



Orthopedic Care Center Hand and Orthopedic Upper Extremity Program Madelung's Deformity

Whether your child or loved one suffers a broken arm, a sports-related injury or the most complex spine condition, The **Orthopedic Care Center** at Children's Hospital Boston is committed to providing comprehensive and compassionate care. Established in 1903, we are among the world's most experienced pediatric orthopedic programs, treating a high volume of some of the most complex orthopedic conditions. And with 10 specialty clinics, we are the largest in the country. We are also one of the busiest. Each year, our staff attends to about 80,000 patient visits and conducts about 5,000 surgeries. In 2010, we were ranked #1 in pediatric orthopedics by *U.S. News & World Report*.

The **Hand and Orthopedic Upper Extremity Program** provides comprehensive care for infants, children and adolescents with a wide range of complex upper limb conditions. Multidisciplinary care involving occupational and physical therapy, splinting, casting and reconstructive surgeries is provided for congenital, neuromuscular, sports-related oncologic, traumatic or post-traumatic conditions.

The term "Madelung's deformity" refers to a condition of the upper extremity characterized by abnormal growth and development of the end of the radius, one of two bones of the forearm. Due to abnormal growth, the end of the radius typically grows palmarly and radially (i.e. in the direction of the palm and of the thumb). Because the other bone of the forearm -- the ulna -- is not affected and continues to grow, the end of the ulna becomes quite prominent on the dorsum, or back, of the wrist.

What causes Madelung's deformity?

The exact etiology (cause) of Madelung's is unknown. Most cases occur sporadically, without any defined inheritance pattern or known genetic association. Some believe that Madelung's deformity is due to an abnormal growth plate at the end of the radius and/or an abnormal ligament connecting the end of the radius to the small bones of the wrist (the so-called "Vicker's ligament"). Furthermore, there are some cases in which prior trauma or injury to the growth plate at the end of the radius may cause a deformity similar to Madelung's.

How common is Madelung's deformity?

The exact incidence of Madelung's is unknown. Typically, females are more commonly affected than males. Usually the changes are bilateral, seen in both wrists. Though the deforming forces may be present from birth, often patients are asymptomatic and there are no noticeable changes in the appearance of the wrist until patients are in their early teenage years. Madelung's deformity may also occur in the setting of associated syndromes, such as Leri-Weill dyschondrosteosis and nail-patella syndrome.

How is Madelung's deformity diagnosed?

Madelung's deformity is diagnosed by treating physicians after a thorough medical history and careful physical examination. X-rays are used to confirm the diagnosis and to identify the extent of bony involvement.

Due to the association with other clinical syndromes, genetic testing may be performed.

How is Madelung's deformity treated?

Fortunately, many patients with Madelung's deformity have no pain or limitations in activities of daily life. In these situations, no treatment is necessary, though serial examinations and X-rays may be recommended to monitor the progression, if any, of the deformity.

In patients with pain, functional limitations, or progressive deformity, surgical treatment may be recommended. In general, the goals of surgical treatment are to reposition and stabilize wrist to allow for painless function and prevention of recurrent deformity. The type of surgery is dependent upon the patient's age, degree of deformity, functional limitations, and general health.

Treatment options include releasing the soft-tissue or bony tethers on the radius ("physiolysis"), cutting and realigning the end of the radius bone ("corrective ostectomy"), ulnar shortening osteotomy, or even removing the prominent end of the ulna bone ("the Darrach procedure"). Furthermore, wrist arthroscopy may also be performed in some patients to evaluate and treat cartilage injury within the wrist joint.



Patient with Madelung's deformity.

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