

Congenital Hand Differences

The hand is formed at between 4 and 8 weeks of gestation. When a baby begins to form *in utero*, their hands are shaped like mittens. As the baby grows, the hand divides and fingers form. When babies are born with differences in the anatomy of the hand, it is not the result of anything the mother ate or did during pregnancy.

Answers to Frequently Asked Questions about Congenital Upper Limb Differences

- 1) Nothing special needs to be done during pregnancy, delivery or early infancy for the congenital upper limb difference.
- 2) They can bring the baby in for an in-person consultation 3-6 months after delivery.
- 3) No surgical intervention is expected during the first year of life and possibility ever.
- 4) This condition is not painful and the limb can be used to support full body weight.
- 5) No special precautions need to be taken with the affected limb; they are not more prone to injury.
- 6) The upper limb difference will not delay other developmental milestones like sitting, crawling or walking.
- 7) Early intervention and intermittent occupational therapy can be helpful when the baby is older if they are having difficulty with specific age-appropriate upper extremity tasks.
- 8) The cause of the congenital limb difference is often unknown and risks to future offspring are usually low, but these questions are best address by consultation with a geneticist after birth.

Symbrachydactyly

Symbrachydactyly is a rare congenital hand condition in which a child is born with abnormally short fingers that may be webbed, misshaped or missing. Usually, only one hand is affected; the other hand appears normal.



Most children with symbrachydactyly have a complete thumb, but in some children the thumb may be short or absent. The hand may not function well, and the bones, muscles, ligaments, and nerves of the hand are also often affected.

Symptoms of symbrachydactyly are varied, but include:

- Short fingers; bones in the fingers may be smaller than normal or missing entirely
- Small nubs of skin and soft tissue where fingers should be
- Fingers that are webbed or conjoined (syndactyly)
- Finger stiffness and limited use of the hand
- Short bones in the hand (metacarpals)
- An X-ray can confirm the diagnosis and show which bones are affected in the hand, and sometimes in the wrist and forearm.

Treatment:

- An occupational therapist can teach your child how to make the best use of their affected hand, sometimes using their typically developing hand to assist with some tasks.
- With hand therapy, children with mild symbrachydactyly can learn to perform many everyday activities such as getting dressed, feeding themselves and writing. Occupational therapy may evolve over time to include new age-appropriate tasks as your child grows.
- The nubbins can be excised if the parents desire; this should be considered if there is repeated irritation or injury or if they are considering a prosthesis. It is preferable to do the surgery when the patient is around 1 year of age or older when the child is bigger and anesthesia is safer.
- There are advantages and disadvantages of prosthetic fitting in children with limb deficiencies. They tend to accept the prosthesis better if fitted early on in life with a passive prosthesis. They can then be fitted with an active prosthesis when old enough to learn how to use one. Many children with this type of deficiency do not end up using the prosthesis because they are quite functional without.
- Toe transfers can be done after a year of age to the hand. This procedure would add "fingers" to the hand that would have active motion and sensibility. This is a microvascular procedure requiring 8-12 hours of surgery and would leave a permanent deficit in the foot. Once the foot donor site is healed, the child should be able to walk and even run. However, there are significant risks with the surgery, including total loss of the the transferred toes.
- Digital distraction lengthening can be done when the bones are large enough, perhaps at age 5-7 years to add length to the proximal phalanges of the central digits. Additional bone graft may be necessary after distraction.

Syndactyly

Syndactyly is the medical term for webbed or conjoined fingers or toes. Syndactyly occurs while a baby is still developing in the womb. During the sixth to eighth week of development, an infant's fingers and toes separate. Syndactyly occurs when the digits fail to fully separate into individual fingers and toes.



Syndactyly can be classified as:

- Simple, where fingers are joined by skin and soft tissue
- Complex, where the fingers are joined by bone
- Complete, where the whole fingers are fused together to the tips
- Incomplete, when fingers are joined only partially

Treatment:

- Syndactyly reconstruction involves separating the fingers and recreating the webspace with skin flaps and frequently skin grafts.
- When multiple web spaces are affected, stage the procedures separated by 3+ month intervals is recommended to avoid compromising circulation to the affected fingers.
- It is preferable to do these surgeries when the patients are around 1 year of age or older when the child is bigger and anesthesia is safer, although we occasionally need to start reconstruction as early as 6 to 9 months of age if affected fingers start to become angulated or rotated.
- Depending on how much skin is needed for skin graft, it can be taken from the lateral groin, elbow crease, or the lower abdomen, and this will leave a separate scar at the donor site.
- The hand and arm will be enclosed in a dressing or cast for approximately 2 weeks after the surgery.