

# Protecting the Weakest Link:

## Treating Growth Plate Fractures in Children

Adults and children share many of the same risks for bone fracture, but a child's bones are also subject to a unique injury called a growth plate fracture.

Growth plates are the softer parts of a child's bones, where growth occurs. Located at each end of a bone, they regulate and determine the length and shape of the mature bone. They are the weakest link in a child's developing skeleton – sometimes even weaker than surrounding ligaments and tendons. Because of the growth plate's vulnerability to trauma, the same injury that might result in a relatively minor joint sprain for an adult can cause a fracture in a child.

Growth plate injuries typically occur when a child has a fall, a twisting injury or other traumatic event. Monkey bars are a common source of injury. Symptoms include sharp pain that doesn't go away, swelling, and an inability to move or put weight on the affected area. "Most of these injuries are not severe and heal quickly because of the high metabolism and activity at the growth plate. But it's essential to get proper treatment as soon as possible so the healing process takes place without complications," explains Daniel Thompson, MD, a Commonwealth physician with a special interest in pediatric trauma. "These injuries have historically been and still are

usually treated with casting. Some may require manipulation to align the bone before the cast is put on, and fewer still may require surgical placement of pins or screws to hold the bone in place."

Growth plate injuries account for about 30% of pediatric orthopaedic injuries. "All children with open growth plates are at risk," says Brantley Vitek, Jr., MD, who has a special interest in pediatric trauma at Commonwealth. "Because kids tend to land on their outstretched hands when they fall, growth plates in the fingers, wrists and forearm bones are most susceptible to fractures. These injuries also occur frequently in the lower bones of the leg: the tibia and fibula. Less often, they occur in the upper leg bone (femur) near the knee or hip."

Growth plate injuries are classified based on the pattern of the fracture through the growth plate:

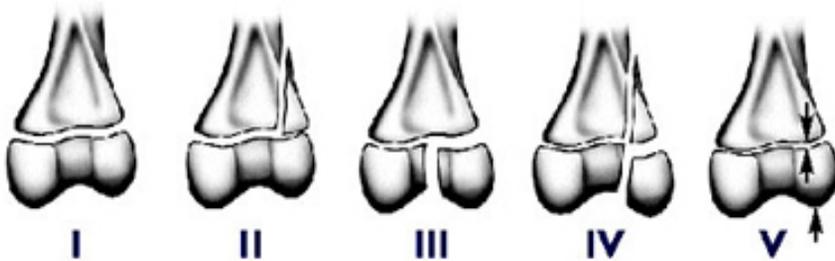
- **Type I fractures** break through the bone at the growth plate, separating it from the shaft.
- **Type II fractures**, the most common, crack through both the growth plate and the adjacent bone.
- **Type III fractures** cross through a portion of the growth plate and extend into the actual joint where movement normally occurs. They are more common in older children.

• **Type IV fractures** break through the adjacent bone and growth plate and extend into the joint. This type of fracture often requires surgery in order to avoid an eventual growth disturbance.

• **Type V fractures**, the rarest and most severe, occur due to a crushing injury to the growth plate from a compression force.

Diagnosis of growth plate fractures can be difficult. "One potential obstacle is the fact that, because it has not yet hardened into solid bone, the growth plate is invisible on an

### The Salter-Harris Classification of Growth Plate Injuries



Adapted from Disorders and Injuries of the Musculoskeletal System, 3rd Edition. Robert B. Salter, Baltimore, Williams and Wilkins, 1999.

X-ray. So, we often have to deduce that the growth plate is the area of injury, based on the X-ray and clinical exam, and treat appropriately," Dr. Thompson says.

Although a growth plate injury can seem terrifying to parents, the prognosis is excellent in most cases. Children usually heal with no long-term complications. "An injury to a growing bone at its growth plate does not mean that there will be a problem with the bone growing in the future," Dr. Vitek explains. "In fact, if treated appropriately, an extremely low percentage of growth plate injuries actually go on to develop any kind of growth disturbance, such as an angulated or shortened bone. But to be on the safe side, we recommend that the majority of growth plate injuries be followed months to years after the fracture has healed."

For these reasons, it's critical that growth plate injuries are evaluated by an orthopaedic surgeon experienced in treating pediatric trauma.



**Brantley P. Vitek, MD** earned a BA in Philosophy from the University of Virginia in Charlottesville before receiving his medical degree from the Medical College of Virginia in Richmond. He then went on to complete a general surgery internship at the University of Colorado followed by an orthopaedic surgery residency at the University of Texas Health Science Center in Houston.



**Daniel E. Thompson, MD** earned a BS in Biomechanical Engineering from Stanford University and then earned his medical degree from the University of Mississippi School of Medicine in Jackson. He completed both his general surgery internship and orthopaedic residency at Georgetown University Medical Center in Washington, DC.

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