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**Plastic Surgery**

# Posterior Interosseous Artery Flap - Its Versatility

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**Abstract** **Original Research Article**

We have shared our experience with posterior interosseous flap in 12 cases, its results and versatility for defects over hand dorsal and palmar surfaces due to various etiologies. Surgical anatomy, harvesting techniques and results were discussed. The uniqueness and versatility of posterior interosseous artery flap is- sparing a major axial vessel supplying to hand and simultaneously providing tissue from the same anatomical region, ends in single stage with satisfactory outcome.

**Keywords:** Posterior interosseous artery flap, hand defects, hand flaps, hand reconstruction.



## INTRODUCTION

For the defects over hand, the regional flaps that are available from the forearm are distal based ulnar artery or radial artery. However harvesting these flaps on axial vessels relatively compromises blood supply to the hand. Thus these flaps are not indicated in trauma involving one axial artery and high voltage electrocution injuries to hand. Posterior interosseous artery running in the posterior compartment of forearm contributing blood supply through its perforators to the overlying skin is another alternative source in providing adequate tissue from the same anatomical region to cover hand defects. We are sharing our experience with posterior interosseous artery flap used for various defects of hand, done between 2017 - 2020, at Department of Plastic Surgery, GGH, Vijayawada, Sri Ramadevi Super Speciality Hospital and Remedy Hospital, Tirupati.

## MATERIAL & METHODS

Total 12 cases were done in three years. Among them, ten males, two were females. All were right hand dominant persons. The age group of patients was ranged from 18 years to 55 years. None of them were suffering with either Diabetes or Hypertension or any peripheral vascular diseases. Flaps were applied more to the right hand than left hand. The cause of hand defects were-motor vehicle accidents and work site injuries contributed more than 50%, infection following (snake bite or Diabetes) cellulites squeal was 25% and rest by the post burn contracture release with exposure of tendons. Often hand defects following trauma were associated with tendon injuries and fractures of short long bones which were attended appropriately. Defects over dorsum of the hand were the common site than palm or wrist. The average size of the defect was 10CmX8Cm.

### *Surgical anatomy*

Posterior interosseous artery is a branch of common interosseous artery which itself is a branch of ulnar artery. Often it arises from the ulnar artery as direct branch. Artery enters into the posterior compartment beneath the supinator muscle, traverses between the Extensor Digiti Minimi (EDM) and Extensor Carpi Ulnaris(ECU), in an inter-muscular septum running sagitally, giving perforators at various intervals. However there is a consistent perforator at the junction of upper third and middle third of forearm. Distally it ends at the wrist by anastomosing with the anterior interosseous artery.

Surface anatomy of the artery is a line connecting between the lateral epicondyle to distal head of ulna, forearm in full prone position indicates the course of the artery on the skin.

***Surgical technique***

Procedure was done either under supra clavicular block or in general anesthesia. Limb elevated and tourniquet applied without emptying the limb. Hand Doppler was used to locate, confirm the presence and position of the perforator. Based on the perforator, an 'island' flap was planned by doing 'planning in reverse', keeping distal radio-ulnar joint as the pivot point. Dimension of the flap was marked. Initial incision was made on the distal forearm due to superficial course of the artery and simultaneously to identify the EDM as by testing its action, the septum between the two muscles (EDM, ECU) could be followed with ease. Then the rest of the dissection was completed from the radial side, as this was found to be technically easy. Vascular pedicle with its perforator was identified. Vessel ligated proximally and flap elevated gently, ligating/cauterising accessory branches to the adjacent muscles at the same time guarding and sparing posterior interosseous nerve, throughout its course. Dissection continued distally till the radio ulnar joints or the flap reach to the defect by checking intermittently. Island flap along with sub cutaneous pedicle was sutured to the defect. Donor site reduced and covered with split skin graft. Drain was kept. In cases where the width of the flap is <4 Cm, donor site was closed primarily. Hand was immobilized with plaster slab applied on volar side and kept elevated for 2 weeks.

## RESULTS

All the flaps were survived. No necrosis was noted. Heamatoma under flap was drained in two cases uneventfully. Suture removal was done after 2 weeks. Donor site healed well. Over all patient acceptability is satisfactory, in spite of donor site scar.

**Fig-1: Schematic picture showing Trans metatarsal amputation stump-flap planning, harvested flap ready to suture, post op results after suture removal**

**Fig-2: Schematic picture showing pre-op, intra-op, and post op events**

**Fig-3: Schematic picture showing defect following scar exicision, planned flap and 9th POD**

## DISSCUSSION

Posterior interosseous artery flap is a fascio cutaneous flap having an axial vessel posterior interosseous artery throughout its course accompanied by two venae commitantes. This artery supplies the dorsal skin of forearm, thus the skin over it is available as a flap to resurface the defects of hand. As a retrograde flap keeping the base distally at the radio ulnar joint, the flap can reach entire dorsum of hand up to proximal phalanges and volarly up to proximal palmar crease line. However the skin is more suitable for dorsum including the web spaces and over wrist than on the palm. The flap can provide maximum dimension of 14 CmX10Cm on an average depending on the bulk of forearm. Flap can be raised as an island flap or pedicle flap. The common defects on dorsum of hand are following trauma, post snake bite cellulitis, post infectious cellulitis and are after surgical release of post burn contractures. Similarly on volar side of palm and wrist are due to post electrical burn injury, trauma, apart from following tumor exicision surgeries. Since most of our patients are right hand dominant, the site of defect is also on right hand side and thus the flaps too. Hand held Doppler is used to locate the perforator

routinely in the beginning cases. However, for later cases, we have assumed that perforator is there and planned the flap accordingly, without any regrets. We also noted that, dissection from the radial side is having more technical advantage due to easy identification of the perforator and followed in all of our cases. Even though post operative flap edema is worrying for first few days, it settles by itself without any intervention. The average time of dissection is one hour thus completed within the tourniquet time limit. There is no injury to posterior interosseous nerve in any case, not even neuropraxia was observed. Similar to retrograde flap, antegrade flap based on posterior interosseous artery is also described for elbow defects. However we haven't had any experience.

Anterior interosseous artery flap is another alternative, to choose for a similar defect over dorsum or to the wrist. However, the position and presence of perforator is inconsistent and is 4-5 Cm proximal to distal radio ulnar joint ths limiting its usage as first choice due to inadequate reach. The skin territory dimensions, surgical land marks of skin of the flap are similar and thus this flap is one of the strong competitors to posterior interosseous flap in choice selection.

Groin flap turned its back with these two options as being a staged procedure, limb restriction, and bulky flap with following debulking procedures, in spite of its major advantage of hidden donor site scar.

Technically long learning curve in harvesting the posterior inter osseous artery flap is limiting its usage widely as first choice flap to hand defects. However, in our experience, this flap should always be considered as the prime option to cover dorsum of hand, web space, wrist, with minimal and acceptable donor site morbidity.

## REFERENCES


1. Zancolli EA, Angrigiani C. Posterior interosseous island forearm flap. The Journal of Hand Surgery: British & European Volume. 1988 May 1;13(2):130-5.
2. Comba S, Martins A, Rodrigues J, Reis J. Further experience with the posterior interosseous flap. British journal of plastic surgery. 1991 Jan 1;44(6):449-55.
3. Landi A, Luchetti R, Soragni O, De GS, Sacchetti GL. The distally based posterior interosseous island flap for the coverage of skin loss of the hand. Annals of plastic surgery. 1991 Dec;27(6):527-36.
4. Balakrishnan G, Kumar BS, Hussain SA. Reverse-flow posterior interosseous artery flap revisited. Plastic and reconstructive surgery. 2003 Jun 1;111(7):2364-9.
5. Reddy GR, Mohan AC, Poldas J, Reddy L. Anterior Interosseous Artery Perforator Flap for Distal Forearm and Hand Defects.
6. Penteado CV, Masquelet AC, Chevrel JP. The anatomic basis of the fascio-cutaneous flap of the posterior interosseous artery. Surgical and Radiologic Anatomy. 1986 Dec 1;8(4):209-15.
7. Richard BM. Distally based posterior interosseous island flap. British journal of plastic surgery. 1995 Jan 1;48(4):258.
8. Giunta RE, Lukas B. Impossible harvest of the posterior interosseous artery flap: a report of an individualised salvage procedure. British journal of plastic surgery. 1998 Dec 1;51(8):642-5.