

Reconstruction of a Supinated Hypoplastic Thumb with Combined Huber Transfer and Derotation Osteotomy: A Case Report

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Abstract

The use of the abductor digiti minimi transfer to restore opposition in patients with hypoplasia of the thumb has been widely described in the literature. It has been found to be effective in restoring abduction, but less so in restoring the rotational component of opposition. In cases where there is concomitant supination of the thumb, abductor digiti minimi transfer alone would not result in a good pinch as the thumb pulp is rotated away from the opposing finger. We present a case of a 6-year-old girl with a hypoplastic supinated left thumb which resembled a digit. There was also hypoplasia of the index finger. The hand had poor function as a result of lack of opposition of the thumb. The thumb function was restored by combining a derotational osteotomy (80°) with the abductor digiti minimi transfer originally described by Huber. Patient was able to hold small object using key pinch and she could pinch with opposition of the thumb pulp to the middle, ring and little finger pulps when reviewed 2 years post-surgery.

Ann Acad Med Singapore 1999; 28:875-6

Key words: Congenital abnormal thumb, Corrective osteotomy, Tendon transfer

Case Report

A 6-year-old Chinese girl presented with a deformity of the left thumb since birth. Her father has a similar deformity. She had an uneventful delivery, with no birth trauma. Examination revealed a small left thumb with mild metacarpophalangeal joint instability and hypoplasia of thenar muscles. There was minimal first web contracture, and no loss of length. The thumb was supinated, resembling a digit (Fig. 1A). There was no opposition. The index finger is hypoplastic and ulnar deviated. The proximal interphalangeal joint of the index had 30° to 90° of motion, the metacarpophalangeal and the distal interphalangeal joints of the index had normal range of motion. She was able to form a fist with mild scissoring of the index finger. The wrist and elbow were normal. Radiographs revealed intact skeletal structures (Fig. 2A). Electromyograph (EMG) revealed absent signals in the thenar muscles. The median nerve was intact.

Reconstruction

Derotation osteotomy and Huber's opponensplasty were performed. An incision was made along the lateral aspect of the first metacarpal. Pronation osteotomy (80°) was performed at midshaft of the first metacarpal and fixed with one Kirschner wire and one interosseous wire (Fig. 2B). The abductor digiti minimi was detached from its insertion,¹ mobilised along with its neurovascular

bundle and passed under the thenar skin to insert into the abductor pollicis brevis using Pulvertaft² tendon weaving technique. A thumb spica was then applied for 6 weeks. Widening of the first web space was not needed in view of minimal first web contracture.

The patient was reviewed 2 years after the procedure. Abduction and opposition of the left thumb were satisfactory with near normal power. Opposition of the pulps of the thumb and the index finger was not possible due to abnormality of the index finger. However, she was able to hold small object with the thumb and index finger using key pinch (Fig. 1C). She could pinch with opposition of the thumb pulp to the middle, ring and little finger pulps (Figs. 1D to 1F).

Discussion

Grade 2 hypoplastic thumb as described by Blauth³ is smaller and less stable than normal. It is characterised by adduction contracture of the first web space, instability of the metacarpophalangeal joint and hypoplasia of the thenar muscles. The skeleton, though usually small, has normal articulations. Reconstruction of the grade 2 thumb as recommended by Littler involves transfer of an active motor, widening and deepening of the contracted first web space, and stabilisation of the metacarpophalangeal joint.⁴ This active motor can either be the abductor digiti minimi or superficialis of the ring finger." The use

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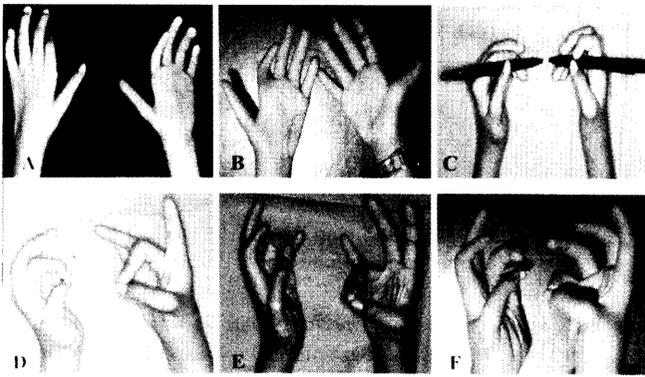


Fig. 1. Prior to surgery, the left thumb was small and supinated, resembling a digit (A). Reconstruction was performed using combined Huber transfer and derotation osteotomy (B). She was able to hold small object with the thumb and index finger using key pinch (C) after surgery. The left thumb was able to pinch with opposition of the pulp of the thumb to the pulps of the middle (D), ring (E) and little fingers (F).

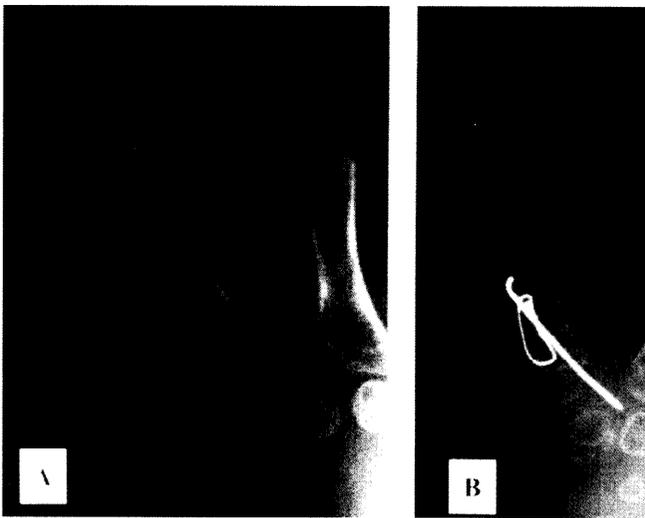


Fig. 2. Radiographs showing intact skeletal structures (A). The derotation osteotomy was fixed with a Kirschner wire and an interosseous wire (B).

of the abductor digiti minimi transfer to restore opposition has been widely described in the literature.⁶⁻⁹ In addition, it also provides some bulk to the thenar region, resulting in better cosmesis. However, while it is effec-

tive in restoring abduction, it is not as effective in restoring the rotational component of opposition.¹⁰ Also, it does not correct the rotational deformity present in some cases.

In this patient, abductor digiti minimi transfer resulted in good abduction and opposition and derotation osteotomy restored effective pinch by pronating the thumb, allowing adequate opposition of the pulp of the thumb to the middle, ring and little finger pulps when pinching. Widening of the first web space and stabilisation of the metacarpophalangeal joint were not necessary as there was minimal first web space contracture and only mild instability of the metacarpophalangeal joint.

This case illustrates that, in cases of supinated hypoplastic thumb, derotation osteotomy is a useful adjunct to the abductor digiti minimi transfer.

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