Syndactyly Release without Using Skin Grafts

Mohammad Abu-Samen MD, Awni Abulail MD*, Issam Odwan MD*, Waleed Haddaden MD**

ABSTRACT

Objectives: Syndactyly is one of the most common congenital hand deformities. Web space reconstruction is an important component of syndactyly treatment. Our objective is to evaluate the method of web space defect closure in syndactyly repair, using a V-Y dorsal metacarpal advancement flap, without using skin grafts.

Methods: Over the period of six years (May 2003 through May 2009), a total of 20 patients (24 hands, 25 web spaces) with simple syndactyly were operated upon using a dorsal metacarpal skin flap based on a direct coetaneous branch of the dorsal metacarpal artery. This flap was advanced in a V-Y fashion to aid in web space defect closure, without using skin grafts. There were 15 males and five females. Four cases had bilateral, three had right sided and the remaining 13 had left sided syndactyly. Fourteen cases had complete type and six had incomplete type. The mean age at operation was 4.7 years (range 1-12). The web spaces affected were the thumb-index, middle-ring, ring-little in one, 18, and six web spaces respectively. The mean follow up period was 10 months (range 6-35 months).

Results: All patients had uneventful postoperative period. There was no flap necrosis or digital vascular compromise. One case showed hypertrophic scarring of the repair but all patients had acceptable range of motion at follow up.

Conclusion: Dorsal metacarpal skin flap advancement is a good way of repairing the web space defect during syndactyly release, eliminating the need for skin grafts.

Key wards: Flaps, Syndactyly, without skin graft

JRMS December 2010; 17(4): 47-50

Introduction

Syndactyly is one of the most common congenital hand deficiencies, with an incidence of one per 2,000 to 2,500 live births. There is a strong familial tendency: 10% to 40% cases are inherited as a result of a dominant gene with variable penetrance.[1] The objectives of treatment are both functional and cosmetic. Current techniques of syndactyly correction utilize a zigzag incision along the full length of the digit to avoid contracture that might follow a straight line closure, the web space is reconstructed in most of the techniques by a skin graft,[2-3] alternative techniques utilize a local skin flap. We demonstrate our experience in syndactyly treatment using a dorsal metacarpal flap.

Methods

This is a prospective study of 20 patients (24 hands, 25 web spaces) with simple syndactyly carried out in the Royal Rehabilitation Center at King Hussein Medical Center over a six years period (May 2003 through May 2009). There were 15 males and five females. Four cases had bilateral, three had right sided and the remaining 13 had left sided syndactyly. Fourteen cases had complete type and six had incomplete type. The mean age at

*From the Department of Plastic Surgery, Royal Jordanian Rehabilitation Center, King Hussein Medical Center, Amman-Jordan
Correspondence should be addressed to Dr. M. Abu-Samen, (KHMC)
Manuscript received May 28, 2009. Accepted October 15, 2009

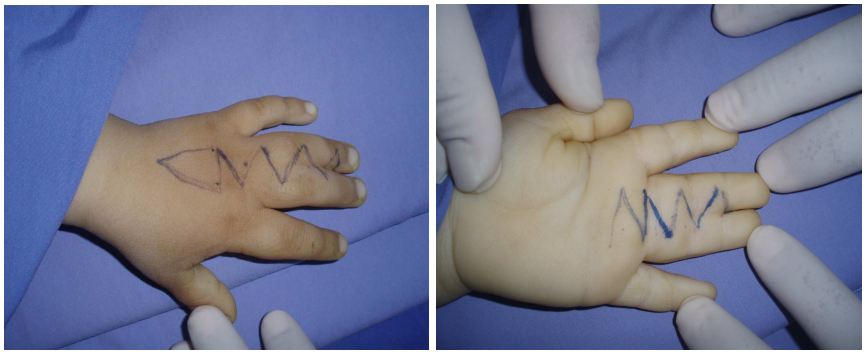

Fig. 1. Marking of the incision palmary and dorsally.

Fig. 2. The dorsal flap is advanced distally and suturing is done with absorbable sutures

operation was 4.7 years (range 1-12). The web spaces affected were the thumb-index, middle-ring, ring-little in one, 18, and six web spaces respectively. None of the patients had any other congenital deformity or had a positive family history.

The operation was performed under general anesthesia with the control of pneumatic tourniquet, marking of the incision was done (Fig 1), and the fingers were separated by the standard zigzag incision. The dorsal metacarpal flap is designed over the dorsum of the hand at the intermetacarpal space centered proximal to the metacarpophalangeal joint in a V (triangular) shape. The length of the flap varies from 1-3cm and its width from 1-2cm, according to the age of the patient. All dissection was done without complete exsanguinations to help in the visualization of the neurovascular bundles of the fingers, excess fat around the neurovascular bundles of the fingers was excised to help closure of the defect without tension, the dorsal metacarpal flap was dissected and mobilized without direct visualization of the perforator, the flap was then advanced distally (Fig 2) and the defect closed directly using absorbable sutures. A usual hand dressing was done with neomycin permeated gauze on the suture line and fluffy gauze in between the fingers and a light pressure bandage. The patients were admitted for one day postoperatively for observation. The first dressing was done after one week under general anesthesia.

Results

All patients had an uneventful postoperative period. There was no flap necrosis or digital vascular compromise. One case showed hypertrophic scarring of the repair but all patients had acceptable range of motion at follow up. The mean follow up period was 10 months (range 6-35 months). (Figures 3 and 4)

Discussion

Syndactyly is classified descriptively on the basis of the degree of skin bridging and according to the presence or absence of bony fusion.[4] The history of syndactyly surgery dates from early 1800s.[5] The principles of syndactyly reconstruction are well established: (A) to create both cosmetically acceptable and functionally independent digits; and (B) to provide a normal web that is well adjusted to

Fig. 3. Preoperative and one-month postoperative views

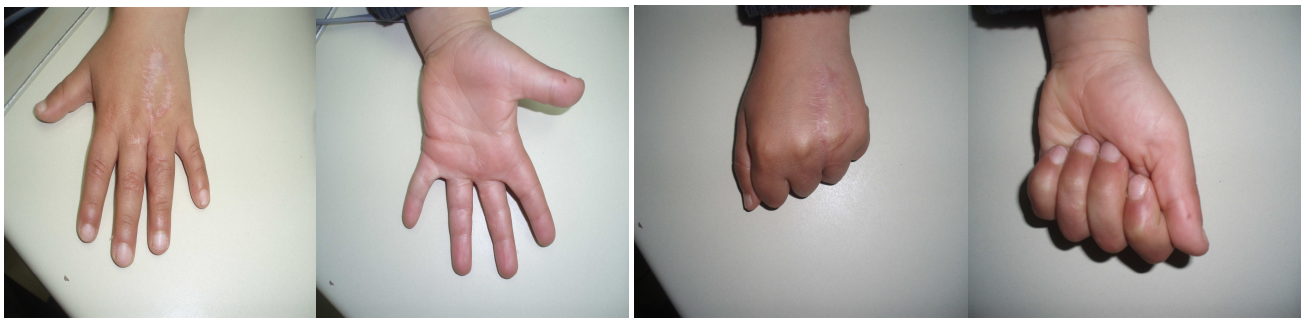

Fig. 4. One-year follow-up views

other interdigital webs. The normal web is wider distally than proximally and slopes at a 35° to 45° angle from proximal-dorsal to distal-palmar direction. The base of the web is located at the mid-portion of the proximal phalanx on the lateral view.[6,7]

Several authors advocated that the operation should be performed within the first years of life, and they consider that the success of the operation would be reduced due to certain developmental bone deformities and increased complication rate if the operation was performed at a later age. It is reported that the average age at the time of surgery was below four years.[8,9] In our study the average age of surgery was 4.7 years and yet there was no bone deformity. The reconstruction of syndactyly using dorsal skin flap and side grafts was the most noteworthy method of choice,[1,3,10] however, complications like hyperpigmentation, contracture, hair growth and morbidity of the donor site[9] necessitate looking for another alternative. In the recent years, there has been an increase in the surgical treatment techniques which do not need a free skin graft for complete syndactyly treatment, rather requiring a skin flap. The dorsal metacarpal V-Y advancement flap is a safe and reliable flap,[5] utilizing the dorsum hand skin to cover the web area, as the size of the flap is large enough to cover the web space without applying suture line in the web area, so web contracture do not occur in these techniques. The new web had the same skin color and texture of fingers,[11] and the resultant scars in the web space are usually inconspicuous. The use of this flap instead of skin graft has markedly shortened the operative time of syndactyly release. No flap has been lost either from arterial or venous complication. The only disadvantage for this flap is the presence of scar on the dorsum of the hand,

which tend to settle down well and become barely noticeable six months after the operation.

Conclusion

Dorsal metacarpal skin flap advancement is a good way of repairing the web space defect during syndactyly release, eliminating the need for skin grafts.

References

1. **Choi M, Sharma S, Louie O.** Congenital hand abnormalities. In: Charles H. Thorne, editor in chief. Grabb and Smith's Plastic Surgery, Sixth Edition. Philadelphia: Lippincott Williams & Wilkins 2007. p. 856-863.
2. **Bauer TB, Tondra JM, Trusler HM.** Techniqal modification in repair of syndactylism. *Plast Reconstr Surg* 1956; 17:385-392.
3. **Zoltie N, Verlende P, Logan A.** Full thickness grafts taken from the plantar instep for syndactyly release. *J Hand Surgery* 1989; 14B:201-203.
4. **Ezaki M.** Congenital hand deformities. Operative Hand Surgery 4th ed. 1999; 415.
5. **Sherif M.** V-Y Dorsal metacarpal flap: a new technique for the correction of syndactyly without skin graft. *Plast Reconstr Surg* 1998; 101:1861-1866.
6. **Tan O, Atik B, Ergen D.** Versalite use of the VM-plasy for reconstruction of the web space. *Annals of Plastic Surgery* 2005; 55:623-628.
7. **Aydin A, Ozden B.** Dorsal metacarpal Island Flap in Syndactayly Traeatment. *Annals of Plastic Surgery* 2004; 52:43-48.
8. **Percival NJ, Sykes PJ.** Syndactyly: A review of the factors which influence surgical treatment. *J Hand Surgery* 1989; 14B:196-200.
9. **Ozgur Cetik, Baris K, Faith E, *et al*.** Contrary intermittent skin release of complete syndactyly without skin graft in adults. *Annals of Plastic Surgery*. 2005; 55:359-362.
10. **Deunk J, Nicolai JP, Hamburg SM.** Long-Term results of syndactyly correction: full-thickness versus split-thickness skin grafts. *J Hand Surg* 2003; 28B:125-130.
11. **Quaba A, Davison PM.** The distally-based dorsal hand flap. *British Journal of Plastic Surgery* 1990; 43:28-39.