

Environmental Conditions

SSE Roundtable #35: Youth in Sports: Summer Games

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ROUNDTABLE

Youth in Sports: Summer Games

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KEY POINTS

1. Awareness of surface conditions, use of protective equipment (helmets, wrist guards), and applying common sense can help prevent injuries and fractures that may arise during in-line skating, bicycling, and other activities in which collisions can occur.
2. Climate awareness, adequate fluid intake, appropriate dress, and reducing heat exposure during exercise can help prevent heat illness in kids.
3. Cumulative sun exposure during childhood may increase the risk of skin cancers and aging of the skin. Regular use of a sunscreen that provides an SPF of 15 or more helps reduce the risk of sun damage to skin.
4. Swimming-related ear infections are treated with topical antibiotics. Preventing the entry of water into the ear canal might help reduce the risk of infections.

INTRODUCTION

Summer is a season that spawns activities, games, and sports for children and teens. Outdoor activities typically lead to increased sun and water exposure. The rough stuff?skate boarding, contact sports, or outings in rugged terrain?can increase the risk of injury. This panel of medical experts addresses specific concerns that arise for active kids in the summer. The panel provides recommendations for initial treatment when concerns are not heeded, and precautions for those who plan ahead to avoid trouble.

1. Summer activities such as in-line skating, skateboarding and mountain biking have recently grown in popularity. Dr. Smith, what are the most prevalent orthopedic injuries to kids in these sports? Are these injuries unique or typical of those occurring in other summer activities?

Smith: In-line skating, skateboarding and mountain biking are all sports that involve high speed, with little protection for the participant. These activities are generally carried out on relatively rough, ungraded surfaces. When a speeding wheel hits a large bump or rut, the rider may be thrown off with great force. A fall onto an outstretched hand can cause a fracture, usually of the wrist or forearm. A fall onto the head can cause a concussion and can lead to permanent brain damage or even death. Lesser injuries include sprains, strains, bruises, scrapes (abrasions) and cuts (lacerations). Damage to internal organs occurs relatively infrequently from falls from in-line skates or skateboards, but handlebars or other objects (such as trees) could harm internal organs during a cycling accident. Also, more kids are likely to attain greater speed when cycling than on skates or skateboards. The large deceleration force that occurs when the athlete is involved in a high-speed collision can tear tissues and cause internal bleeding. Of course, anyone who skates, skateboards, or cycles on a street used by cars is at risk for very serious injury if he or she loses control and runs into a car, or if a driver doesn't see the athlete and collides.

How can such injuries be minimized?

Smith: Injuries in these sports can be decreased by paying attention to the condition of the pavement or other surface (and avoiding slippery, gravel-covered, or bumpy surfaces) and by using protective equipment. Helmets are the most important piece of protective equipment for these sports. Helmets have been shown to decrease the incidence of concussion and to markedly decrease the chance of serious brain injury. The helmet should meet approved specifications such as those of ASTM (American Standards and Testing for Manufacturers) or U.S. CPSC (Consumer Product Safety Commission), and should fit appropriately. Be sure to select the proper helmet for the corresponding age group (under 5 years of age or 5 years and older). Wrist guards for in-line skating and skateboarding probably reduce the number and severity of soft-tissue injuries (sprains, abrasions, lacerations) of the hand and wrist. Whether wrist guards really reduce the incidence of fractures remains to be proven. However, there is no evidence that they cause significant problems, and epidemiological evidence suggests that they might decrease the incidence of fractures. Elbow pads and knee pads seem to decrease soft-tissue injuries and probably make these sports more comfortable for athletes when they fall on elbows and knees. Common sense is very important. Avoid these activities on roads at night or when visibility is poor. Also, discourage kids from attempting tricks or speeds above their skill level—especially in “showing-off” situations.

What first-aid procedures should be given in the event a coach or parent suspects a fracture?

Smith: Many fractures are obvious—the limb is painful, deformed and discolored. First aid in this situation includes immobilizing the limb as well as possible with a non-constricting splint. A splint may be constructed from two rolled newspapers, one placed on each side of the limb, and firmly (but not tightly) securing the flattened rolls in place with an elastic bandage. Elevation of the limb at or just above the level of the heart and ice application are also useful while the injured athlete is being transported to a medical facility. For collarbone, shoulder, or upper arm injuries, a sling usually decreases pain during transport. Some fractures initially appear to be such minor injuries that the diagnosis is

delayed for 2-3 days. These are generally stable fractures of a finger, hand, wrist, or ankle.

Here are some common symptoms my patients have noted before seeking medical attention a few days later and finding they actually had a fracture: tears came to their eyes at the moment of injury, significant swelling was apparent in a very localized area, and that area was located where a bone is close to the skin surface, such as the wrist or ankle bone. When a fracture is present, firm pressure of a fingertip against the injured part of the bone almost always causes significant pain. Sprains may cause just as much swelling as some fractures, but the pain and swelling are mainly over soft tissues between the bones, rather than right at the bone. Wrist sprains in children and growing adolescents are extremely rare. Fracture, rather than sprain, should always be suspected with post-traumatic wrist swelling in this age group.

2. Dehydration and heat illness can strike any active child regardless of the summer activity. Are kids more at risk of heat illness than are adults, Dr. Bar-Or?

Bar-Or: Yes, compared with adults, children are at a higher risk for heat-related illness. There are several reasons for this difference: children have a lower ability to perspire, which interferes with their ability to cool themselves on a hot day. At the same time, they produce more body heat during most physical activities. In addition, it takes children longer to adjust to climatic heat waves and other abrupt changes in climate.

What are the symptoms of each heat illness?

Bar-Or: Heat-related illness is really a family of conditions that vary in severity. Heat cramps appear as pain and tightening of muscles during or after prolonged exercise in the heat. This usually occurs when a person does not replace the salt that is lost in the sweat. Heat syncope denotes fainting, preceded by dizziness, that occurs when a person stands upright in a hot climate. It results from blood pooling in the skin and legs, which lowers blood pressure and reduces the blood supply to the brain. Heat exhaustion results from dehydration (i.e., loss of body fluids without adequate replacement) and/or loss of body salt. It is manifested by extreme fatigue and the inability to perform any physical activity. The child may faint or feel dizzy and nauseated. Vomiting may occur. The skin is very flushed and hot. Muscle cramps may also be present. Heatstroke is the most severe heat-related illness and, in extreme cases, may lead to death. Typically, the person is exhausted and disoriented and may lose consciousness. The skin is often (but not always) dry, suggesting a lack of sweating, and rectal temperature exceeds 106 degrees F.

What first aid is needed when a heat illness occurs?

Bar-Or: The first-aid approach depends on the specific heat-related illness. For heat cramps, adequate drinking of a beverage such as a sports drink that contains some salt (sodium) is often all that is needed. For syncope, one should keep the child lying down in the shade, preferably with raised legs. In heat exhaustion, call for medical help. While waiting, the child should be fully rested in the shade and, if possible, should drink fluids that include sodium. Heatstroke is a major medical emergency. Until medical help arrives, the child should be put in a cool environment and be further cooled by ice or cold water applied to a large skin area. If the child is conscious, ample fluids for drinking should be provided.

What steps can be taken to prevent or minimize the risks of dehydration and heat

illness in children?

Bar-Or: It is most important to realize that all the above conditions are preventable. One should make sure that at the start of a hot season (or during climatic heat waves) children reduce their level of physical training and then increase it gradually over a two-week period. On particularly hot days, activities should be limited to the cooler hours (e.g., before 10 a.m. and after 6 p.m.), and the child should be given adequate rest breaks in the shade every 10-15 minutes. When exercising under the sun, the child should wear a hat. A T-shirt that is tight on the skin is better than a loose shirt, because it allows the sweat to penetrate through the shirt and cool the skin by evaporation. Last, but not least, the prevention of dehydration is extremely important. Before the activity starts and then every 15-20 minutes during the activity, a child should be given extra fluids, preferably ones with flavoring and sodium (carbohydrate-electrolyte beverages such as sports drinks) to stimulate adequate drinking. Salt tablets should be avoided. Remember that children, like adults, underestimate how much fluid their body needs. They should therefore be encouraged to drink above and beyond thirst.

3. Besides adding to heat stress, direct sun exposure can be tough on the child. Dr. Bronson, how tolerant is a child's skin to the sun?

Bronson: Infants and children have not had the gradual ultraviolet exposure that stimulates a protective tan. The tan is really a brown pigment called melanin that is produced by specific skin cells called melanocytes. Melanin production in infants is limited until the infant is exposed to light and the melanocytes are stimulated. For these reasons, children are more susceptible to the damaging effects of the sun. The majority of a person's sun exposure occurs before age 20, but the effects of excessive exposure to the sun may not be seen for many years beyond this age. Changes that we once believed were caused by aging are now known to be due to ultraviolet light exposure. These changes include mottled pigmentation, wrinkling, fine blood vessels (telangiectasia), and bruising (purpura).

Studies have linked sun exposure early in life to the development of skin cancer as an adult. The risk of skin cancer grows with increased sun exposure for all individuals, but some children face higher risks than others. Children with red or blond hair, fair skin and blue eyes, with a family history of melanoma or other skin cancers, and those of Scottish, Irish, and Welsh descent face a greater risk than Asians, Hispanics, and African-Americans, whose darker skin color provides them with some degree of natural protection. Children who live in the South are exposed to stronger doses of ultraviolet radiation than are children in the North, and children living high above sea level need more sun protection than those living at sea level.

Do sunscreens or sunblocks really provide protection?

Bronson: A sunscreen with a sun protection factor (SPF) of 15 will filter more than 92% of the ultraviolet radiation responsible for sunburn. A statistical model has shown that if children consistently used a sunscreen with an SPF of 15 through the age of 18, the occurrence of non-melanoma skin cancer could be reduced by 78%. The SPF is defined as the ratio of the amount of sun exposure or ultraviolet B (UVB) radiation necessary to produce a faint sunburn on sunscreen-protected skin to the amount of energy required to produce the same redness on unprotected skin. Screening of these rays is important because the relationship between UVB and non-melanoma skin cancer has been well established. Ultraviolet A (UVA) exposure plays an important role in a variety of disorders in which UVA causes adverse reactions to certain medications, foods, cosmetics, and fragrances. The role of UVA in the development of skin cancer is more controversial, but

UVA may be linked to the development of malignant melanoma, the most deadly of the skin cancers.

For most people in non-tropical areas, a sunscreen with an SPF of 15 or higher will provide adequate protection against sunburn. An individual who typically burns after 20 minutes of sun exposure will receive about 300 minutes (five hours) of protection after applying a sunscreen with an SPF of 15. Sunscreens need to be applied liberally before a child goes outdoors. Between one-half and one fluid ounce is needed to cover the average teenager's body. The amount of time required before a sunscreen is effective varies from sunscreen to sunscreen. The sunscreen should be reapplied every two hours during swimming or when there is excessive sweating.

Among the wide varieties of sun protection available, commercially available products can be classified as chemical sunscreens or physical blocking agents. Chemical sunscreens are generally more popular because they are more cosmetically acceptable, but they absorb less of the ultraviolet spectrum than do the physical agents. Common chemical agents that protect against UVB include PABA esters (padimate O), salicylates, and cinnamates. Most newer "broad-spectrum" chemical sunscreens include several of the above agents in addition to a benzophenone or Parsol 1789, chemicals that absorb part of the UVA spectrum. Physical blocks reflect and scatter a large portion of the solar spectrum, namely UVB, UVA, and visible light. In the last few years, a more cosmetically acceptable group of physical blocking agents has been developed; micronized titanium dioxide is not as apparent after application as older agents because of the tiny size of the sun-reflecting powder. Most products containing titanium dioxide are not waterproof and must be applied frequently. Likewise, the choice of a vehicle for a chemical sunscreen is important. A product that is called "water resistant" must maintain its original SPF after 40 minutes of swimming. By FDA standards, a "waterproof" sunscreen retains its effectiveness after 80 minutes of swimming.

What are the current recommendations for treating sunburns?

Bronson: Sunburn is a first-degree burn or thermal injury to the top layer of the skin, the epidermis. Sunburned skin can be red and very painful with some swelling. It starts 3 to 6 hours after sun exposure and peaks 12 to 24 hours later. There is no agent that will block the sunburn reaction. Treatment is aimed at relieving the pain. Usually, sunburn is not a medical emergency and can be treated at home by applying soothing cool (not cold) wet towels to the affected area. Topical anesthetics and emollient creams may be helpful, but an over-the-counter corticosteroid ointment or a high potency corticosteroid cream may provide the best pain relief. Normally the skin heals in about 7 days. Should parents, children, and coaches also be alert for other dermatological problems of the summer that get overshadowed by sunburn? Bronson: The summer would not be complete without poison ivy, insect bites, impetigo, and head lice! Parents and children should become familiar with the "leaves in threes" that characterize poison ivy and learn to avoid it. All except the mildest case of poison ivy may require treatment with cortisone by mouth if it is to clear up in less than two to three weeks. Insect bites are annoying, but they can also provide a break in the skin to allow entry of the bacteria that produce impetigo. The honey-colored crusts that are typical of impetigo may respond to treatment with soap and water and a topical antibiotic preparation, but impetigo frequently requires a course of oral antibiotics. Finally, the summer is the time of year when children with head lice are most likely to spread it to other children through their play and activities. Come Labor Day, it's not a bad idea to check for nits, the little eggs that are attached near the base of the hairs, most easily observed on the nape of the neck. Although there are good over-the-counter preparations to treat head lice, some lice are now resistant to these medications; optimal treatment requires the expertise of a physician and medications available only by

prescription.

4. Outdoor pools and swim teams are a big draw among children and teens, and the water exposure may contribute to ear infections. Dr. Richardson, does ear pain always mean a bacterial infection is underway?

Richardson: With the onset of warm weather and school breaks, kids head to pools, lakes, ponds, and rivers for summer fun in the water. This leads to a surge of cases of external otitis (swimmer's ear). This is an infection in the tissues of the ear canal. Because these tissues have little room to expand, the swelling that accompanies inflammation leads to intense pain. The causative organisms are usually bacteria, but occasionally, yeast and fungi can be found.

This disorder usually causes intense pain that gets worse when the ear is touched. Ear pain without a tender ear is rarely, if ever, a sign of swimmer's ear. In fact, ear pain alone is a poor predictor of ear infection whether it be the external, middle, or inner ear that is infected. This is because the throat and the temporal-mandibular (jaw) joint can both give rise to ear pain.

Why are some kids more susceptible to ear problems than others?

Richardson: As with many medical conditions, some people are more likely to get swimmer's ear than others. It is not clearly known why this is so. It has been suggested that along with earwax, the skin of the external ear canal secretes a protective barrier to infection. When this barrier is damaged or removed (almost always due to prolonged/recurrent water exposure such as in swim-team members), infection risk is increased.

Is aggressive antibiotic therapy the best treatment? Can these infections be prevented?

Richardson: Swimmer's ear is treated by applying topical antibiotic drops (such as Cortisporin or Floxon) or antimicrobial drops (such as Vo-So-I-HC® or Zo-tor-HC®) along with oral pain relievers. Those children with sensitivities should be aware that Cortisporin® contains neomycin. Oral antibiotics are not usually helpful until there is spread of the infection to the tissues around the ear. Return to swimming is usually delayed until the ear is no longer tender to the touch. This typically takes about three to five days. Preventive treatment is not reliable but may be helpful and should be tried on those who get a recurrent infection. Prevention focuses on getting water out of the ear canal after swimming. In addition, there are over-the-counter products and prescription products available that can be of help with this.

SUMMARY

Summer opens the doors for kids to participate in physical activity and receive plenty of outdoor exposure. We've identified some of the main concerns and risks that parents and coaches have when working with active children. Application of the recommendations made here, with a little preparation and planning, can help kids and teens avoid the injuries that derail the enjoyment of summer.

SUGGESTED ADDITIONAL READING

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