



Orthopedic Care Center Hand and Orthopedic Upper Extremity Program Radioulnar Synostosis

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 "radioulnar synostosis" is used to describe a bony or soft tissue connection between the radius and ulna, the two bones of the forearm. This abnormal connection may be congenital or may occur following fracture or other trauma to the forearm.

What causes congenital radioulnar synostosis?

During in utero development, the upper limb develops between the 5th and 8th week of gestation. Initially, the radius and ulna are connected. Separation between these two bones occurs by a process known as "apoptosis," or programmed cell death, and the individual radius and ulna bones are formed. Congenital radioulnar synostosis is caused by failure of separation of these bones during this time.

How common is congenital radioulnar synostosis?

The exact incidence of this condition is unknown. Males and females are equally affected, and over half of patients will have bilateral involvement. While most cases of congenital radioulnar synostosis occur spontaneously, approximately one in five cases is associated with a family history of the same condition. Congenital radioulnar synostosis can also occur as part of an underlying syndrome or with other developmental abnormalities.

How is congenital radioulnar synostosis diagnosed?

Congenital radioulnar synostosis is diagnosed by treating physicians after a thorough medical history and careful physical examination. X-rays or CT scans may be used to confirm the diagnosis. The diagnosis of congenital radioulnar synostosis is often made late in childhood or adolescence, as pain is rarely a complaint and much of elbow flexion and extension is preserved. In relatively mild cases, patients and families may only notice subtle differences in forearm rotation. With more significant involvement, forearm rotation is markedly limited and the diagnosis is typically made at an earlier age.

How is congenital radioulnar synostosis treated?

In general, treatment recommendations for congenital radioulnar synostosis are made based upon the degree of functional loss associated with loss of forearm rotation. Some patients with unilateral involvement in whom the forearm lies in a functional position never require surgical treatment. Others, however, with bilateral involvement and/or in whom the forearm is fixed in a position which compromises function may benefit from surgery. Surgery can be performed either to remove the abnormal soft tissue or bony connection or to position the forearm in a more functionally acceptable position. While it is rare that a "normal" joint between the radius and ulna can be reconstructed, some patients obtain significant improvement in function from osteotomy procedures, in which the forearm bones are surgically repositioned.



Elbow radiographs of a congenital radioulnar synostosis.

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