

ORIGINAL RESEARCH

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Littler heterodigital neurovascular island flap applied to tissue defects of the distal thumb

Fatih Duygun, Cengiz Aldemir

Antalya Training and Research Hospital, Department of Orthopedics and Traumatology, Antalya, Turkey

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Abstract

To observe the results of Littler heterodigital island flap utilized in the treatment of pulpa defects of the thumb and evaluate our findings in the light of the literature. Twelve patients who applied to our clinic with defects on the distal tissue of the thumb between 2008 and 2016 were included in the study. Ten of the patients were male, 2 were female. Mean age was 40.25 (range, 30-55) years. Eight patients had tissue defects on their right 1st digital and 4 on their left. The sensory and functional outcomes and wound healing on the receiving site were evaluated. Additionally, we determined 2-point discrimination and cortical re-orientation. In all patients, the flap was healthy and no necrosis was observed. Mobility and stability of the thumb was optimal in all cases. In 2 patients, scar tissue development was observed at the donor site, but there was no functional deterioration. Sensory examination was normal in all patients. Mean value of 2-point discrimination was determined as 7 (range, 4-10) mm's. Littler neurovascular island flap is an effective treatment which re-establishes sensory ability in distal thumb injuries with tissue loss.

Keywords: Littler, heterodigital, neurovascular, flap

Introduction

Trauma to the hand may result in soft tissue defects which cause functional loss [1]. The thumb is crucial in hand function. Daily activities such as holding, gripping, opposition, circumduction, and motions involving the manipulation of the hand are possible because of the unique anatomical properties of the thumb. Thus, damage to the thumb results in greater loss of function compared to the other fingers [2].

Various flap types are used to repair tissue defects of the fingertips. Local V-Y flaps establish good sensory function; however, their size and transfer distance are limited [3]. Neurovascular island advancement flaps can be utilized in relatively larger defects; however, they may cause dorsal skin necrosis [4]. Cross-finger flaps may be used for the same purpose, but this method requires 2-step surgery [5]. The Littler flap is widely used in the tip and pulp defects of the thumb because this method flawlessly restores sensory function [6].

Our aim with this study was to report the results we obtained with the Littler island flap technique in our patients.

Material and Method

Twelve patients who applied to our clinic with defects on the distal tissue of the thumb between 2008 and 2016 were included in the

study. Ten of these patients had applied to our ER and 2 patients came to our clinic after applying to another medical center in which amputation was suggested to them. In all patients, a crushing trauma was the cause of defect. Among the patients, 10 were male and 2 were female, mean age was 40.25 (30-55). Mean duration of follow-up was 37.6 (11-96) months. Eight patients had tissue defects on their right 1st digital, and 4 on their left. In all patients, 2-point discrimination and cortical re-orientation were determined in addition to evaluation of sensory and functional outcome and wound healing on the receiving site.

Results

We did not observe necrosis of the flap or donor-site wound problems in any of the patients. None of the patients developed restriction of mobility or contractures in the thumb or donor finger. Only 2 of the patients developed scar tissue at the donor site without any functional loss. Four patients had cold intolerance. Sensory examination was normal in all patients. Mean value of 2-point discrimination was determined as 7 (range, 4-10) mm's. cortical re-orientation was found to be satisfactory in all patients.

Discussion

The thumb plays a very important role in hand function. It is important to take any kind of measure to restore the mobility, stability, length and sensory properties of the thumb after hand trauma. The Littler heterodigital neurovascular flap and the Foucher first dorsal metacarpal artery flap are methods used to achieve this purpose. Iraklis and colleagues compared these two methods and came to the conclusion that they were similar in

terms of the potential for development of necrosis, contracture, and reflex sympathetic dystrophy. However, they found that the Foucher flap was significantly superior in regard to cortical re-orientation and stereognosis (perceiving the form or identifying an object by touching) [7].

Peraut et al., reported the results of Littler flap in 2 patients who had ring avulsion trauma. Both patients were reported to have satisfactory 2-point discrimination and cortical re-orientation [8].

The primary complications of heterodigital neurovascular island flaps have been identified as: cold intolerance, low somatosensory cortical integration, and weakened sense of discrimination [9].

In a study by Hashem et al., the results of 6 patients who received Littler flaps were presented and all flaps were reported to remain healthy. Two-point discrimination was found as 8.3 mm's and 3 of the patients had cold intolerance [10].

In the present study, no flap or donor site necrosis was found in any

of the patients (Fig 1a,1b,1c,2a,2b,2c). Two-point discrimination was found as 7 mm's and 4 patients had cold intolerance.



Figure 1a. 55-year-old male patient with a pulp defect of their right hand first digital prior to surgery



Figure 1b, 1c: The same patient's intra-operative images



Figure 2a. 50-year-old male patient with a pulp defect of left right hand first digital prior to surgery



Figure 2b, 2c. The same patient's intra-operative images

Conclusion

The Littler heterodigital neurovascular island flap is effective in treating volar pulp defects of the thumb because it can sufficiently restore distal sensory ability and help preserve crucial hand function.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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Informed consent was obtained from all individual participants included in the study.

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