The pedicled flap from the first dorsal collateral artery of the long fingers: an anatomic study

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Introduction

- Reconstruction solution for digital skin defect
- Common situation
- Different surgical procedures
  - Most important: Vascular reliability and surgical reproductibility
- Functional result: Sensitive flap +++
- Anatomical variations
First Dorsal Collateral Artery Flap

- Described by Tellioglu et al. in 1998 (only the nerve)
- Clinically used by Feng et al., Zhao et al. and Chen et al.

- Pedicled flap:
  - **Dorsal branch of the palmar digital collateral nerve** (DBDN)
  - **First dorsal collateral artery** (FDCA)

- Not described:
  - Anatomical variations of neurovascular pedicle
  - Steps of flap dissection procedure
  - Size of skin cutaneous pallet
  - Potential indications (homo- and hetero-digital)
Purpose of the study

Anatomic cadaveric study

- Evaluate the **anatomical variations of the neurovascular pedicle** and its reports
  - Clarify the **dissection technique** of the FDCA flap
  - Evaluate its **potential indications**
Methods
Study protocol

→ 8 upper limbs from fresh cadavers

→ 26 long fingers dissected

→ MICROFIL®, red injection,

→ Dissection few days after
Methods
Surgical procedure

- 2 senior surgeons
- Skin pallet = dorsal surface of second phalanx and proximal interphalangeal (functional skin unit)
- Pedicle flap approach
Methods
Descriptive anatomical assessment

- Independant examiner

  - **Width** and **length** of skin pallet

  - **Origin, path and anatomical relationships** of pedicle

  - Distance between **emergence of FDCA** and palmar digital arterial bifurcation

  - **Emergence of DBDN** from the diaphysis of first phalanx

  - **Mobility arc**
Methods
Descriptive anatomical assessment

- Relationship between FCDA and DBDN
  - Superficial or deep position of the nerve relative to the artery
  - Proximal or distal position of the nerve relative to the artery

- Mobility arc
  - Homo-digital skin defect
  - Hetero-digital skin defect
Results

- 26 long fingers dissected: 6 D2, 6 D3, 8 D4, 6 D5

- Neurovascular pedicle **systematically found**
Systematically, we found a pedicle composed of the first dorsal collateral artery from the palmar digital collateral artery, and the dorsal branch of the palmar digital collateral nerve.
Results

- Average length: **33mm** (26-40 mm)
- Average width: **21 mm** (15-30 mm)
- Average surface: **703 mm²** (420-1080 mm²)
- Birth DBDN: **half-length** of the diaphysis of the 1st phalanx
- Birth FDCA: **19 mm** from the arterial bifurcation
• **4 anatomical variations of the pedicle:**

<table>
<thead>
<tr>
<th>Variants</th>
<th>Superficial Proximal</th>
<th>Deep Distal</th>
<th>Deep Proximal</th>
<th>Superficial Distal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers</td>
<td>15 (58%)</td>
<td>7 (27%)</td>
<td>3 (11%)</td>
<td>1 (4%)</td>
</tr>
</tbody>
</table>

![Image of anatomical variations](image)
Results


**Conclusion**

- **FDCA Flap:**
  - **Reliable and reproducible**: pedicle systematically present
  - **Sensitive** flap: functional result
  - **Low morbidity**: accessory pedicle and dorsal skin
  - Only one surgical step: ≠ cross finger flap

- **Pedicle:**
  - **Same emergence** and systematically before IPP joint
  - **Neurovascular**
  - **Artery**: around 2 cm from the palmar arterial bifurcation
  - **Nerve**: 4 anatomic variations: >50% = superficial and proximal relative to the artery

- **Skin pallet:**
  - **Functional skin unit** (including IPP for not to injure pedicle)
  - Paratenon preserved: accessible to a skin graft

- **Good potential indications:**
  - Mobility arc = **Homo** - and **Hetero**digital +++
  - Skin defect accessibility = **Middle size**
Limitations of the study

- Anatomic study
- Return of venous blood?
- Cortical integration?
- Graft of donor site?

- Prospective clinical study
Thank you for your attention!

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