Moberg Advancement Flap in the Thumb

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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).

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.
All procedures followed in this series were in accordance with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from all participants provided informed written consent prior to study enrollment.

**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, and preserve the length of the thumb, which also define the location of the proximal 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 the proximal palmar digital nerve and the palmar aponeurosis. The flap is an advancement flap based on the 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 to extent 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 ≤ 2 cm, 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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**Table 1: Postoperative scores.**

| Case | Age | Injured hand | ROM of IP (°) | S2PD (mm) | Postoperative Assessment |
|------|-----|--------------|--------------|-----------|-------------------------|
| 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 IP:** Range of Motion of Interphalangeal Joint

**S2PD:** Static two-point discrimination
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