Adipofascial turnover flaps based on perforator vessels of the forearm: an anatomic study

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Introduction:

- Large soft tissue defects in the hand require flap coverage.
- Both regional fasciocutaneous and fascial flaps can be used in the hand for large loss of tissue.
- Nevertheless an alternative is available with free flaps and can be used when they may be contraindicated.
- The aim of this study is to assess the possibilities of hand and wrist coverage using 3 different adipofascial flaps.

Introduction:

According to Cormack and Lamberty classification, adipofascial flap is based on fasciocutaneous perforator vessels.

Type C: septo cutaneous or septo fascial perforator flap

*Cormak and Lamberty, 1994.*
Materials and methods:

Cadaveric anatomical study

8 forearm specimens from 4 fresh cadavers
• 4 females & 1 male
• Age at death 67 - 83 years old
• No scare at the upper limb
• Vascular injection with RTV colored Silicone:
  Arterial: from the proximal subclavicular arteries
  Venous: from dorsal veins of the fingers

• 3 different flaps were rised:
  Distal Radial Artery Perforator Flap
  Distal Ulnar Artery Perforator Flap
  Posterior Interosseous Artery Perforator Flap
• Surgical landmarks was the lunoradial joint line & humeroradial joint line
Results:

- 24 flaps from 8 forearms.
- The perforating and subfascial vessels were clearly identified.
- The pivot points after identification allowed a satisfactory rotation of the different flaps.
Results

Distal Radial Artery Perforator Flap:

Radial perforator vessels: 7.6 (7-9)
Pivot Point: 37.1mm (32-50)
Flap length: 161mm (155-168)

Anterior view, left forearm

Magnification of the last view
Results:
Distal Radial Artery Perforator Flap: flap rising

Pivot point at 3.5 cm above the radio-carpal line

Anterior view, left forearm
Results:

Distal Ulnar Artery Perforator Flap:

Ulnar perforator vessels: 5.5 (5-6)
Pivot Point: 41.6mm (21-52)
Flap length: 166.5mm (148-176)
Results:

Distal Radial and Ulnar Arteries Perforator Flaps:

Covering palmar surface of the hand

Right forearm
Anterior view
Results:

Posterior Interosseous Artery Perforator Flaps:

PIOA perforator vessels: 6.8 (6-8)
Pivot Point: 19mm (6-25)
Flap length: 145.3mm (137-157)
Results:

Posterior Interosseous Artery Perforator Flaps:

Rising PIOAF
Left forearm

Left hand
Posterior views
Discussion

The indications for the adipofascial turnover flaps include a variety of soft tissue defects secondary to trauma, tumour resection, radioulnar synostosis or burns with exposure of structures that would be less suited or preclude skin grafting.

Based on these anatomical evaluations, the flaps created in our study must be vascularized by direct perforating dorsal branches from the radial, ulnar and posterior/anterior interosseous arteries, or branches from interconnections of these arteries.

These flaps provide a sliding surface opposite the surface of the fascia which allows further tendon reconstruction.
Discussion (2)

• Palmar or dorsal coverage of the hand and elbow.
• Restauration of a gliding interface around tendons.
• Nervous protection.
• Living interposition in synostosis of the forearm.
Conclusion

Technically simple, no surgical microscope need!

Minimal donor site morbidity.

No sacrifice of major arterial axes.

No pre-operative exams.

Can be performed under surgical lens.
Thank you!