because it’s not affecting her play.

This volleyball player is suffering from an overuse injury commonly known as shin splints. Her shin splints are in the initial stages, resulting from repetitive small tears in her shin muscles. If she continues to ignore the injury, the damage to her shins will increase, eventually restricting her movements and physical capabilities, if not benching her completely.
Overuse injuries are a rapidly growing concern among youth athletes. Every year 3.5 million children under the age of 14 are treated for sports injuries, and among middle school and high school athletes half of them are overuse injuries. Unfortunately, the rate of overuse injuries is climbing while the average age of children afflicted with overuse injuries is decreasing. In the past 10 years, there has been a fivefold increase in the number of severe elbow and shoulder injuries in youth baseball and softball players alone. This is a growing epidemic that cannot be ignored.

The Problem is Not in the Body, It’s in the Head

The rise of overuse injuries in the youth sports community is often a direct result of early sport specialization. Kids are specializing in sports—playing only one sport year-round—at an earlier age. Specialization usually stems from high expectations with competition. However, as we will learn, the physical and mental consequences of sport specialization greatly outweigh any reward.

In recent years, top professional athletes have dominated the sporting world. We constantly watch highlight videos and listen to remarkable success stories, but what we don’t hear about are the 70 percent of kids who drop out of youth sports by age 13 due to pressure from adults, coaches and parents. These children will be deprived of enjoyment and health simply due to the excessive demands of our sporting community.

Youth sports are supposed to facilitate sportsmanship and fun. Children are not mini-adults. They are not developed enough physically or mentally to begin specializing in sports. Our youth sporting community needs to readdress the role of sports in our children’s lives and realize that fun, learning and camaraderie are more important than fashioning the 13-year-old professional athlete. We all must realize that the one individual who specialized and went on to professional stardom in athletics is a “one-in-a-million” child, not the norm. As such, everyone involved in youth athletics needs to be mindful of realistic expectations and goals.
Physical Dangers of Overuse Injuries

Unlike many acute injuries, overuse injuries are highly preventable if coaches, parents and players make a commitment to educating themselves on prevention. Overuse injuries result mainly from training errors and/or excessive training. Quick jumps in intensity, duration or frequency of practices and training are common training errors that result in overuse injuries. These risks are especially relevant at the start of a season, among athletes who have not gradually or adequately prepared themselves for the upcoming season. Athletes who try to start off where they finished the previous season often develop overuse injuries during the first weeks back.

In all of youth sports, poor mechanics is still the number one cause for overuse injuries. Improper technique can put unsafe torque and pressure on tendons, bones and joints. Done repeatedly, improper technique will lead to a variety of overuse injuries that will only get worse until the form is corrected or a severe injury is sustained. This is why good and knowledgeable coaches are so important to young athletes.

While coaching and parenting youth athletes, it is crucial to understand that children, even in high school, are physically much less mature than adults. Over-exercising children before they have reached skeletal maturity can have severe long-term consequences. Intense forces or high volume muscle contractions on an immature skeleton can result in severe injury, such as an avulsion fracture of a growth plate. Growth plate injuries will not only sideline an athlete, but also can have lifelong consequences on their growth. Untreated injuries can cause permanent damage and stunt physical maturity.

Overall Prevention

Building a solid foundation of strength is highly recommended for all sports and activities. Do not sacrifice overall fitness for sport-specific strength, especially before the body is fully developed. Focus on training the total athlete gradually with adequate resting time. Competing in several sports throughout the year will prevent sport-specific repetitive stress as long as there is adequate rest between seasons.
The American Academy of Pediatrics Council on Sports Medicine and Fitness recommends that children play only one sporting activity to a maximum of five days a week, with a minimum of one day off per week. Giving children an additional two to three months off per year from a particular sport will allow the body to heal and recharge the mind. The council also recommends playing multiple sports, especially before puberty. Children who play multiple sports have fewer injuries and continue to play longer and at higher levels than children who specialize in one sport before puberty.  

As your children mature, educate yourself on preventing overuse injuries common in their sports. The STOP Sports Injuries campaign offers injury prevention resources for specific sports, which are great references for helping youth athletes play sports in safer and smarter ways. The following summary of common upper and lower body overuse injuries seen in many sports explains how to recognize, treat and prevent them.

**Common Upper Body Overuse Injuries**

**Shoulder**

Some of the most common overuse injuries are seen in players’ shoulders. One of the most common overuse injuries in the shoulder is called Little League Shoulder (overuse injury to the proximal humeral physis). Swimming, baseball, tennis, softball and volleyball are just some of the sports that result in frequent overuse injuries. Many injuries in the shoulder stem from muscular imbalances in the shoulder, rotator cuff, and upper back. These muscles stabilize the shoulder joint and are directly involved in the eccentric (muscle lengthening) and concentric (muscle firing) movements of the arm and shoulder (e.g., throwing a baseball or spiking a volleyball).

In most athletes, the muscles in the front of the arm and shoulder are stronger than those in the back of the joint, which are responsible for slowing the forward motion of the arm after a pitch or swing. The four rotator cuff muscles are strained from too much force or overuse in one direction. Shoulder aches and pains during or after exercise should not be ignored. Rest, proper diagnosis, and rehabilitation are always best, but in general, using light weights to gradually strengthen and balance muscles in the upper body will help the shoulder recover.
Elbow injuries are typically seen in baseball and tennis players because of repetitive throwing or swinging motions. The problem arises from the inflammation and deterioration of ligaments and tendons in the elbow. This can lead to pain, tenderness, stress fractures, Ulnar Collateral Ligament (UCL) injuries, or permanent growth plate damage.

“Little League elbow” (overuse injury to the medial epicondyle apophysis) is an injury to the elbow that is caused by frequent forces (such a pitching) that overload the area. A common case involves a youth baseball pitcher who is throwing in too many innings, throwing inappropriate pitches for his/her age, or trying to throw too hard. It is important for athletes, parents, and coaches to know the signs of fatigue, such as consistently elevating pitches, changing the arm angle, missing locations more frequently, decreased velocity, and using the lower body less during the activity. This common injury has led youth organizations to impose maximum pitch counts and required rest periods for youth pitchers in order to protect them from injury. Such guidelines as implemented by Little League Baseball are listed below.

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<th>Maximum Pitch Counts</th>
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<td>Age</td>
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<td>7-8</td>
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<table>
<thead>
<tr>
<th>Rest Periods Required</th>
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<tr>
<td>Ages 7-16</td>
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<td>61+</td>
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It is also important to follow these recommendations:

- Rotate playing other positions besides pitcher
- Avoid pitching on multiple teams with overlapping seasons
- Do not pitch with any elbow or shoulder pain
- Never use a radar gun, as it encourages over-throwing
- Emphasize control, accuracy, and good mechanics
- Do not rotate between pitcher-catcher or catcher-pitcher in the same game

Master the fastball and change-up first before even considering breaking pitches, which torque the arm far more severely. A general rule is not to throw breaking pitches until the player shaves. In other words, the pitcher has gone through puberty and his/her bones, cartilage and growth plates have matured.

Pitchers, tennis players, and javelin throwers often experience UCL injuries. This ligament is often stressed by repeated use, causing progressive deterioration or even a complete rupture. If unaddressed, this injury can progress and ultimately require the commonly known Tommy John surgery, a procedure where the UCL is replaced with a graft from another part of the body. The average recovery time for this procedure is 12 to 18 months. Athletes should be aware of the potential long-term consequences resulting from this type of injury at a young age, such as chronic pain, joint instability, and loss of function.

Although many overuse injuries can affect the upper body, shoulder and elbow injuries are the most common. Regardless of the injury, it is absolutely vital to stop and reverse the progression of overuse injuries. Work with a physical therapist or athletic trainer to increase flexibility, as well as strengthen and balance the core and other relevant muscles before injuries occur. Additionally, emphasize the importance of proper technique, using the entire kinetic chain and muscles involved in a particular movement for optimal safety and performance.
Common Lower Body Injuries

Knee/ACL

Athletes in all different sports are susceptible to overuse injuries in the knee, primarily due to repetitive movements such as jumping, cutting, and sudden starts and stops. The factors that seem to make females more likely to injure their Anterior Cruciate Ligament (ACLs) are not fully understood. Current research suggests that specific differences in movement patterns may be one of the culprits, but additional studies are needed. Common overuse injuries to the knee include patellar tendonosis and overuse damage to the tendon tissue.

Athletes also commonly sustain ACL injuries, a ligament that provides support to the knee. ACL injuries are commonly associated with a single event or “blow out.” Approximately 60% of these injuries occur from cutting with non-contact.

Strong hip abductors keep the legs stable and pelvis level when landing, preventing the knee from abnormal torque or twisting. Imbalances in abductor strength or the quad/hamstring ratio, which should be 2 to 1, will add further stress on the knee during jumping movements. It is commonly believed that strengthening the quadriceps prevents ACL injuries, and while this is partially true, athletes should not sacrifice strengthening the lower body as a whole.

Patellar tendonosis, like all overuse injuries, develops over time and arises from the inflammation of the patellar tendon that connects the kneecap to the shinbone. This tendon provides strength when the knee is straightened out during the jumping process. Often referred to as “jumper’s knee,” athletes will feel an ache below the kneecap after activity during the early stages of progression. Pain will continue to increase as the injury progresses. Patellar tendonosis can be treated to a certain degree with rest and ice and by developing effective flexibility in the quadriceps, lower leg, and hamstring muscles. Many athletes wear braces or supports called infrapatellar straps to support the tendon and improve stability.
A child’s body cannot take the stress that an adult’s body can. Stressing a premature bone, tendon, or ligament will often lead to short- and long-term injury, affecting an athlete’s performance later in life and possibly impairing growth.

**Shins**

A very common overuse injury affecting players of all sports is shin splints. Shin splints result from inflammation of the tissues surrounding the tibia. This is caused by a number of factors such as a rapid increase in training, poor flexibility, or repetitive contact (jumping or running) on hard surfaces. In the early stages, athletes will notice mild tenderness around their shins, especially when the foot is bent downwards. If not addressed, athletes will further damage the area, creating discomfort eventually to a point where movement is greatly hindered. The treatment for this condition is a combination of rest, ice, and massage as well as proper flexibility/strength training.

If an athlete recognizes any early signs, consult an athletic trainer to treat, recover, and prevent reoccurrence. Shin splints can easily recur if not adequately cared for, and as with all injuries, coaches should emphasize the importance of resting the body and taking gradual and thorough measures to prevent further injury.

**Achilles Tendon**

Achilles tendonosis is caused by repeated micro-tears to the Achilles tendon, leading to damage and loss of healthy tissue. Achilles tendinitis can progress either rapidly over a couple of days or gradually over several months. Athletes will often feel a gradual onset of pain before, during, and after exercise. The tendon and calf will often feel stiff and be sensitive to stretching when the foot is pointed upwards.

Athletes who try to reach high levels of performance too quickly, typically at the beginning of the season, are susceptible to Achilles tendinitis. Athletes with weak calves or other muscular strength and flexibility imbalances are at risk for a number of injuries as well as Achilles tendinitis.
Similar to all overuse injuries, rest and ice are essential in preventing further progression of Achilles tendonitis. Additionally, heel inserts or pads prevent the strain put on the Achilles tendon during everyday activities, but this is only for short-term use when the tendon is recovering. Consultation with a physical therapist or athletic trainer is necessary in order to recover, strengthen, and increase flexibility, as well as to assess the athlete for unique needs based on the structure of their foot.

**Hip/Thigh**

Hip injuries are common in all sports, but are commonly seen in sports with repetitive, high intensity hip movements, such as track and gymnastics.

Snapping hip syndrome is an overuse injury that occurs after large amounts of training and practice in a single sport, which leads to strength and flexibility imbalances. Tendons may audibly and painfully snap over the bones around the hip joint when the hip is raised upwards to the chest and back down. This condition has many variations depending on the muscles involved and underlying hip ailments.

A more serious overuse injury seen in athletes is a femoral neck stress fracture, which affects the top part of the thighbone. This stress fracture develops over time in athletes who have poor running mechanics, increase their training too quickly, lack of proper nutrition, or excessively train throughout the year.

Athletes developing a femoral neck stress fracture often have gradually intensifying groin pain during everyday activities. This pain will begin to focus onto a specific point as it develops. If diagnosed early enough by a doctor, athletes can reverse the progression with rest and physical therapy. In later development of the injury, an athlete will often be put on crutches for a period of time or even require surgery.

Once again, as with any injury, proper diagnosis and rest is the crucial first step in the recovery process. Strengthening the core and pelvis gradually and preventing other muscular imbalances is highly efficient in preventing overuse injuries at the hip.
Lower Abdomen

Athletes may develop a weakening of the muscles or tendons of the lower abdominal wall, particularly in the region where the wall is quite thin, that results in a condition called sports hernia. While an inguinal hernia has a palpable hernia, that is not the case with this injury. The symptoms include pain in the lower abdomen, often radiating into the groin or testicles (in a male). These symptoms are exacerbated with stressful activities such as those related to sports (e.g., running, cutting and bending) as well as coughing or sneezing. This injury is most common in athletes such as hockey players who are forced to maintain a forward lean, but it is also prevalent in high-stress sports such as soccer and football. While conservative treatments such as rest, ice, and physical therapy may be used, unfortunately, surgery is often required to correct the problem.

Spotting an Overuse Injury and Recovering From It

Many overuse injuries are easily recognizable by pain or a decrease in ability/loss of function. Make sure athletes report any discomfort or pain when warming up, playing, or resting after activity. Even if the pain is not affecting their performance now, ignoring pain will lead to further injury. Remember that it’s better to miss one practice or game than the season. Athletes may also feel grabbing, snapping, or popping, which is often an indicator of a developing overuse injury. Use the following system as a general guideline for classifying, grading the development, and assessing the progress of an overuse injury.

Classification of Tendonosis/Overuse Injuries

- **Stage 1**: Pain after activity, no functional impairment
- **Stage 2**: Pain during and after activity with minimal functional impairment
- **Stage 3**: Pain during and after activity that persists throughout the day, significant functional impairment
- **Stage 4**: Significant functional impairment with all daily activities
Athletes will notice the beginning stages of tendonosis and most overuse injuries. It cannot be stressed enough how important it is to teach players that playing through any amount of pain will only cause further injury and likely longer periods of time away from their sport. Furthermore, it is the coach’s and parent’s job to know what activities and what amount of exercise puts their child at risk. Taking the necessary precautions will not only keep athletes healthy, but also increase their performance and enjoyment for years to come.

When an athlete, coach or parent suspects injury, have it assessed and diagnosed by a healthcare professional, being sure to follow the recommendations of that person for optimal outcomes. To initially reverse and prevent, overuse injury progression, follow the R-I-C-E method (rest, ice, compression and elevation). This will help muscles, ligaments, and tendons recover after play.

Advantages to Sport Diversification

Recent research has shown there is a clear advantage to early sport diversification, with one study concluding: “Athletic performance at one age in childhood does not accurately predict performance at a later age.” A young athlete's performance when they are young is not an accurate predictor of performance later in life. What is certain is that over-training young athletes, especially in a specific sport, will likely lead to injury and may permanently compromise an athlete's performance and/or long-term health. It is often recommended that sport specialization should be discouraged until the athlete is a senior in high school.

It is vital to the future of youth sports that we, as a culture, understand the consequences of early specialization in children. Overuse injuries, surgeries, and permanent damage are all common physical consequences of over-training and sport specialization. Mentally, children will become less motivated and “burnt out,” stripping them of the benefits of youth sports.

Educated, multi-sport athletes are diversified in their athletic skills and strengths. This is the total athlete. Sport diversification builds a well-rounded athlete, physically, socially, and mentally. Enjoyment should be the priority in youth sports. By understanding these concepts, we can preserve the “youth” in youth sports.