What is a growth plate?

Growth plates are areas of cartilage tissue near the ends of long bones that are still growing in children and adolescents. Each long bone has at least two growth plates – one at each end of the bone. A growth plate is also called an epiphyseal plate or a physis.

The growth plate is responsible for the length and shape of mature bones. When an adolescent stops growing, the growth plate closes and is replaced by solid bone.

Growth plates are the weakest part of a bone, weaker than the ligaments and tendons that connect bones and muscles. Therefore, growth plates are more susceptible to injury. Injuries to growth plates are called fractures.

What causes growth plate fractures?

The most common cause of growth plate fractures is either a traumatic event, such as a fall or injury during competitive sports or recreational play, or from chronic stress and overuse.

Who is at risk for growth plate fracture?

• Growing children and adolescents
• Boys are twice as likely as girls – a girl’s body matures at an earlier age and their bones finish growing sooner.
• Children who participate in competitive sports such as football, basketball, or gymnastics.

How is a growth plate fracture diagnosed?

Your provider will take a detailed health history and perform a physical evaluation. X-rays will be taken to help determine a treatment plan. Because growth plates are soft tissue, they appear as empty space on x-ray. Your doctor may x-ray both limbs to look for differences to help indicate an injury.

Sometimes an MRI or CT scan is needed to get better detail of the fracture or to look for associated injuries.

Signs and Symptoms

Symptoms of growth plate fracture may include any one or more of the following:

• Persistent or severe pain, swelling, and/or bruising
• Difficulty or inability to move or bear weight on the injured limb
• Visible deformity
What is the treatment for growth plate fracture?

Treatment depends on the classification or type of growth plate fracture. Many factors influence treatment – such as whether the fracture is displaced or non-displaced, stable or unstable. Other considerations include age, overall health, and any other injuries associated with the fracture. Your provider will help determine the best treatment plan for your specific injury.

- **Splinting or Casting** – if the fracture is not displaced, or has been set and needs immobilization, a splint or cast is used. Splints may be pre-fabricated or custom-made and can usually be removed for hygiene purposes. Casts cannot be removed, may or may not be waterproof, and if not waterproof need to be covered with a plastic bag when showering or bathing.

- **Surgery** – fractures that are displaced or unstable may require surgery to properly set and stabilize the bone as it heals. Surgery may include using plates, screws, and/or pins. Your orthopaedic surgeon will determine the most appropriate form of fixation for your individual case.

Children’s bones heal very quickly. Immediate diagnosis and treatment is necessary to prevent stunted growth of the bone. Risks of treatment should be discussed with your provider.

Managing Pain and Swelling

It is not unusual to have pain and swelling while recovering from a growth plate fracture. Here are some suggestions to help manage symptoms:

**Elevation**
Keep your injured body part elevated as much as you can for the first several days after an injury or surgery, then as needed, to minimize swelling. This will also help decrease pain.

- **For arms** – elevate above your heart.
- **For legs** – elevate at or slightly above your hip.

**Ice**
Can be used 3-4x/day to help manage pain and swelling. Use a cold pack or bag of crushed ice for 15-20 minutes at a time. It can be difficult to ice over casts or bulky dressings, but you can try putting the ice just above or below the cast or dressing to see if this helps your pain.

**Safety Note**: If you had any anesthesia, do not use ice until your injured limb has “woken up”.

**Medication**
Over-the-counter medicines such as acetaminophen (Tylenol®), ibuprofen (Advil®), or naproxen (Aleve®) may help reduce pain. In some cases, your doctor may prescribe other pain medicine. Take medication as instructed to help minimize your pain.

**Move unaffected joints**
Joints that are not included in your splint or cast should be moved through their full range of motion several times per day. Feeling tightness, stiffness, pulling, stretching, and/or discomfort as you start to move is normal.

**Resume daily routine as tolerated**
This includes schoolwork and other light activity. Increase activity as tolerated, avoiding things that increase pain at the fracture site. Drink plenty of water and eat healthy meals to help boost your body’s healing power.
What is the prognosis for bone growth in the involved limb after a growth plate fracture?

Approximately 85% of growth plate fractures heal with no lasting effects. The following factors influence whether an arrest of bone growth occurs:

- Severity of the injury
- Child's age at time of injury
- Which growth plate or bone is affected
- Type of growth plate fracture

What happens after cast or splint removal?

Once your provider determines the bone is clinically healed, the splint or cast is taken off and you can begin to move and use your limb.

Your provider will let you know if there are any activities you should avoid and for how long – for instance, returning to sports or play.

Salter-Harris Classification of Growth Plate Fractures

This system divides growth plate fractures into different categories based on the type of damage to the bone. It has been the standard used since the 1960’s.

- **Type I** – This fracture goes across the growth plate, not into the bone, so may or may not show up on x-ray. Typically has excellent outcomes.
- **Type II** – Most common growth plate fracture.
- **Type III** – Rare. Usually occurs at the lower end of the tibia bone.
- **Type IV** – Surgery is frequently needed to restore joint surface and align the growth plate.
- **Type V** – Uncommon and usually occurs at the knee or ankle. Surgery is always required and prognosis is poor. Stunted growth of the bone is almost inevitable.

Image adapted from UptoDate
Growth Plate Fractures

What happens after surgery?
Immediately after surgery you will be placed in a bulky post-operative dressing. This dressing must stay clean and dry until your first post-op appointment to minimize the risk of infection. Your surgeon will provide more information about what type of hardware was used and what to expect after surgery.

Will I need therapy?
Not all growth plate fractures require therapy to regain motion and function. However, many children benefit from formal instruction in rehabilitation exercises with a hand therapist or physical therapist to regain range of motion, strength, and function. Most children who have had surgery to repair a growth plate fracture will see a therapist as part their recovery.

The number of therapy appointments needed will depend on how quickly you regain range of motion and function. Your therapist can give you a better idea of how much therapy you may need during your first appointment.

Consistent follow-through with a home exercise program is a vital part of your recovery process and will help ensure the best possible outcomes.

Additional Suggestions:

- **Showering and bathing** – If you had surgery or are in a non-waterproof cast, put a plastic bag over your injured limb to keep the dressings or cast dry. Your doctor or therapist will tell you when it’s safe to get your arm or leg wet in the shower or bath.

- **Grooming and hygiene** – If your arm or hand has been injured, use pump containers for soap, lotion, and shampoo/conditioner; use pre-strung flossers to floss your teeth; keep caps loose on bottles and tubes to make them easier to open.

- **Dressing** – Dress your injured arm or leg first; avoid tight sleeves or pants; slip your belt through belt loops before putting on pants; use slip-on shoes or keep them tied loosely so you can slide your feet in easily. In the winter, use a thick sock or hat to keep your hand or foot warm when you’re outside.

Additional resource for information on growth plate fractures

- American Academy of Orthopaedic Surgeons – [aaos.org](http://aaos.org) or [orthoinfo.org](http://orthoinfo.org)

The content provided here is not intended to be a substitute for professional medical advice, diagnosis or treatment. Always seek the advice of your physician or another qualified health provider with any questions you may have regarding a medical condition.