

Childhood Fractures

What Is a Fracture?

- Children are very energetic individuals and with increased activities, run the higher possibility they may take a fall or take a tumble. Although most falls are usually harmless, if a child impacts a surface with enough force the underlying bone may fracture
- A fracture is a break in a bone. Most bones in the body, given the correct circumstances, have the potential to break. Since bones provide the firm structure of a limb, a fracture may deform the limb and cause the associated muscle to no longer properly work leading to loss of function
- Most fractures follow a predictable manner that is related to the initial mechanism of injury. In addition to breaking, the ends of the fracture may move away from each other (displacement), bend at the site of the fracture (angulate), or rotate in relation to one another.
- Common locations of fracture include
 - Hand (metacarpals or phalanges)
 - Wrist (distal radius or ulna)
 - Forearm (radial or ulnar shaft)
 - Elbow (distal humerus and its condyles)
 - Thigh (femoral shaft)
 - Leg/shin (tibial shaft)
 - Ankle (distal tibia or fibula)
 - Foot (metatarsals or phalanges)



Who Is at Risk for Having a Fracture?

- Participating in competitive sports such as football, basketball, gymnastics, etc
- Frequent falls or episodes of trauma
- Chronic stress or over use of a limb such as prolonged running
- Boys are more likely than girls to acquire a fracture

Does My Child's Fracture Heal the Same Way as a Fracture in an Adult?

- Until a child reaches skeletal maturity in his or her teenage years, a child is growing. Therefore, their bones have an enormous capacity to heal and do so much faster than adult bones
- A fracture in a child deserves more urgent attention than an adult because the healing process starts sooner and is more rapid. Therefore a child should be evaluated by a pediatric orthopaedic specialist within five to seven days, but preferably sooner
- The increased speed of healing also means a child requires less time in a cast than an adult

What are the Symptoms of a Fracture?

- Deformity of a limb
- Severe pain, tenderness, or inconsolable crying
- Swelling
- Abrupt onset of not being able to use a limb in its proper manner such as limping or refusing to use the dominant arm
- Some fractures may be very subtle and present only as chronic pain

How is a Fracture Diagnosed?

- A physical exam is necessary to ensure the skin, blood vessels, muscles, and nerves are intact as well as ruling out any other injuries to surrounding hard or soft tissues
- An injured limb should have x-rays (radiographs) taken of it at least once during the course of the child's treatment. This allows your doctor to assess the alignment of the fracture and optimize proper treatment. Even though x-rays do require exposure to radiation, the amount of exposure is negligible and less than that experienced at the dentist
- In some instances, an x-ray may not properly reflect the true nature of a bone especially when involving the growth plate of a child, thus your doctor may request a computed tomography scan (CT), ultrasound, or magnetic resonance imaging (MRI). Both MRI and ultrasound do not involve radiation. A CT scan is similar to a series of x-rays

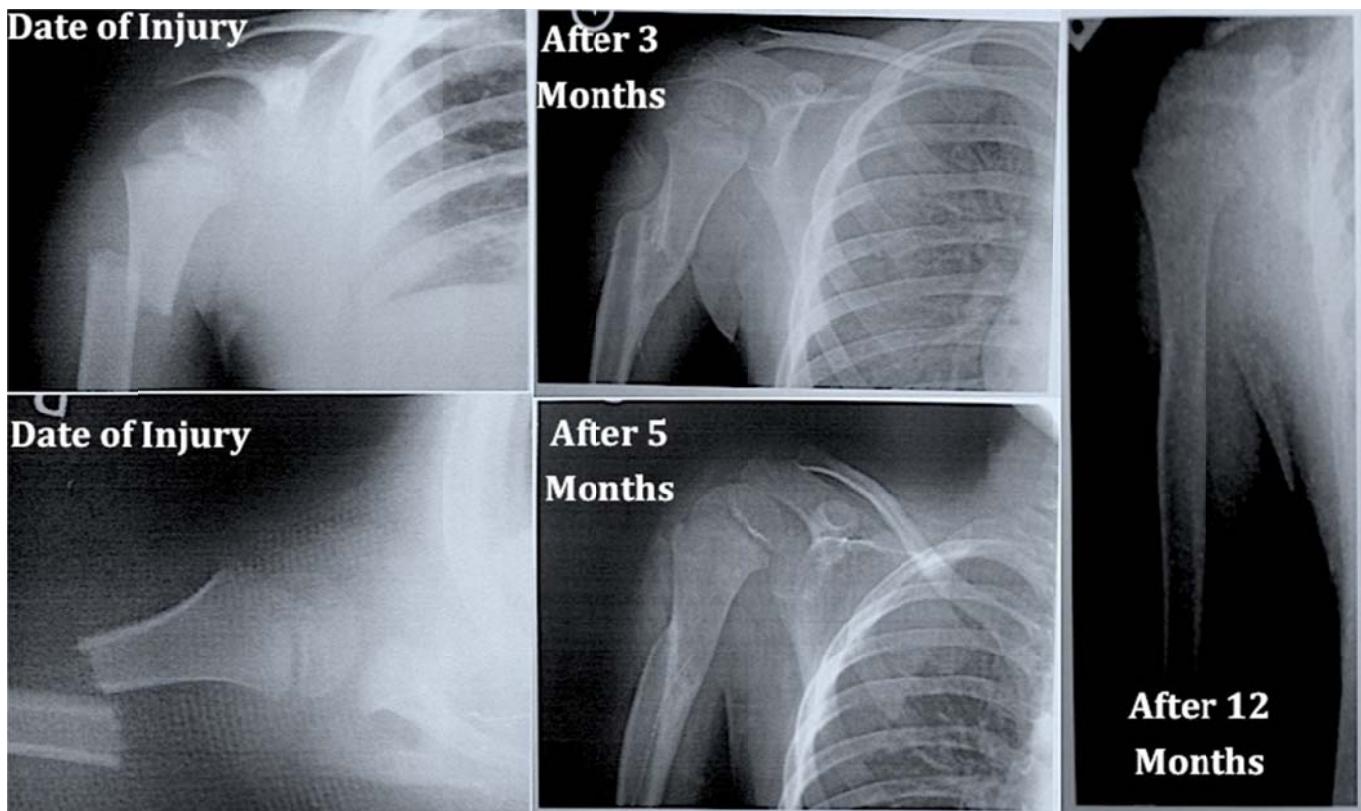
How is a Fracture Treated?

- Treatment depends on the type of fracture, the degree of rotation/angulation/displacement, injury to surrounding structures, and the age of the child. In most cases a nonsurgical treatment plan is appropriate
- Nonsurgical treatment
 - As long as the bone has not pierced the skin (called an open or compound fracture), injured a blood vessel, damaged a nerve, or significantly injured the growth plate, all attempts will be made to treat the fracture non-operatively.
 - If a significant deformity of the limb exists, your doctor may attempt to manipulate the fracture with various degrees and direction of pressure or tension (called closed reduction) to achieve proper alignment of the bone fragments. This may require an injection of local anesthetic or sedation/anesthetic during the procedure
 - A cast or a splint is applied to the affected limb to restrict movement at the fracture site (called immobilization) in order to ensure proper healing
- Surgical treatment
 - Indications for surgery include:
 - A bone piercing the overlying skin
 - A fracture that easily moves or is at high risk for moving (termed unstable)
 - Bone segments that are not properly aligned despite attempts at closed reduction
 - Bones that have already begun to heal in an undesirable position
 - Injury or threatening damage to surrounding blood vessels or nerves
 - Significant damage to the bone's growth centers

- During surgery, the physician opens the skin to realign the bones (termed open reduction) and may use pins, metal plates, and/or metal rods (termed internal fixation) to hold the bone in place till they have healed
- If a metal wire (also called a pin) is used to hold the bone in place, it is typically removed after healing. If a metal plate or rod is used it is typically left in place even after healing without any impairment of function. Indications to remove hardware are infection, pain, or breakage of the hardware
- If the fracture involves a growth plate (a structure found at the end of a bone that allows it to grow in length), the physician may want to carefully follow the child to ensure that the growth plate continues to grow in an appropriate fashion

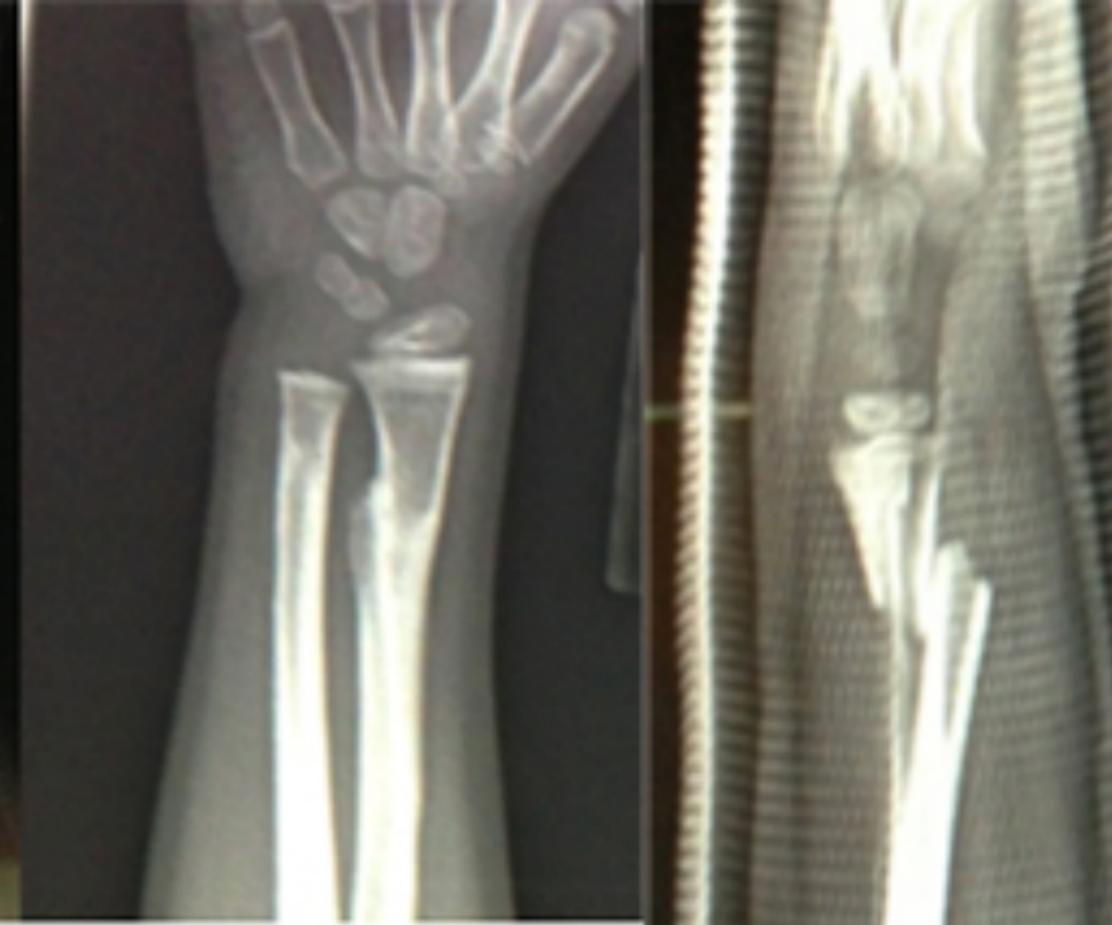
What is Remodeling?

- Remodeling is the process of changing bony architecture based on the stress patterns imposed across the bone
- This process primarily occurs in the skeletally immature patient (children)
- The bones of a young child have immense capability to remodel. Even grossly angulated bones have the ability to heal straight in a young child, even though some form of reduction is preferred





Injury



4 months After



Injury



4 months After