

KidSports:

The causes and nature of overuse injuries in children and adolescents

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Kids love to play and it's really good for them! Exercise is needed for proper growth and development. In addition, children learn many social skills such as cooperation and sharing from simple playground games.¹ Organized team sports instill self-esteem, empathy, confidence, joy, and pride.¹

When children are left to play sports or games by themselves, overuse injuries are not a problem.^{1,7} No child ever repeats a physical activity often enough to cause an injury.¹ Until the past 25 years overuse injuries were extremely rare in children.^{1,2} Studies within the past 15 years show that 30-50% of pediatric sports injuries are due to overuse, with the frequency of injury equal among boys and girls.^{2,3,4} Sports, rather than less organized play activities, are the most frequent cause of injury for both male and female adolescents. Interestingly, most injuries occur in practices rather than in games.¹

This first article of a two-part series discusses potential causes of overuse injuries in children and adolescents and the nature and dangers of this new type of injury. In the next article you will learn how to help your child avoid these serious injuries and what you should do if you suspect your child is experiencing overuse problems.

Causes of sports overuse injuries in children

Organized sports, specialization and competition. Why has the incidence of overuse injuries in sports increased so quickly? Most sources agree that the primary reasons are *the growing number of young people participating in sports at an early age, training year-round, playing only one sport and competing at elite levels.*³ Between school and club programs, private instruction, and popular summer sports camps, many youngsters are training and competing year-round.² More youngsters participate in the *same sport all year.*^{2,4} The *competitive culture* of most organized youth sports is quite intense.⁵ Traditional team sports in the form of casual, less intense, unpressured pickup play are in decline, while organized team sports have flourished.⁵

Ignoring pain and avoiding treatment. Often, children, parents, and coaches *don't take the aches and pains seriously.*⁶ Pain is an indication that something is being done too often, too quickly or incorrectly.⁷ Sometimes kids won't admit to being sore and they just drop out of the sport, often for life.^{6,9} Many young athletes play through pain and disability because they fear being removed from activity or disappointing parents and coaches.³ Coaches may just tape up an injury and send the athlete back out to play, causing increased injury.⁷ Organized sports have a 20% re-injury rate that is attributed to inadequate rehabilitation and returning to play too soon.¹ Returning to play before an injury is completely healed places stress on the injury and forces to the body to compensate for the weakness, often causing injury to another body part or re-injury to the same body part.⁸

Parental pressure. When parents put extra pressure on their children to compete, be a star, or get a college scholarship, there is an increased risk of injury.^{5,7} In these cases, children tend to play through an injury, or if they are not enjoying the activity, they may not heal at a normal rate or may have uncharacteristic symptoms.² It is important to make sure kids are participating because they want to.^{5,13}

Extreme sports such as skateboarding, snowboarding, wakeboarding, and mountain biking are a new phenomenon. While these sports are obviously highly risky, children may be driven to them by fanatical parents and coaches, resulting in higher injury.⁵

Uninformed coaches. 90% of the volunteer coaches in the U.S. have never taken classes designed to enhance their knowledge of the sport they are coaching.^{1,7} Overtraining and improper technique often lead to overuse injuries.^{1,6} Well-trained coaches will make sure children warm up and cool down, learn proper techniques, and do practice drills. They will also make sure that children don't exceed restrictions, such as the limit on the number of innings pitched in one week. Informed coaches notice if someone is hurting, identify an injury, and replace improper or ill-fitting equipment which can aggravate overuse injuries.^{7,8}

Growth spurts. Rapid growth of the long bones of the arms and legs is often faster than the growth of muscles and tendons, resulting in joint tightness, inflexibility, and imbalances in movement.² This is associated with an increase in injury, especially for adolescents. The mean onset of the adolescent growth spurt is approximately 10 years for girls and 12 years for boys.²

Inadequate diet and hydration. Physical activity increases the need for more calories and protein as well as fluids, calcium, and iron.³ To avoid stomach cramps from drinking large quantities of fluids too quickly, follow the guidelines below.¹⁰

Inadequate calories and protein in females can lead to primary amenorrhea (no sexual development by age 14 or no periods by age 16), or secondary amenorrhea (three or more months between periods or fewer than six periods in 12 months).³ The consequences of amenorrhea include decreased circulating estrogen levels leading to decalcification of the bones and increased risk of stress fracture.³

Guidelines are as follows:

- Fluids: 16 oz 15-20 minutes prior to exercise, 4-8 oz every 15 minutes during exercise, and 16 oz for every pound of body weight lost after exercise.³ Avoid drinks with carbonation and caffeine.¹⁰
- Calcium: 1,200 mg/day for ages 11-24 years and 1,500 mg/day for amenorrheic women.³
- Iron: 15 mg/day.³
- Protein: 1.2-1.4 g/kg weight/day for endurance sports. 1.2-1.7 g/kg weight/day for strength sports.³

Nature and dangers of overuse injuries in children

Overuse injuries in sports occur from repetitive actions that put too much stress on the body, including stress fractures, strains, sprains, tendonitis, torn cartilage, bursitis and shin splints.¹ Overuse injuries can happen to people of any age, but they are especially problematic in children and adolescents because they can affect bone growth.⁸

One type of overuse injury unique to children is injury to the growth plate (physes) of the bone.^{2,4,11,12} The growth plate is an area of developing tissues at the end of long bones, such as

the arm or leg bones. The growth plates do not finish closing until age 15-17 in boys and 13-15 in girls.¹³ Damage to the growth plate is a type of stress fracture, but most heal without any lasting effects.^{4,11} Stress overload at the physis can impair calcification (ossification) and, when prolonged, can result in a widening of the growth plate or a permanently unfused closure of the growth plate (that is, the cartilaginous growth plate never closes and fuses with the bone).^{2,11} Because of the susceptibility of growth plate damage, the sponsors of the Boston Marathon recently increased the minimum age to participate from 16 to 18.¹³

A second type of overuse injury is related to growth.^{1,2} The speed at which the long bones of the arms and legs bones grow is faster than the muscles and tendons, which cause a loss of flexibility, imbalances during movement and an increased chance of overuse injury.^{1,2} Injuries that occur without changes to training or other contributing factors may be due to this type of injury associated with growth.²

This article and all of our articles are intended for your information and education. We are not experts in the diagnosis and treatment of specific medical or mental problems. When dealing with a severe problem, please consult with a healthcare or mental health professional and research the alternatives available for your particular diagnosis prior to embarking on a treatment plan. You are ultimately responsible for your own health and treatment!

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