

Abstract

Vascular Anatomy of Peroneal Perforator Flap

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Materials and Methods: We studied 50 cases of peroneal perforating branch about branching pattern, course, length of vascular pedicle, and perforating level of the perforating cutaneous branches from Oct. 1985 to November 2003 by doppler flow meter and intraoperative findings.

Results: 1) The perforating cutaneous branches were classified into four types, the Straight Branch (27cases), the Proximal Oblique Branch (11cases), the Branch from Muscular Artery (10cases), the Distal Oblique Branch(2 cases) respectively. The most common patten was Straight Branch, that was 54%. 2) There were 3 pathways of these branches, the most common one passed between the Soleus and Peroneus muscles(34 cases, 68%) 3) The length of vascular pedicle in Buoy Flap was variable from from 3 cm to 15 cm, but 32 cases(64%) were distributed between 5 cm and 6 cm. 4) The perforating level of branches were 5.9 cm in average from fibular neck to subcutaneous perforator artery 5) Peroneal Buoy Flap in possible to reconstruct both seperated bone and skin defect in some distance by One-Stage Operation and we can harvest maximal 8 × 16 cm sized flap in one perforating artery. If we include more two perforating artery, we get more wide flap which can cover large defect.

Key Words: Perforator cutaneous branch, Doppler flow meter, Perforator level

가 (free flap)

(variation)

(arterial based flap)

(branch based flap)

(perforator based flap)

(Fig. 1).

(cutaneous perforator)

(direct cutaneous perforator)

(peroneal artery)

(vascular fibular graft)

Osteocutaneous fibular vascularized graft

(free vascularized fibular graft)

(buoy flap)

(monitoring flap)

(branch 2,3)

(perforator)

(septo flap)

(perforator)

Peroneal perforator

Osteocutaneous Free Flap

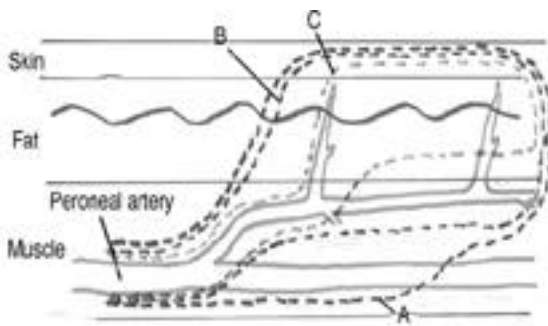


Fig. 1. Schema of advancement in flap concept4)

A. arterial based flap (black, most outer lines)

B. branch based flap (blue, middle lines)

C. perforator based flap (green, most inner lines)

14 가

1985 10 2003 11 36
 14 가 50
 Buoy Flap 가 9 ,
 (monitoring) 가 , (Vascular Pedicle) ,
 27 .
 36 Doppler Flow Meter
 Peroneal Buoy Flap 가 , (main peroneal
 가 artery)
 , (Vascular 가
 Pedicle) 가 Buoy (Fig. 2).
 14
 doppler 가
 가 , (Vascular Pedicle) 1. (Perforating Cutaneous
 Branch)
 doppler 가 47가

(Perforating Cutaneous Branch)
 Doppler Flow Meter



Fig. 2. This presents perforator of peroneal artery dissected between soleus and peroneus muscle.

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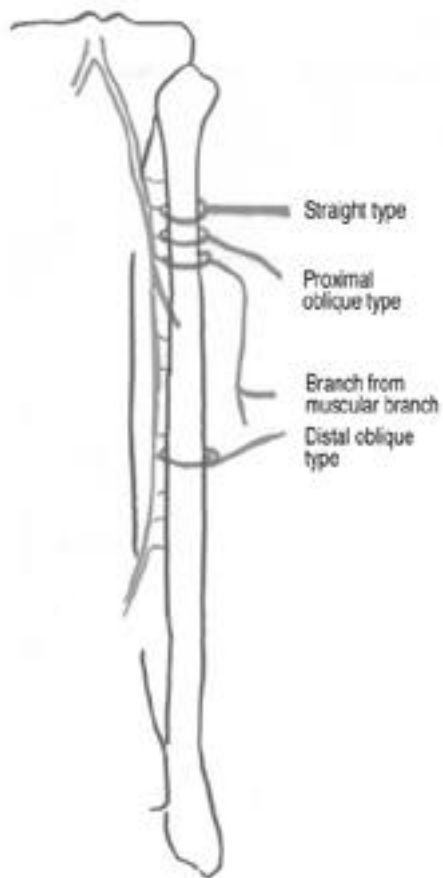


Fig. 3. Patterns of perforating cutaneous branch.

가

(Fig. 3).

2.

가

3가

가

(Anterior Margin)

2 , ,

가

3

가

(Fig. 4).

3.

(subcutaneous perforator artery)

5.9 cm

(Fig. 5).

4.

가

5.2 cm

3 cm

15

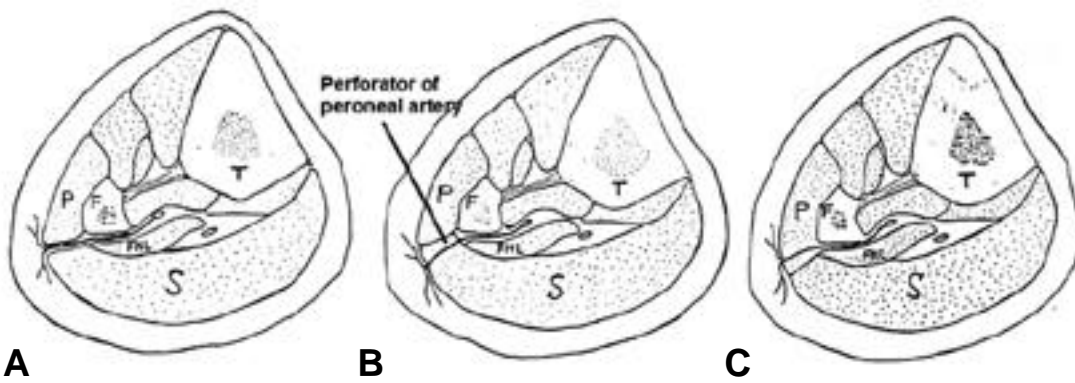


Fig. 4. Relations of perforating cutaneous branch (A) between the soleus and peroneus muscle (B) through the soleus muscle (C) through the peroneus muscle.

cm 5~6 cm 가 50 5.
32 64%

Buoy Flap

(Monitoring) 가

2×5 cm 8×16 cm

(Fig. 6).

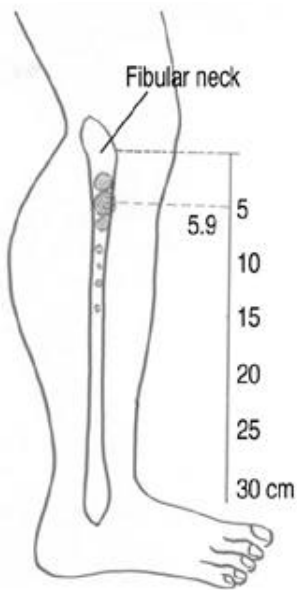


Fig. 5. Distance from fibular neck; Most common site of musculocutaneous perforator is 5.9 cm from fibular neck.



Fig. 6. Perforator flap is harvested 8 × 16 cm sized flap that had 8 cm pedicle length from lateral aspect of tibia

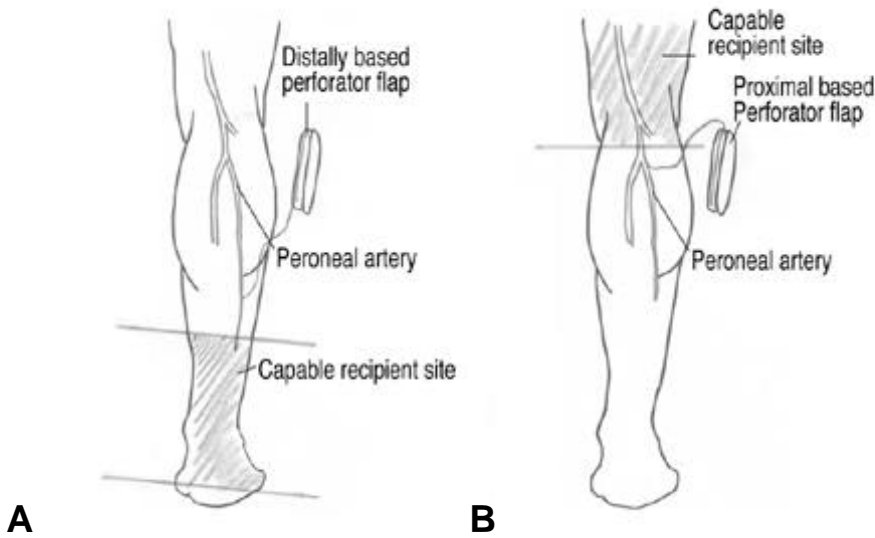


Fig. 7. Area that can be covered by perforator flap (A) distally based perforator flap that can cover around heel side (B) proximally based perforator flap that can cover around knee joint.

가

1983 Chen and Yan⁹ Bouy Flap 가
 Osteocutaneous Flap (Rib)
 Pectoral Skin , (Ilium)
 Groin Skin Flap, (Fibula) 가 34
 Peroneal Skin Flap, Chinese Flap 68% 가
 64% Yosimura
 Peroneal Skin Flap 가 Whetzel
 3 2
 , 20 cm 가 가
 (Peroneal , 3 1 가
 Vessel) , 4.8 ,
 0.5 1 mm ,
 (Torniquet) 7,8
 (Operation Field)가 가 .⁵ Christoph
 Heitmann cadavar study
 0.3 mm
 perforator 20 95 ,
 0.6 mm, 4.8 ,
 (66%) ,
 One Stage 가
 가 4×10 cm 3 2
 가 3 1 가
^{7,8,9} 가 Peroneal Flap .⁶
 Kochi Okubo¹⁰ 가 가
 4가 가
 , Flap
 Kochi Okubo Size
 ,
 Flap Size
 가 가 가
 Yosimura¹¹ , Peroneal perforator
 Pseudoarthrosis flap
 17 가

(Fig. 7).

REFERENCES

50
(microdissection)

1. 27 , 11 , 10 , 2 , 54% 가 .

2. 34 (68%) 가 .

3. Peroneal Flap 1 , 2 , 3

4. Buoy Flap , 1 8 x 16 cm 2

1) : , 20 6 , 1145-1152, 1985.

2) : *Buoy Flap* , 22 5 , 1157-1165, 1987.

3) : *Peroneal Buoy Flap* , 24 2 , 565-569, 1989.

4) : , 68-77, 2004.

5) Whetzel, Thomas P., et al.: *Arterial Fasciocutaneous Vascular Territories of the Lower Leg. Plast Reconstr Surg. 1997 Oct; 100(5):1172-83; discussion 1184-5.*

6) Christoph Heitmann, M.D., et al.: *Vasculature of the Peroneal artery: An anatomic study focused on the perforator vessels. J Reconstr Microsurg. 2003 Apr; 19(3):157-62.*

7) Sin-Daw Lin, Chih-Kang Chou, et al: *The distally based lateral adipofascial flap. Br J Plast Surg. 1998 Mar; 51(2):96-102.*

8) Akio Minami., et al.: *Simultaneous Reconstruction of Bone Skin defects by Free Fibular Graft with a Skin Flap, Microsurgery, 7;38-45, 1986.*

9) Chen, Z.H. and Yan, W.: *The Study and Clinical Application of the Osteocutaneous Flap of Fibula. Microsurgery, 4;11-16, 1983.*

10) Koichi Okubo, et al.: *Free vascularized fibula Graft associated with flap. Orthopaedic and Traumatic Surgery, Vol. 26, No. 5. 1983.*

11) Mitsuo Yosimura Takao Shimada: *Peroneal Island Flap for Skin Defects in the lower extremity J. Bone and Joint Surg., 67-A;935-946, July, 1985.*