OVERVIEW
Your child has been diagnosed with a fracture of the lower part of the humerus (upper arm bone) involving the medial epicondyle. This is the bony prominence at the inside (toward your body) of the elbow. Non-displaced and mildly displaced fractures can be treated with a cast for 4-6 weeks. If the fracture is significantly displaced, it is treated with surgery to reposition the displaced fragment and stabilize it with pins or a screw, followed by a cast for 3-4 weeks. Pain typically resolves after 5-10 days and healing is usually pretty good by 6 weeks. Stiffness is not uncommon, but most patients recover pretty good motion and return to activities by 8 weeks.

BACKGROUND
The medial epicondyle is the site of attachment for the muscles in the forearm, primarily responsible for flexing the wrist. The epicondyle is also the attachment for the joint capsule and ligaments that support the medial side of the elbow joint. The ulnar nerve runs down the back of the elbow in a groove directly behind the medial epicondyle.

This fracture occurs most commonly in the 10 to 14 year old age group. It is a less common type of elbow fracture, which primarily occurs in children with open growth plates. The fracture occurs through a cartilage plane between the developing ossification center in the epicondyle and the main part of the humerus. The fracture occurs partially through growing cartilage, but if the fracture heals with good alignment, growth problems are uncommon. Many of these fractures show little or no displacement. Because this is an area of growing bone, a little displacement is acceptable and the bone will grow and remodel with time.

The usual mechanism is a fall onto the arm which bends it to the side. Sometimes the fracture is an associated with a posterior dislocation of the elbow joint. Occasionally, the injury can occur with a very forceful throwing motion or forceful flexion of the wrist. This is more common if there is preceding symptoms from a repetitive activity, such as a baseball pitcher.

If the fracture is associated with a dislocation of the joint, there will also be stretch injury to the joint capsule and ligaments. If this occurs, stiffness can be problematic. If there was a dislocation, the epicondyle fracture fragment can become entrapped within the joint space.
CLINICAL PRESENTATION AND DIAGNOSIS
At the time of injury, there is usually a sharp pain or pop at the elbow. If the pain is severe, children are brought to the emergency department. This is especially true, if there is an associated dislocation of the elbow joint. Some fractures are less dramatic and the pain and swelling may be less. Children are often brought for evaluation when the pain and swelling persist for more than a few days.

X-rays usually demonstrate the fracture, but may be difficult to verify depending on the degree of bone development. Sometimes, X-rays of the other (normal) elbow are helpful to provide a good comparison. X-rays are used to identify the fracture and assess displacement and joint alignment.

TREATMENT
Fractures with little or no displacement and good joint alignment are generally treated with a splint, initially used full time. After pain improves, it is beneficial to remove the splint for gentle motion to minimize stiffness. Pain will usually improve in 1-2 weeks, but healing takes at least 6 weeks before returning to gym or sports, especially throwing sports.

Mildly displaced fractures are usually treated in a similar fashion. There is controversy, about how much displacement constitutes "mild" displacement and it can be difficult to accurately measure the displacement. In general, studies show displacement less than 5 mm heals and remodels very well. Some studies have shown displacement less than 10 mm usually do well. Older textbooks recommend accepting more than 10 mm and often patients do well. However, displacement more than 5 mm seems to increase risk for poor healing, joint instability, or irritation of the ulnar nerve.

Fractures are associated with an elbow dislocation need to have the elbow reduced promptly. This is often done at the time of injury or in the emergency department. Subsequent X-rays are done to assess for fractures and joint alignment. If the fragment is trapped in the joint, treatment is usually operative. In the operating room, it is reasonable to try manipulating the arm without making an incision to achieve reduction. If unsuccessful, an incision is made the fragment removed from the joint and restored to a more normal position, often it is held in place with a screw or pins as with displaced fractures.

Displaced fractures are usually treated with open reduction and internal fixation. "Open" means that an incision is made to expose the fracture. "Reduction" means that the deformity at the fracture site is reduced as the fracture is put back in place. "Internal Fixation" means that pins are used to hold the fracture in the proper place. During surgery, the ulnar is usually identified and protected while the fracture fragment is repositioned and stabilized with a screw or pins.
Younger patients are usually stabilized with percutaneous pins. These pins are put in through the skin and across the fracture site. The pins are protected with padding and a temporary cast is applied. After 5-7 days, an X-ray is obtained to confirm that the fracture is still properly aligned. The temporary cast is then converted into a solid cast. After 3-4 weeks, the cast and pins are removed. The arm is rested with a sling and skin care and motion exercises are started. After 6 weeks, the fracture is well healed and activities can be gradually increased.

Displaced fractures in patients close to skeletal maturity are often fixed with a single screw. Screw fixation usually provides good stability and allows for early motion to minimize stiffness. A splint is applied at the time of surgery. After 1-2 weeks, the splint is removed and an X-ray obtained to confirm that the fracture is still properly aligned. If the incision and X-rays look good, a removable splint or sling is used to rest the arm and skin care and motion exercises are started. After 6 weeks, the fracture is well healed and activities can be gradually increased.

PAIN MANAGEMENT
Fractures hurt and appropriate pain management is important. With good pain management, children will eat better, sleep better, heal better, and have less apprehension when they have the cast removed and start working on motion. Elements of pain management include treating the injury, resting the elbow, elevation to decrease swelling, pain medications, and other supplementary measures.

Ibuprofen and Lortab, when given together, work well and provide good pain relief for most children. It is worthwhile to set an alarm (even in the middle of the night) to stick to the schedule. It takes a few minutes to wake up and take the medicine, as opposed to letting pain build up and spending hours trying to get it under control. Ibuprofen is a non-steroidal anti-inflammatory medication, which has few side effects and low risk. For best effect, it should be given every 8 hours for a least 5 days and as long as needed after that. Lortab is a mild narcotic medication, which will provide better pain relief, but also has more side effects, which often include sleepiness, nausea, constipation, etc. Pain relief is best and side effects are minimized if dosing is adjusted based on the pain severity. Start by giving a full dose every 4 hours. If pain relief is good, continue at the same dose or decrease the dose by half. If pain relief is not adequate, increase the dose. In summary, give ibuprofen every 8 hours for 5 days and on top of the ibuprofen, give the Lortab every 4 hours, adjusting the dose based on the level of pain. Most kids are off the Lortab within 2-3 days and off the ibuprofen by 5-7 days. Children usually do very well are usually pain free within 5-10 days.

CAST CARE AND ACTIVITY
Cast care is also important. A partial cast or splint is used initially to allow for swelling. It is usually put on
with an ACE wrap, but it is not meant to be adjusted. If the temporary cast starts getting loose, tape should be applied to reinforce it as needed.

For the first 48 hours, the elbow should be elevated to minimize swelling and pain. It is possible for the swelling to increase to the point that the cast or the skin may get too tight. This is a serious problem. The first and most reliable sign of trouble is that the pain is not well controlled. If pain is severe and increasing over 2-4 hours despite elevation and appropriate pain medicine, it is very important to return to the hospital. Do not remove or loosen the cast, as this can make things worse.

It is also important to keep the cast clean and dry. Sponge baths are recommended to minimize risk of getting the cast wet in a shower or tub. While a plastic bag may protect the cast in the tub or shower, if the plastic bag leaks and the cast gets wet, it typically takes hours and hours to get the cast replaced. The time and risk you take using a plastic bag to get into the tub are far greater than just doing a nice quick and safe sponge bath.

While in the cast, it is important to take it easy. The cast will protect the arm, but it is not strong enough for gym or sports. There should be no running, jumping, climbing, and definitely no falling. This includes staying off bikes, skates, skateboards, scooters, trampolines, monkey bars, slides, swings, etc. A general rule of thumb is to keep 2 feet on the ground at all times.

EXPECTED OUTCOMES AND POTENTIAL COMPLICATIONS
Most medial epicondyle fracture heal well and children are able to return to full activities. Stiffness is not uncommon with this type of fracture, but some loss of motion is usually well tolerated and rarely causes long term issues. Stiffness is more common when there was an associated fracture or when open reduction and internal fixation was required. Because the fracture occurs through a plane of cartilage, there can be changes to the bone growth. If the fracture is not adequately rested/protected, the injury may heal with fibrous tissue instead of bone. This is referred to as a “non-union”. A non-union may or may not be symptomatic. If there is no pain or limitations, no treatment is needed. If symptomatic, surgery can be done. Fractures treated with open reduction and internal fixation are at risk for incison problems, infection, and problems with irritation over the head of the screw. An effort is made to bury the head within the bone, but this can weaken the fixation and redisplacement can occur. If the screw head is prominent, it can be removed once the fracture is well healed. If there was a dislocation of the elbow, there can be instability with stress. This is possible, but uncommon and generally the joint is too stiff and not too loose. For some patients, there can be problems with the ulnar nerve, either at the time of injury or later depending on healing. If there is numbness or weakness at the time of injury, recovery usually occurs with time, but slowly. Provided recovery progresses over the first 3-6 months, usually no treatment is needed and full recovery progresses over the first year. Sometimes, scarring can develop around the nerve during the healing process, this can lead to irritation of the nerve and cause a delayed or late onset of pain, numbness, or weakness. If this occurs, surgery to release scar tissue or to reposition the nerve may be appropriate.
MORE INFORMATION
Further information can be obtained on the internet. Your local public library can help you explore these sources if you are interested. Two good sites for expert and peer reviewed information are the American Academy of Orthopedic Surgeons at www.aaos.org and www.emedicine.com.

FEEDBACK
If you have questions or comments, please contact the office or submit them to the web site at www.pedortho.com.