



Professional Development Cooperative

Understanding Overuse Injuries in the Young Athlete

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Participation in youth sports has become an ever increasing part of American culture and involves a steadily growing population which is currently estimated at 35 million children. This increase has been seen in both scholastic programs and non-scholastic club sport programs. In many cases participation in school programs and club teams occur concurrently. In addition, attendance at sport camps and work with personal trainers to provide specialized training is on the rise. This has created a situation where many youngsters have specialized in a sport early, leading to training and competition year round. This has resulted in an increase of adolescent injuries, most of which, are from overuse. Recent research indicates that close to 50% of all injuries in young athletes is the result of overuse and athletes that had overuse injuries lost 54% more time from participation as compared to those with acute injuries. It is imperative that those working with youth athletics have a basic understanding of overuse injuries, the contributing factors of overuse injuries, and when the appropriate time to intervene is.

Overuse Injury

Overuse injuries occur when tissue is subjected to repetitive sub-maximal stresses. The repetitive stress fatigues and wears down the tissue. If the tissue is allowed sufficient recovery time, the tissue adapts and is able to withstand the same level of stress. When tissue is not given that rest, the normal

inflammatory response becomes stalled and degenerative changes occur that weaken the tissue. Tendonitis, stress fractures, joint instabilities are all common overuse injuries that follow this pattern. These injuries progress due to the fact that the athlete can usually function for a period of time with the pain and the repetitive stress is allowed to continue.

Dr. David Starch is an orthopedic surgeon and sports medicine specialist who serves as the team physician for Texas Lutheran University, and small high schools like La Vernia, Luling, Stockdale, and Navarro. Dr. Starch has seen a dramatic increase in surgical procedures to correct overuse conditions in adolescent athletes. "Joint instabilities, ligament tears, and cartilage defects are the most common abnormalities that need to be corrected", said Dr. Starch, "Many times these procedures are a result of young athletes performing repetitive skills that their bodies are not ready to take." The example Dr. Starch used was that of a young pitcher trying to throw a curve ball too early, "This puts an extreme amount of valgus (outward twisting) stress on the elbow which leads to ligament tears and cartilage fractures. Young pitchers do not have the range of motion to throw the curve ball correctly and consequently use other compensations to accomplish the pitch. This often leads to permanent changes in the growing bone." Studies have shown abnormal development of the humeral head in adolescent pitchers.

These abnormalities were correlated with those athletes that consistently threw curve balls.

Overuse conditions are not limited to the upper extremity. Cartilage fractures, stress fractures, and tendonitis lead the list of lower extremity overuse conditions. The knee is very susceptible to cartilage injury both at the articular (joint) surfaces and at the apophyseal attachment of the patellar tendon. If not adequately treated, these conditions can require surgical intervention and lead to abnormal bone formation causing permanent biomechanical changes. If these injuries are allowed to progress past a certain point, permanent effects can occur. "Too many times I see kids with previous overuse injuries that have lost necessary range of motion or joint stability to be effective at higher levels" Dr Starch said, adding, "It would have been so easy to avoid these situations with just a little rest."

Contributing Factors

As with most injuries there are both internal and external factors that can lead to overuse injuries.

External factors, such as too rapid progression, inadequate rest periods, incorrect technique, poor playing surface, and poor equipment are the easiest to address and usually are the first to be investigated. Physicians often blame the increase of adolescent overuse conditions on external factors and these are the very factors that



coaches can influence the most. It is crucial that young athletes be properly conditioned and master the requisite techniques before being asked to perform a complex skill. With the dramatic rise in youth sport participation, the demand for qualified coaches has been exceeded and many times have thrust unwitting parents into the role of sport teacher. Coaches can also have a great influence on the amount of training a youngster is involved in. Many parents and coaches have adopted the philosophy that specializing in a sport early will maximize the child's chances to excel. While this has not yet been proven through research, the outcome has led to young athletes performing the same drills, same techniques, over and over without adequate rest and recovery for the overused parts of their body. Many coaches will agree that overeager parents can provide extreme amounts of pressure and further exacerbate the problem. Coaches must work with their team physician, athletic trainers, and fellow coaches to present a consistent message to the athlete and parents in order to prevent overuse injuries.

Internal factors that contribute to overuse injuries are much more difficult to identify and require professional examination. Active growth is probably one of the most the most common internal factors that contribute to overuse problems because tissue adapt to training at variable rates. For example, bone growth occurs faster than muscle and other soft tissue. This puts the dynamic and static stabilizers, (muscles and ligaments), in a state of inflexibility and is a key component contributing to overuse problems like apophyseal injuries (Osgood-Schlatter disease). The rapid change in bone length relative to muscles and tendons put a young athlete at an increase risk for tendonitis and joint instability. Biomechanical abnormalities such as foot deformities, hyperpronation (flat feet), patellofemoral malalignment, and leg

length discrepancy contribute to overuse injuries in older athletes can also affect the younger population and worsen other existing risk factors.

What Can Coaches Do to Prevent Overuse Injuries?

In the case of overuse injuries in young athletes, prevention is always the best treatment. All conditioning programs should engage athletes for at least 6-8 weeks prior to sport participation and emphasize general conditioning as well as flexibility training. Balance and skill mechanics must be mastered at simple tasks before moving on to more complex movements. Cross training and participation in multiple sports should be encouraged as a way to develop fitness, motor skills, and proprioception. Probably the hardest thing for coaches to do is control the intensity level. But it is imperative that coaches understand that adolescent athletes develop at different rates and modifications of training intensity have to be made for certain athletes at certain times. Participation in two or more sport conditioning programs at the same time is never a good idea and there must be adequate rest between training sessions and seasons.

Not all overuse injuries will be prevented. The history of the injury is usually the best indicator if overuse is involved. Athletes often will complain of a slow onset of pain that has worsened over a period of time. There is usually no one time or activity that he or she can point to. Questions about training frequency, changes in intensity, equipment use, and playing surface can all provide clues to the etiology of the symptoms. Many times, simple adjustments in these external factors can make a difference. If internal factors are suspected, medical advice should be sought with the understanding that training will need to be altered during active periods of growth.

As an athletic trainer, the best advice I can give to coaches is to listen to your athletes and use pain as a guide. If an athlete complains of pain or soreness the day after a training session, the activity should be modified. If the athlete is complaining of pain during inactivity or in their normal daily activities, a period of rest is advised until symptoms subside. If symptoms persist after applying these strategies, the athlete should be referred to an orthopedic physician. When structural abnormalities are detected, immediate rest is advised until the athlete is cleared by their physician. It is crucial that when injuries get to this stage, the coach adheres to the physician's orders and presents a united front for the athletes and their parents. Finally, when it comes to dealing with over eager parents, my best advice is to try send consistent messages to the athlete and their parents and I also wish you "good luck." Coaches have been trying to figure out a way to deal with this delicate situation for years and it is one of those coaching challenges that never seems to go away.

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