

RESULTS AFTER POLLICIZATION FOR CONGENITAL HYPOPLASTIC THUMB

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SUMMARY

Purpose: The purpose of this study is to report results of pollicization for congenital hypoplastic thumb. **Method:** Nineteen patients 24 hands with congenital hypoplastic thumb have been treated with pollicization and followed up for more than 2 years. In these cases, the right hand was affected in 10 cases, the left in 4 and both hands in 5 cases. According to Blauth's classification, one hand was grade 3, 12 hands were grade 4, 8 hands were grade 5, two digits were missing in 1 hand and 2 hands were five fingered hands. Surgery was performed according to the Buck-Gramcko's method. The age at surgery of pollicization ranged from 1.2 year to 5.8 years with an average of 2.4 years. Centralization or radialization was performed in 8 hands before pollicization. Free skin graft was performed in 2 hands during pollicization. Additional surgery was performed in 6 hands. Mostly it was performed to improve thumb position. The follow-up period ranged from 2 years to 19 years with an average of 6.9 years. **Results:** At follow-up, all patients could use the pollicized digit for pinch. Excellent pinch function has been achieved in 16 hands, good in 5 hands, and fair in 3 hands. The percent pinch strength compared to the opposite hand ranged from 25 to 93% with an average of 48%. Average active extension of the IP joint was -5 degrees and average flexion was 42 degrees. Average active extension of the MP joint was -2 degrees and average flexion was 39 degrees. In 17 cases out of 24 cases, patients always used pollicized digit well in usual manner. Satisfactory result was not always achieved in the cases with defect of the radius and/or preoperative contracture of the digits. All parents were satisfied with the results. *Riv Chir Mano* 2006; 2: 161-164

KEY WORDS

Hypoplastic thumb, pollicization, radial deficiency

INTRODUCTION

Blauth (1) classified the hypoplastic thumb into five grades. Treatment is different for each grade. For grade three, there are two choices. One is pollicization and the other is multiple tendon transfer including opponensplasty and stabilization of the first carpometacarpal joint. In 1971, Buck-Gramcko (2) reported a new design of skin incision and a new method of fixation for a newly formed carpometacarpal joint for pollicization. The purpose of this study is to report the subjective fee-

lings of the parents to the results after pollicization, functional results of the hand treated with pollicization, the influence of radial club hand, and that of contracture of the fingers on the postoperative pinch function.

MATERIALS AND METHODS

Between 1974 and 2002, 27 patients, 33 hands, with congenital hand anomalies have been treated with pollicization. Nineteen patients, 24 hands,

could be followed up for more than two years. The right hand was affected in 10 cases, the left hand in 4 cases, and both hands in 5 hands. According to Blauth' classification, 12 hands were grade 4, 8 hands were grade 5. Two radial digits were missing in 1 hand, and 2 hands were five-fingered hand. Surgery was performed according to the Buck-Gramcko method (2). The age at the time of pollicization ranged from 1 year to 5.8 years with an average of 2.4 years. A total of 17 other procedures were performed on 13 hands. Centralization was performed in 6 hands and syndactyly release in 1 hand before pollicization. Free skin graft was performed in 1 hand during pollicization. Additional surgery was performed in 9 hands after pollicization. The following items were evaluated: 1) the patient's or parents' opinion of the results, 2) pinch function, 3) use of the pollicized digit in daily activities, 4) dominant hand, 5) the effect of radial club hand on the pinch function, and 6) the effect of contracture of the fingers on the pinch function. The follow-up periods ranged from 2 years to 20 years with a average of 6.9 years.

RESULTS

Subjective feelings of the results: The patient and/or parent were satisfied with the cosmetic results in all hands, and they were satisfied with the functional results in all hands except 4 hands. All parents of the patients with grade 4 hypoplastic thumb answered that the appearance of the hand after surgery was better than that before surgery.

Pinch function: Before surgery, no patients had pinch function in the usual manner. All patients could use the pollicized digit for pinch (Fig. 1). Pinch was possible between the pollicized digit and other all fingers (excellent) in 16 hands, between the pollicized digit and other two fingers (good) in 5 hands, between the pollicized digit and one finger (fair) in 3 hands. In 9 unilateral cases, percent pinch strength was measured. The percent pinch strength ranged from 0 to 93% with an average of 48%.

Use of the pollicized digit in daily activities:

In 18 hands, patients always used the pollicized digit well in the usual manner. In 6 hands with limited pinch function, they did not always use the pollicized digit in daily activities.

Dominant hand: In 2 out of 14 unilaterally affected cases, the patient used the pollicized digit as a dominant hand.

The influence of radial club hand and contracture of the finger on the postoperative pinch function: In 6 hands with radial club hand, the pinch function was excellent in 3 hands, good in 1 hand, and fair in 2 hands. In 18 hands without radial club hand, the pinch function was excellent in 13 hands, good in 4, and fair in 1. The pinch function seemed better in a group without radial club hand than that with radial club hand. In 9 hands with preoperative contracture of the fingers, the pinch function was excellent in 5 hands, good in 2 hands, and fair in 3 hands. In 15 hands without preoperative contracture of the fingers, the pinch function was excellent in 11 hands, good in 3, and fair in none.



Figure 1. Case 1: Hypoplastic thumb (Blauth Grade 4), 4-year-old girl. She always used the index finger for pinch function before pollicization.

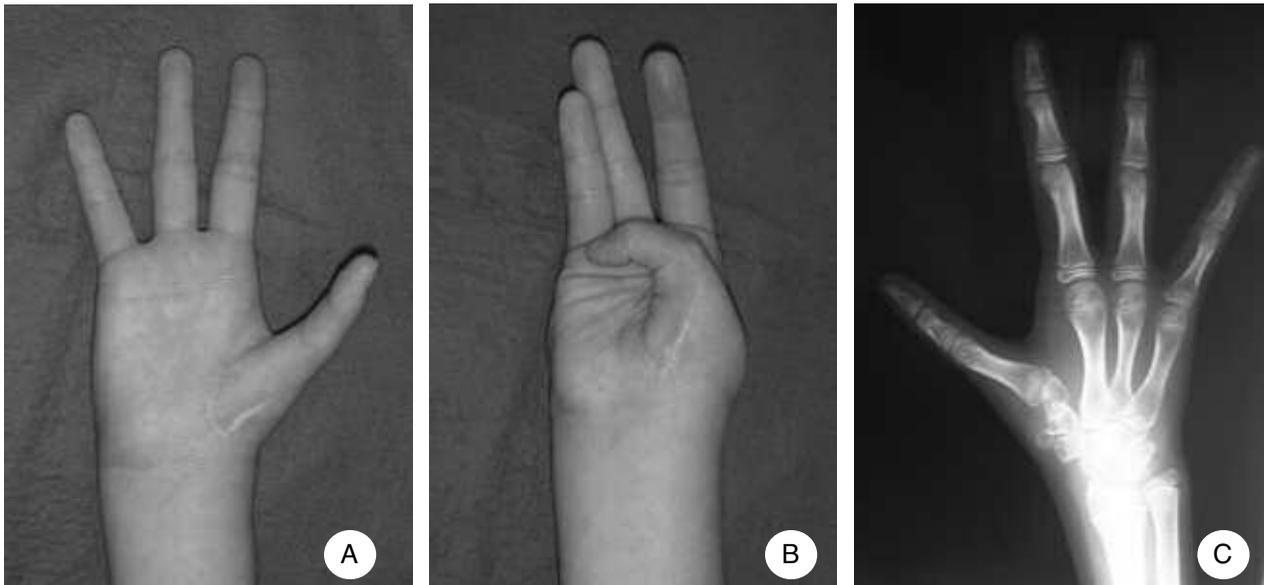


Figure 2. Case 1: 7 years after pollicization. Good mobility and stability have been achieved after surgery. A) extension; B) flexion; C: roentgenogram.

The pinch function seemed better in a group without preoperative contracture of the fingers than that with preoperative contracture of the fingers.

DISCUSSION

Blauth's grade 5 hypoplastic thumb is the best indication for pollicization of the index finger. However, several attempts have been made to reconstruct grade 4 and 3 hypoplastic thumb (3). Multiple tendon transfers combined with free vascularized toe joint transfer is one of the methods to reconstruct an unstable first carpometacarpal joint. The problem is whether the reconstructed floating thumb will grow sufficiently or not. In our experience, the thumb could grow to sufficient size in some cases while not in other cases. It is still unknown what kinds of factors influence the growth of the reconstructed thumb. Long-term follow-up study is necessary to clarify these points. On the other hand, long-term results after pollicization have been described by several authors (4, 5). In this series, parents and/or patients were satisfied with the cosmetic results in all cases and there

was no remarkable growth disturbance of the pollicized digit in all cases. All parents of the patients with grade 4 hypoplastic thumb thought that the appearance of the hand after surgery was better than that before surgery. From the esthetic point of view, the results of pollicization after removal of the hypoplastic thumb seems to be better than those of reconstruction of the grade 4 hypoplastic thumb. On the other hand, the parents were satisfied with functional results in all except 4 hands. In these 4 cases, the patient did not always use the pollicized digit in daily activities. However, the pinch function at follow-up was satisfactory, objectively, in all hands except 3, which were associated with radial club hand and contracture of the pollicized digit and other fingers. Pollicization is a reliable treatment to restore pinch function for hypoplastic thumb, especially if there is no association of radial club hand and contracture of the digits.

The optimal age for pollicization is still controversial. Roper and Turnbull (6) stated that pollicization should be performed early. Buck-Gramcko also recommended that pollicization should be performed before the age of one year. Masatomi and Gilbert (5) reported that pollicization should be performed before 2 years of age. However,

Egloff and Verdán (7) reported that there is no advantage in performing pollicization before the age of 1 year. They prefer to perform the operation before the age of 4 years. According to Manske et al (4), the results after pollicization were not influenced by the age of the patient at the time of operation. In our series, the number of cases was too small for statistical analysis. However, two patients used the pollicized digit as a dominant hand. In these cases, pollicization was performed at the age of 2.8 years and 1.7 years. If pollicization is performed at these ages, adaptation of the pollicized digit and cerebral cortex may occur. Pollicization can be performed safely at the age of one year. Therefore, we prefer to perform pollicization after the age of one year and before the age of 2 years. However, even if the surgery is delayed, we have an impression that the results seem to be always excellent when the mobile index finger without club hand, which is always used for side pinch with the middle finger, is pollicized (Fig. 1). Therefore, pollicization is still indicated in preschool age patient,

if the patient uses the index finger for pinch function.

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