

Abstract

**Gracilis Muscle Free Flap Transplantation in the Lower Extremities
- 32 Cases Snalysis-**

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Purpose: To cover the exposed tendons and bones after trauma and cure the concomitant osteomyelitis in the lower extremities, gracilis muscle free flaps are frequently preferred. 32 cases of gracilis muscle free flap we had done were analysed according to the indications, specification of flap length and width, pedicle length, vessels used in the anastomosis and final healing after at least over 1 year follow up.

Materials and methods: From August 1995 through November 2002, we have performed 32 cases of gracilis muscle free flap transplantation with the general microsurgical procedures in the lower extremities. Open fracture of the middle and distal tibia were 12, exposed heel 6, crushing injury in the foot 5 cases, open fracture of the ankle 4, chronic osteomyelitis of the tibia 3 and osteomyelitis of the tarsal bones 2. Tailored flap length were ranged from 16 cm to 4 cm, width were from 5cm to 4cm. Pedicle length averaged around 4 cm. Anastomosis of one artery and two veins in both of donor and recipient were performed in 17 cases and one artery and one vein in 15 cases.

Results: All flaps were survived, except 2 cases. Final flap healing was satisfactory to both of the patients and microsurgeon.

Conclusion: Gracilis muscle free flaps are frequently chosen to cover the exposed components and cure the osteomyelitis in the lower extremities.

Key Words: Exposed tendons and bones, Osteomyelitis, Gracilis muscle flap

8 66 42.4
 가 27 , 5
 (flap) 12
 32 cm (heel) 6 (18.8%),
 6 cm , 5 (15.6%),
 1. 4 (12.5%), 3 (9.4%),
 2 (6.2%) (Table 1).
 (medial femoral circumflex artery) 16
 6 8 cm cm 4 cm , 5 cm
 2. 1.0 2.0 mm , 2 4 cm 가 ,
 5 cm 2
 1.5 2.0 mm . 가
 (obturator nerve) 1
 2 cm .
 20 cm 6 cm 4 , 28 4 cm
 , 17 1 (flap)
 (functioning muscle) 가 .
 32
 , ,
 (dominant medial femoral circum-
 flex artery and venae comitantes) ,
 12
 11 , 1 ,
 6 2 , 4
 , 5 2 ,

1995 8 2002 11

32
1

Table 1. Indications

Causes	Cases(%)
Open tibia Fracture	12(37.5)
Exposed heel	6(18.8)
Crushing injury, foot	5(15.6)
Open ankle fracture	4(12.5)
Chronic O-M, tibia	3(9.4)
Chronic O-M, tarsal	2(6.2)
Total	32(100.0)

O-M: osteomyelitis

Table 2. Recipient artery

Causes	Recipient artery	
Open tibia Fracture	anterior	11
	posterior	1
Exposed heel	dorsalis pedis	2
	posterior	4
Crushing injury, foot	dorsalis pedis	2
	anterior	1
Open ankle fracture	posterior	2
	dorsalis pedis	4
Chronic O-M, tibia	anterior	1
	posterior	2
Chronic O-M, tarsal	anterior	1
	posterior	
Total		32

O-M: osteomyelitis

1 , 2 , (collapse)
 4 , 가 가 가
 3 1 , 17 2
 2 , 2 .
 1 (Table 2). , 22
 (10.0 Ethilon®, Johnson & Johnson Co.) 2 10
 , 32 17 2 2
 2 2 (epitheliza
 (Table 3). 7 tion)
 가 6 50% 가 ,
 (greater saphenous vein) (branch) ,
 , 1 (lesser saphenous .
 vein) . 32 3 .
 , 2 1 .
 - .
 , 가
 32 30 가 .
 93.8% , 가 2 (ramus)
 , 가 2 (sarto
 2 1 1995 6 rius muscle)
 , (semitendinosus muscle)
 가 , (obturator nerve)
 2 2
 , 2
 (minor vascular pedicle)
 ,
 , 1
 .
 (medial femoral circumflex artery)
 6 8 cm ,
 1.0 2.0 mm , 2
 ,
 1.5 2.0 mm .
 (obturator nerve)
 가 .
 (functioning muscle)
 ,
 ,

Table 3. Anastomosis of the vessel

Anastomosis		Cases(%)
Donor	Recipient	
1 artery & 2 veins	1 artery & 2 veins	17(53.1)
1 artery & 1 vein	1 artery & 1 vein	15((46.9)
Total		32(100.0)

16 cm , 4 cm , 16 cm , 11 12

가 , (tibialis anterior) (extensor hallucis longus)

16 cm 가 가

6 4

4 cm 32 3

1 (medial femoral circumflex artery) (discrepancy)

32 17

(adductor magnus) 2 2

(assistants) (tie)

2 1

가 가 가

6 (greater saphenous vein) (branch) , 1

(lesser saphenous vein)

2

Mathes

(marking pen)

Vranckx ¹⁰ 60

83% 5 cm 7 cm

(transposed) (transplanted) - , 13%

81% , - 19%

⁵ 3

2 5 3 3

3

¹⁰ 22

7 가 . 1
 32 가
 (medial femoral circumflex artery)
 2
 가 (flap)

REFERENCES

1) : . p.185-192. , 2003.

2) Buncke HJ: *Microsurgery: transplantation-replantation. Gracilis muscle transplantation.* p. 370-393, Lea & Febiger, 1991.

3) Jobe MT: *Microsurgery. cited from Campbell 's Operative Orthopedics.* Mosby Co, p. 3330, 2003.

4) Mathes SJ, Alpert BS and Chang N: *Use of the muscle flap in chronic osteomyelitis: Experimental and clinical correlation.* *Plast Reconstr Surg* 69:815-828, 1982.

5) Ger R: *Muscle transposition for treatment and prevention of chronic post-traumatic osteomyelitis of the tibia.* *J Bone and Joint Surg* 59A;784-791, 1977.

6) Hallock GG: *Further experience with the medial circumflex femoral gracilis perforator free flap.* *J Reconstr Microsurg* 20:115-122, 2004.

7) , : 7:129-134, 1998.

8) Manktelow RT: *Microvascular reconstruction.* p. 37-44, Springer-Verlag, 1986.

9) Manktelow RT and Zuker RM: *Microvascular free gracilis muscle and musculocutaneous flap.* *Grabb ' s Encyclopedia of Flaps, 2nd ed.* Lippincott-Raven, Philadelphia, p. 1793-1794, 1998.

10) Vranckx JJ, Misselyn D, Fabre G, Verhelle N, Heymans O and Hof BVD: *The gracilis free muscle flap is more than just a graceful flap for lower-leg reconstruction.* *J Reconstr Microsurg* 20:143-148, 2004.