



Orthopedic Care Center Hand and Orthopedic Upper Extremity Program Thumb Hypoplasia

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 hypoplasia?

Thumb hypoplasia refers to a thumb that is unusually small or underdeveloped. In general there are four types of thumb hypoplasia:

- The thumb is slightly smaller than normal, but all of its structures - the bones, tendons, ligaments, muscles and joints - are normal.
- The thumb is small and there are often minor abnormalities in the tendons and muscles within the thumb. The middle joint of the thumb (metacarpophalangeal joint) is unstable, causing the thumb to wobble. The web space between the thumb and index finger is tight and restricts movement.
- The bones of the thumb are abnormally small. There are abnormalities in many of the thumb's muscles along with a range of problems in the joints of the thumb and an abnormal tight web space between the thumb and index finger.
- The thumb is "floating" with no bony support and is attached to the hand by only skin and soft tissue.
- In some instances, the thumb may be absent altogether (aplasia).

What causes thumb hypoplasia?

The exact cause of thumb hypoplasia is unknown.

How common is thumb hypoplasia?

Thumb hypoplasia is rare, occurring in approximately 1 out of every 100,000 births. It can occur by itself or may be associated with other conditions where the radial side (thumb side) of the forearm does not develop properly. In some cases, both the right and left hands may be affected.

How is thumb hypoplasia diagnosed?

Thumb hypoplasia is usually detected during your child's first neonatal exam. Detection of this deformity will prompt your child's doctor to look for other deformities that are sometimes associated with this condition. An x-ray will also be used to look at the internal structures of the thumb. Other tests will depend on whether the doctor believes the thumb deformity is associated with another condition.

How is thumb hypoplasia treated?

Since the thumb is responsible for roughly half of our hand function, children born with underdeveloped thumbs need to be closely evaluated. In general, surgery is recommended when the condition impairs hand function. Surgical procedures are typically performed when your child is between 6 and 18 months old.

The following is a general description of options for treatment:

Occupational therapy— If your child has a mild case of thumb hypoplasia where the thumb is slightly shorter or the web space between the thumb and index finger is slightly tighter than normal, surgery may not be necessary and occupational therapy is recommended.

Reconstruction of the thumb— This may involve one operation to (a) release the tight web space between the thumb and index finger using skin grafts, (b) stabilize the middle joint through ligament reconstruction and (c) improve function and stability by transferring a tendon from another part of the hand.

Pollicization — This procedure is used when your child has no thumb or when the hypoplasia is more severe. The operation involves creating

a functional thumb by transferring another finger (usually the index) to the thumb position. This may seem drastic because a normal index finger is being sacrificed. However, since thumb function is crucial to overall hand function, a three fingered hand with a thumb will enable your child to have considerably better hand function than a four fingered hand with no thumb. Surgeons and parents also find that a hand with one thumb and three fingers can actually be quite acceptable in appearance. This operation has an excellent track record and its results are very reliable. In cases where the index finger is normal and functional, a very good thumb results. It should be noted however, that the decision to undergo this procedure relies heavily on the condition of your child's index finger. If the index finger cannot move independently or has other problems, pollicization may not be recommended.



Example of a Blauth type IIIA hypoplastic thumb.

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