



# Orthopedic Care Center Hand and Orthopedic Upper Extremity Program Thumb Duplication

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.

## What is thumb duplication?

Thumb duplication Also referred to as pre-axial polydactyly, radial polydactyly, or supernumerary thumbs, the term thumb duplication refers to a congenital condition of the upper extremity characterized by the presence of two thumbs on one hand. The thumbs may be separate or appear fused. (See Figure)

It is important to recognize that the term - thumb duplication is somewhat of a misnomer. Rather than having two normal thumbs, patients with thumb duplication typically have thumbs that are smaller and less developed than normal. Furthermore, the muscles, tendons, ligaments, blood vessels and nerves are often divided between each of the abnormal thumbs. For this reason, many believe that the term split thumb is more appropriate. For the purpose of this brief discussion, we will refer to this condition as pre-axial polydactyly.

## What causes pre-axial polydactyly?

The exact cause of pre-axial polydactyly is unknown. Most cases occur sporadically during fetal development, without any defined inheritance pattern or known genetic association. In some instances, there may be a hereditary predisposition, particularly in the presence of a triphalangeal thumb, (i.e., a thumb with three bones instead of two).

## How common is pre-axial polydactyly?

It is estimated that pre-axial polydactyly occurs in 1 out of every 1,000 live births. In general, males are more commonly affected than females. Usually the changes affect only one hand. Pre-axial polydactyly tends to occur more frequently in Caucasians, Asians, and Native Americans.

## How is pre-axial polydactyly diagnosed?

Pre-axial polydactyly is diagnosed by physicians after a thorough medical history and careful physical examination. X-rays are used to confirm the diagnosis and to identify the pattern of bone involvement.

## How is pre-axial polydactyly treated?

Surgery is necessary to create a single, functioning thumb. Typically this is performed around one year of age, before the development of pinch and fine motor function. As mentioned above, simply removing one of the two thumbs will not suffice, as each of the split thumbs has elements that need to be combined to recreate the best possible thumb.

As a result, surgical treatment usually entails removing the bony elements of the smaller thumb and reconstructing the remaining skin, tendons, ligaments, joints, and fingernails to form a new thumb. Even in the best of situations, the resulting thumb may smaller than the child's other, normal thumb. Furthermore, given the possibility of recurrent deformity in a small percentage of patients, additional operations may be needed later in life.



Example of thumb duplication (pre-axial polydactyly.)

## Clinical Team

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