**OVERVIEW**
Your child has been diagnosed with Madelung’s Deformity. There is a growth disturbance in the wrist that results in bowing of the radius and frequently a prominent distal ulna, creating a downward bend with a bump on the back of the wrist. This condition often runs in families. The cause is not clear. Some people do very well and have no limitations or problems. However, many people develop soreness in the wrist with activity or do not like the look of the wrist. Surgery can be done to improve the alignment, but cannot make the wrist normal.

**BACKGROUND**
This condition was first described in 1878 by Dr. Otto Madelung. The cause of this condition is not fully known. There is a growth disturbance in the center and palm side of the wrist that is associated with a thick fibrous band that crosses the wrist joint, called Vicker’s ligament. This ligament may be the cause of the growth disturbance, but it may also be the result of it. There is clearly a genetic component with autosomal dominant inheritance, but with girls tending to show more involvement. The frequency of this condition in the population is not known.

Madelung’s deformity can sometimes be related to trauma or a problem with bone growth and quality. After repetitive trauma (as in gymnastics) or following a single more severe injury, there can be a disruption of growth in the bone at the wrist. Bone growth and quality problems are called bone dysplasias, and there are several associated with this deformity, which include multiple hereditary osteochondromatosis, Ollier’s disease, achondroplasia, multiple epiphyseal dysplasia, and Leri-Weill dyschondrosteosis. Leri-Weill dyschondrosteosis is a mesomelic dwarfism with stature less than <25th percentile with short forearms and lower legs.
**DIAGNOSIS**

Madelung’s deformity is discovered most often in adolescent girls who present with pain, decreased range of motion, and deformity. Sometimes the condition goes unrecognized until x-rays are obtained for a fall with a mild injury to the wrist. Usually, the wrist injury will improve with appropriate treatment. Symptoms related to Madelung’s deformity usually begin during adolescence in girls aged 10-14 years. Patients may recognize increasing deformity and pain in the wrist with decreased range of motion. On examination, the hand usually appears below the forearm when the arm is held horizontally with the palm downward. There is usually a bump at the lateral side of the wrist. Range of motion is decreased, with a limitation of supination, extension, and radial deviation. Pronation and flexion usually are normal.

**TREATMENT**

Treatment is not needed if the wrist is functioning well and does not hurt. If pain develops related to an injury, it should be treated like an injury with rest, ice, elevation and protection as needed in a splint or cast. There is evidence that pain can develop related to tension within Vickers ligament and splinting is not felt to be effective for this type of pain. However, most of the time, resting and protecting the wrist with a removable splint will usually relieve joint irritation from over-activity. Patients may eventually decrease their manual activity levels to a point that will keep their symptoms manageable without surgery.

Operative treatment is indicated for relief of persistent or activity limiting pain and for cosmetic improvement. Reduced motion is usually not improved with surgery. There are several options for surgical treatment. The goals of surgery are to reduce pain, improve alignment, and maintain joint support and congruency. Options can be divided into procedures that correct the short radius, procedures that shorten the relatively long ulna, and those that address both. The most common approach is to release Vicker’s ligament, do an osteotomy of the radius to correct the angulation, and then remove a segment of ulna to improve the joint congruity. In younger children with remaining growth, there is procedure called a Vickers physiolysis, which attempts to reestablish normal growth by removing the abnormal area and hoping for an improved growth pattern. This can only be done on children with enough growth remaining. Sometimes the deformity can be addressed with a method called the Ilizarov technique, which uses an external...
fixator and slow correction of the distal radius to make a more congruous joint. Postoperative management is dependent upon the surgery, but typically 6 to 8 weeks of cast immobilization is necessary following an osteotomy of the radius or ulna to allow for bone healing. Hand therapy is necessary if the patient is not able to regain motion on their own after 2-3 months without restrictions.

**EXPECTED OUTCOMES**

Many patients do well without treatment or with occasional splinting if the wrist is sore. When patients are surveyed after many years, mild soreness is not uncommon, but occupation and other activities are usually not limited. Patients are generally satisfied with non-operative treatment.

If surgery is elected, the goals are primarily pain relief and correction of the cosmetic deformity. A secondary goal is to increase range of motion. Most patients who undergo surgery attain both primary goals. Range of motion usually is only moderately improved at best. It should be noted that pain relief can be substantial following release of Vickers ligament. However, surgery is not without potential problems including wound infections, nerve problems, and recurrent deformity after continued growth. Historically, surgical treatment has been a closing wedge biplane osteotomy in conjunction with an ulnar shortening osteotomy of the distal ulna. Recently, a new procedure that addresses the deformity with a dome-shaped osteotomy, release of Vickers ligament, and realigning the joint without an ulnar procedure has been successfully used. This procedure shows great promise.

**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](http://www.aaos.org) and [www.emedicine.com](http://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](http://www.pedortho.com).