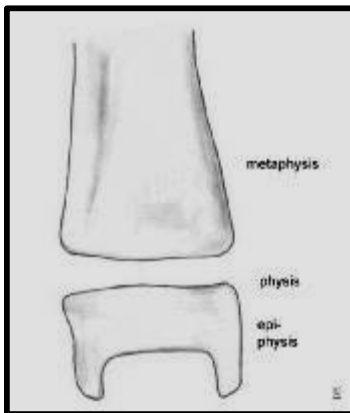


Growth Plate Fractures



One of the more common injuries sustained by young, active, athletes are fractures of the growth plate. These fractures are also termed “Salter-Harris” fractures. The growth plate or “physis” as it is termed medically is the area of actively growing bone that has not yet calcified. The physis consists of cells that are very much like cartilage and gradually mature into fully mineralized bone as the child matures. Fractures occur in the growth plate because it is weaker than the nearby ligaments that stabilize the joint. An injury that would cause a sprain in an adult causes growth plate fractures in children and adolescents. As long as the growth plate is open, the child will continue to grow in height. The growth plate closes as children enter their teenage years.



The figure to the left illustrates the growing end of a typical bone in a child. The physis or “growth plate” is the clear space between the metaphysis and epiphysis. Salter fractures are classified based on location, extent, and orientation of the fracture line. The bones most affected in pediatric athletes are the end of the radius in the forearm, the lateral malleolus at the end of the fibula, the bones of the fingers, and in throwing athletes, and the medial epicondyle of the elbow. Less common Salter fractures include those of the knee, shoulder, and hip.

Growth plate fractures that occur in the wrist usually are the result of a fall on an outstretched hand. Those that occur in an ankle are due to the ankle being forcefully twisted, while those occurring in the fingers are due to direct trauma such as being hit by a ball. Growth plate fractures can also occur from overuse such as is seen in gymnasts, baseball pitchers, and long-distance runners.

To the surprise of some, only about 1/3 of all growth plate fractures are due to sports participation. Most fractures result from falls, usually while running or falling off playground equipment, furniture, skateboards, bicycles, skiing, and sledding.

Most growth plate fractures are diagnosed by physical exam and x-rays. Often, the physician may take x-rays of the opposite, uninjured, bone. The reason for this is that sometimes the fracture is hard to see and the growth area of a bone often looks different from child to child, but will be identical in the opposite bone of the same child. MRI and CT scan are used when x-rays do not provide a concise diagnosis.

If growth plate fractures are out of alignment, or misplaced, the doctor may have to align the bones by use of his/her hands (manipulation) or by performing surgery (open reduction and fixation).

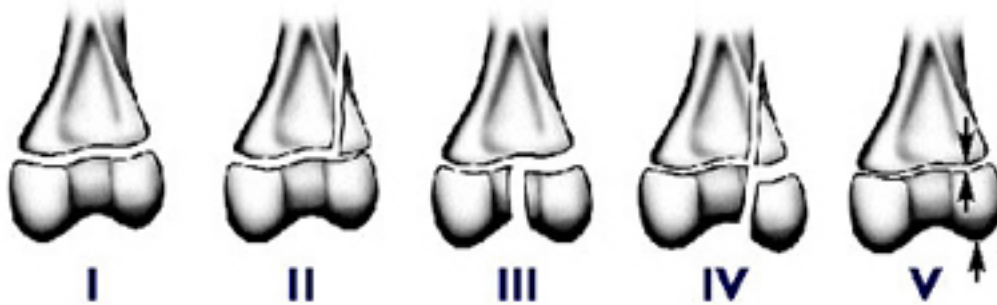
Most growth plate fractures require a period of immobilization with a cast, splint, or fracture boot. These fractures take from two weeks to as long as months for more serious injuries to heal.



About 85% of growth plate fractures will heal without any detrimental effect on growth. Lack of further growth is more likely to occur based on the type of fracture (IV, V) as well as the particular growth plate that is injured (the knee for example, which is responsible for extensive growth). Younger children have a higher risk of growth arrest because their bones have more growing to do, although this also allows for more remodeling of bone. If the growth plate was displaced, crushed, shattered, or had its blood supply disrupted, growth arrest is also more likely to occur.

The pictures below illustrate some of the more common type of growth plate fractures encountered in elementary school aged children.

The Roman numerals refer to the type of Salter-Harris fracture. The Salter I fracture is very common and is often found at the end of the radius of the forearm and the end of the fibula in the ankle.



The Salter II fracture is the most common and accounts for about 75% of all growth plate fractures.

Salter III fractures most often occur in the ankle and will sometimes need surgery to align the joint surfaces

.Salter IV fractures while uncommon, almost always need surgery to not only align the joint surfaces, but to insure the blood supply to the growing bone is maintained. Further growth is often affected. Salter V fractures are very rare and almost always result if stunting of growth.

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