



DOUBLE PADDLE FIRST DORSAL METACARPAL ARTERY FLAP FOR RECONSTRUCTION OF FIRST WEB SPACE DEFECTS

Surgery

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ABSTRACT

Objective: The first dorsal metacarpal artery (FDMA) flap is an axial flap, based on the First Dorsal Metacarpal Artery (a branch of Radial artery) and its terminal dorsal digital branches. It is harvested from the dorsum of hand, index finger, and thumb. The objective of this study was to use Double paddled FDMA (a modification of conventional FDMA) for the coverage of first web space defects. **Patients and Methods:** This is a retrospective analysis of usage of FDMA flap for defects over 1st web space. Study was done from May 2022 to 2023 among 7 patients with defects over 1st web space. Split skin grafting was done to cover the donor site defect in all cases. **Conclusion:** The FDMA flap is a versatile flap to cover defects over 1st webspace, dorsal aspect and to certain aspect volar aspects of thumb. This flap is sensate, durable and provides adequate soft tissue coverage.

KEYWORDS

INTRODUCTION

The first dorsal metacarpal artery (FDMA) flap is an axial flap based on the first dorsal metacarpal artery and its terminal dorsal digital branches, and it is harvested from the skin of the dorsal surface of the hand, index finger. It can be raised as a proximally or distally based fascial or fasciocutaneous flap; vascularized tendon, periosteum, or bone can be also be included.

This flap is used mainly as a sensory flap for coverage of skin defects over the palmar surface of the thumb, dorsal thumb skin defects, first web space especially in cases of severe contracture.

The FDMA flap is especially indicated in severe first webspace contractures with irregular surfaces and exposed blood vessels and nerves. As a sensory flap, it can be used for reconstruction of the volar skin of the thumb, and it is able to cover the whole volar surface up to the thumb tip. Literature mentions different variations of FDMA flap, one such variation is double paddled FDMA flap. FDMA flap provides stable sensate soft tissue cover with minimal donor site defect and also has wide arc of rotation, thus making it workhorse for selected defects of hand.

Aims:

The aims of this study are as follows:

1. To evaluate the use of double paddled FDMA in 1st web space contracture.
2. To analyse intraoperative challenges during harvest of double paddled FDMA.
3. To evaluate the post operative outcome of the same.

Patients and Methods

This study is conducted between May 2022 and May 2023. There were total of 7 patients, including 4 males and 3 females, with age ranging from 20-45 years with mean age of 33 years. Patients presented with moderate to severe contracture of 1st web space following either post electric burns or post trauma were taken in this study.

Through pre operative evaluation was done. Using ultrasound doppler presence of artery was confirmed.

Operative Technique

The patient is operated under Brachial plexus block with the arm positioned on the hand table. Under tourniquet control, the contracture is released and the true defect measured. The flap is marked on the dorsal aspect of index and middle finger over proximal phalanx. First incision is taken on the dorsum of hand with convexity towards ulnar side to include SDMA when it is not possible to include FDMA. Skin is cut in all directions and incision is deepened to expose fascia over First

Dorsal Interossei muscle, superficial vein which drains the flap is preserved, and fascia is cut in 3 directions to include FDMA. The islanded flap is then raised from distal to proximal direction in the plane above paratenon. Flap is raised till its pivot point (tip of first web space). After raising the flap tourniquet is released and the flap is tunneled into the defect. Donor site raw area is covered with split skin graft.

Flap loss either with exposure of underlying bone or joints or bare tendon was recorded for each area. The donor area is usually covered by a split-thickness skin graft.

RESULTS

Sl. no	Age of the patient	Sex of the patient	Mode of injury	Size of defect	Defect location	Patient comorbidities
1	20 years	male	Post electric burn contracture	4.1 x 3.5 cm	1st web space	None
2	24 years	female	Post electric burn contracture	4cm x 5 cm	1st web space	epileptic
3	25 years	female	Trauma	4.4 x 3.8 cm	1st web space	None
4	28 years	male	Post burn contracture	5cm x 4.1 cm	1st web space	None
5	32 years	female	Trauma	4.5 x 4cm	1st web space	None
6	45 years	male	Post electric burn contracture	4.8cm x 4cm	1st web space	None
7	45 years	male	Trauma	4.6 x 4.5cm	1st web space	DM, HTN

Post Operative Assessment of Flap:

Sl. no	Flap color	Flap loss	Skin graft condition	Donor site	Flap condition at followup
1	Good	None	100% uptake	Healed well	Good
2	Good	None	100% uptake	Healed well	Good
3	Good	None	100% uptake	Healed well	Good
4	Good	None	100% uptake	Healed well	Good
5	Good	None	100% uptake	Healed well	Good

6	Good	None	100% uptake	Healed well	Good
7	dusky	5% partial loss	100% uptake	Healed well	Good

DISCUSSION

A total of 7 patients were included in this study, out of which 4 were male and 3 were females. The median age was 33 years and the range was 20-45 years. The mode of injury was either trauma or post burns. Trauma in 3 patients, burns in 1 patient and post electric burns in 3 patients. The location of the defect was in 1st web space in all the patients. There were no underlying bony injuries in these patients. All the post electric burn patients were treated immediately after the electric burns in an outside hospital. One post burn patient immediately after burns did not get treated anywhere else and landed up in post burn contracture. The 2 trauma patients also neglected treatment immediately after trauma and presented to us with 1st web space contracture.

With respect to comorbidities, out of the 7 patients 2 patients were comorbid- one had h/o seizures and other had h/o DM and hypertension.

All the patients were thoroughly evaluated and optimized prior to surgery. The surgical procedure performed was first dorsal metacarpal artery flap with split skin grafting over the donor site of proximal phalanx and primary closure of donor site over dorsum of hand. All patients were placed in plaster of paris splint post operatively. Intra operative condition of the patient was stable and post operative assessment of flap was studied under the following conditions- flap color, flap loss, split thickness skin graft uptake. Out of the 7 patients, flap color was good in 6 patients and dusky in 1 patient. Partial flap loss of about 5% was noted in one patient. Graft uptake was 100% in all the 7 patients. Donor site was healthy in all the 7 patients. The patients had a mean hospital stay of 8-10 days. Flap condition was found to be good in all the patients at the time of discharge. All the patients had well settled flaps at the time of follow up. Donor site healed well.



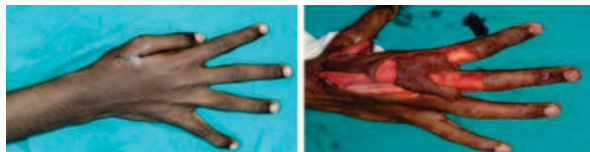
Preoperative Image

Intraoperative Image



Postoperative Image

Postoperative Image



Preoperative Image

Intraoperative Image



Preoperative Image

Preoperative Image



Postoperative Image

Postoperative Image

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