

Research Article

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Moberg Advancement Flap in the Thumb

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Abbreviations

S2PD : Static two-point discrimination; TAM: Total active motion; IP: interphalangeal.

Introduction

Complete or partial amputation of the thumb leads to considerable impairment in hand function [1,2] Preservation of length, soft tissue coverage and restoration of sensation are very important in the treatment of thumb injuries. In 1964, the volar advancement flap was first described by Moberg for the reconstruction of pulp defects of the thumb [3]. This flap is a pedicle advancement flap proximally based on an intact skin pedicle including both neurovascular bundles. This technique establishes a successful neurosensation of the pulp with a limited advancement as well. This article reports the outcome of a consecutive series of 10 patients to verify the advantages and disadvantages of the Moberg flap for coverage of palmar defects.

Materials and Methods

In 10 cases (7 males, and 3 females) with pulp defect of the thumb ≤ 2 cm, a Moberg palmar advancement flap (under regional anesthesia) was performed. A bilateral incision (dorsal to the neurovascular bundles) is made on both sides (Figure 1) and palmar advancement flap was raised over the parathenon including neurovascular bundles (Figure 2). Flap is subsequently adapted, meticulously (helped by flexion of IP joint) (Figure 3).



Figure 1: Marking for the radial incision of a Moberg flap.



Figure 2: Moberg flap raised just above the level of the flexor pollicis longus tendon sheath including neurovascular bundles.



Figure 3: Volar advancement flap and flexion at the interphalangeal joint to allow closure.

One-week immobilization was given to the patients to prevent flap loss and detachment. Patients were examined on postoperative days 1, 15, 30 and 60. Interphalangeal range of motion was measured via goniometer and joint mobility was evaluated according to the original Strickland classification (Total active motion [TAM]) [4]. Static two-point discrimination (S2PD) of Weber [5] was assessed for pulp sensibility on 60th postoperative day. A summary of this information on the patients is shown in Table 1.

Table 1: Postoperative scores.

Postoperative Scores				
Case	Age	Injured hand	Postoperative Assessment	
			ROM of IPJ(°)	S2PD (mm)
1	26		85	3
2	21		80	4
3	20		90	3
4	23		88	3
5	18		83	4
6	27		86	3
7	29		82	4
8	33		85	4
9	46		84	3
10	31		89	4
ROM of IPJ: Range of Motion of Interphalangeal Joint S2PD: Static two-point discrimination				

Results

The range of the patients’ age was between 18 and 46 (mean: 27.4). TAM was calculated according to the original Strickland classification. All flaps healed with a satisfactory cosmetic and functional thumb (Figure 4). S2PD was below 5 mm in all cases, which revealed normal pulp sensation. Table 1 summarizes the postoperative scores.



Figure 4: Postoperative view on 60th day. Please note excellent pulp fullness.

Discussion

The fingertips are the most important organs of tactile sensibility. Two-point discrimination usually is below 5 mm owing to the density of Vater-Pacini bodies and the branches of the palmar digital nerves responding to tactile stimuli and providing skin sensibility [6]. The goals in fingertip amputation reconstruction are to cover the defect with a satisfactory cosmetic appearance, establish maximum tactile gnosis, preserve the length of the thumb, obtain a well-padded pulp tissue, preserve an intact nail bed, and minimize time off work. Classification of thumb tip defects is not clearly defined in the literature. Usually defects are defined arbitrarily as small or large [7]. Other definitions use the structures involved such as the pulp, nail, and bone, which also define the location of the injury [8,9] Using both criteria definitions most likely gives the best basis for selecting the appropriate reconstructive method.

Soft tissue injuries distal to the interphalangeal (IP) joint through zone I are frequently amenable to local or regional reconstructive techniques. In the thumb, the palmar advancement flap first described by Moberg [3] in 1964 has special importance. The flap is an advancement flap based on proper neurovascular bundles for coverage of palmar defects of the pulp. It is considered a standard flap for reconstruction of medium defects 2 cm or smaller. The major concern with the Moberg flap is the potential introduction of a thumb IP flexion contracture to reduce tension at the closure site. Although this typically does not occur in the absence of trauma or arthritis in the joint, other option to obtain additional mobility of the flap without excessive and IP flexion flap is extends it proximally into the thenar eminence.

In this series all defects with a length ≤2 cm were successfully reconstructed. The Moberg advancement flap does not cause marked impairment of active range of motion. All patients, with an additional intra operative IP joint flexion, were able to actively achieve a neutral position of the IP joint. This confirms that positioning the IP joint in flexion is a useful adjunct in the operative technique without the risk of a functionally persistent impairment. One of the main purposes in defect covering of the distal palmar thumb is restoration of sensibility. Like other investigators, [10-13] we found that sensory quality was maintained in all patients.

Conclusion

In conclusion, palmar advancement flap is a good option in fingertip defects ≤2cm, especially in situations in which they need to cover fingertip defects whether the bone is exposed or not.

a. Statement of Informed Consent: All study participants provided informed written consent prior to study enrollment.

b. Statement of Human Rights: All procedures followed were in accordance with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from all patients for being included in the study.

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