

Abstract

Reconstruction of the Extremities with Lateral Arm Free Flap

Jun-Mo Lee, M.D., Ju-Hong Lee, M.D., Hak-Ji Kim, M.D.

*Department of Orthopedic Surgery, Chonbuk National University Medical School and
Research Institute of Clinical Medicine, Chonbuk National University, Jeonju, Korea*

Introduction: To cover the exposed tendons and bones in the foot and hand which need coverage and abundant vascular flow, lateral arm flaps were transferred. Lateral arm flap is a thin and innervated fasciocutaneous flap with a lower lateral cutaneous nerve and posterior radial collateral artery.

Materials and methods: From October 1992 through September 2003, we have performed 5 lateral arm flaps for reconstruction of the exposed achilles tendons in 2 cases and the exposed forearm extensors, 2nd to 5th metacarpal bones and scaphoid each 1 case. The causes were traffic accident in 2 cases and machinary injury in 3 cases. Age range was between 31 to 74 (average 50) and all male except 1.

Posterior lateral collateral artery and venae comitantes were anastomosed by end to end in 3 cases and vena comitante in 2 cases. Lower lateral cutaneous nerve was anastomosed with a branch of superficial radial nerve in 2 cases.

Results: The results were evaluated by survival of the flap, sensory discrimination, cosmesis and comfort in the activities of the daily living. All flaps were survived. Sensory recovery was graded as deep cutaneous pain sensibility in 2 cases. Cosmesis was moderately satisfied and comfort was good except 1 as moderate. Postoperative defatting procedure was done in 1 case and skin abrasion was occurred in 1 case.

Conclusion: Lateral arm flap was suitable for coverage of the exposed achilles tendons and exposed forearm extensors, metacarpals and scaphoid in the wrist.

Key Words: The foot and hand, Lateral arm flap

cm, 4 cm, 4 cm, 7
 cm (Table 1). 3

(posterior radial collateral artery)
 (lower lateral cutaneous nerve of the arm)

2

1 2

가

가

가

가

(cephalic vein)

(heel)

(deltoid muscle)

2

(posterolateral arm)

(triceps fascia)

3 5
 10 11

3 2

(tacking suture)

(pos-

terior radial collateral artery)

(8 5)

가

(posterior radial col-

lateral artery)

가.

1992 10

2003 9

5

31

73

50

가 4

가 1

2

3

Table 1. Cases

Case	Age/Sex	Cause	Lesion	Size of flap
1.	45/M	traffic accident	exposed achilles	7 cm x 4 cm
2.	58/M	press machine injury	exposed scaphoid	4 cm x 3 cm
3.	43/M	traffic accident	exposed achilles	6 cm x 3 cm
4.	31/F	machinary injury	2-5 MC amputation	6 cm x 4 cm
5.	73/M	machinary injury	exposed forearm extensors	6 cm x 4 cm

*MC: metacarpal level

(lower lateral cutaneous nerve of arm) , 가 (cephalic vein) (flap) , (flap) , 2 (lower lateral cutaneous nerve of arm) 1 (Table 2). 1 1. 1. 10.0 (10.0 Ethilon, Johnson & Johnson) 45 , (lateral malleolus of fibula) (1 (7 cm × 4 cm) (Fig.1A).

Table 2. Neurovascular anastomosis of the flap

Case	Lesion	Recipient structures
1	exposed achilles	dorsalis pedis artery, vena comitante
2	exposed scaphoid	radial artery, cephalic vein, 1 branch of radial nerve
3	exposed achilles	dorsalis pedis artery, vena comitante
4	exposed metacarpal	radial artery, cephalic vein, 1 branch of radial nerve
5	exposed extensors	radial artery, 2 branches of cephalic vein

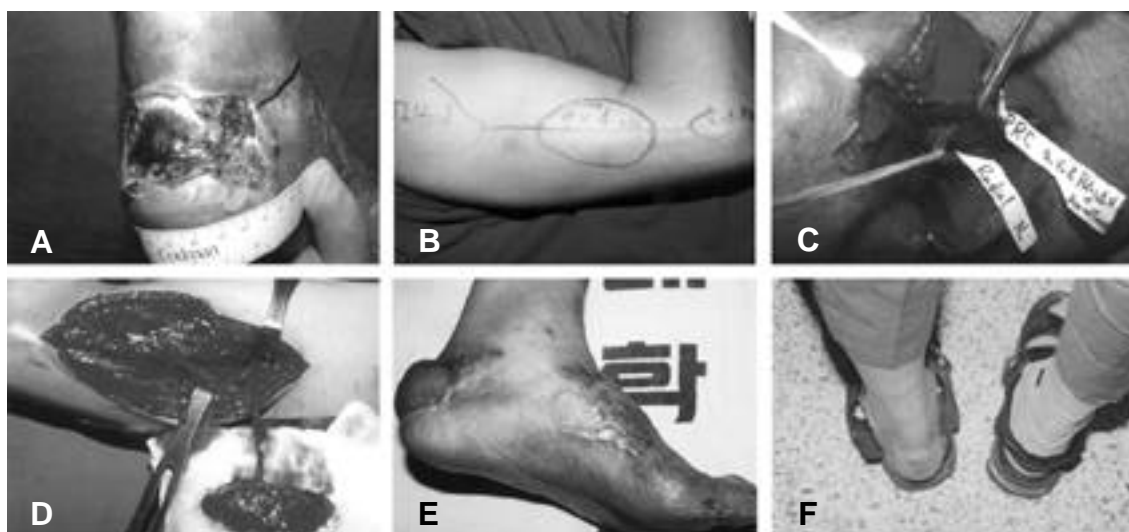


Fig. 1. (A) Achilles tendon was exposed (7 cm × 4 cm). (B) Lateral arm flap was designed from deltoid insertion to the lateral epicondyle. (C) Posterior radial collateral artery and lower lateral cutaneous nerve of the arm) were identified. (D) Lateral arm flap was isolated with relatively long vascular pedicle(around 7 cm). (E) The flap was survived. (F) Returned to the job.

(7 cm x 4 cm)
 (Fig. 1B),
 (posterior radial collateral artery)
 (lower lateral cutaneous nerve of arm), (flap)
 (Fig. 1C, 1D).
 (10.0 Ethilon®, Johnson & Johnson Co.)
 (lateral malleolus of fibula)
 (Fig. 1E).
 (maceration)
 (Fig. 2A).
 (4 cm x 3 cm)
 (Fig. 2C)
 (cephalic vein)
 (lower lateral cutaneous nerve of arm)
 (Fig. 2D),
 (S1)
 (Fig. 2E).
 (lower lateral cutaneous nerve of arm)
 (posterior cutaneous nerve of forearm)

가 .
 5 ,
 1 2-5
 1 2
 (S1: deep cutaneous pain sensibility),
 2 2
 1 (2)
 가 가
 (maceration) 1
 4 (Table 3).
 1 10.0
 (profunda brachii artery) (deltoid)
 (posterior radial collateral artery)
 (lateral intermuscular septum)
 2 ,
 (deltoid)
 2.
 58 가
 2.
 1 cm 15 cm 4 7
 9.7 cm .
 (lateral intermuscular septum)
 가 .
 (posterior radial collateral artery)
 2
 3

(flap)
가
(lower lateral cutaneous nerve of
arm)
(posterior cutaneous nerve of forearm)

Table 3. Results

Evaluation	Success cases(%)
flap survival	5(100)
sensibility	2(40)
cosmesis	4(80)
comfort in ADL	4(80)

*ADL: activities of daily living

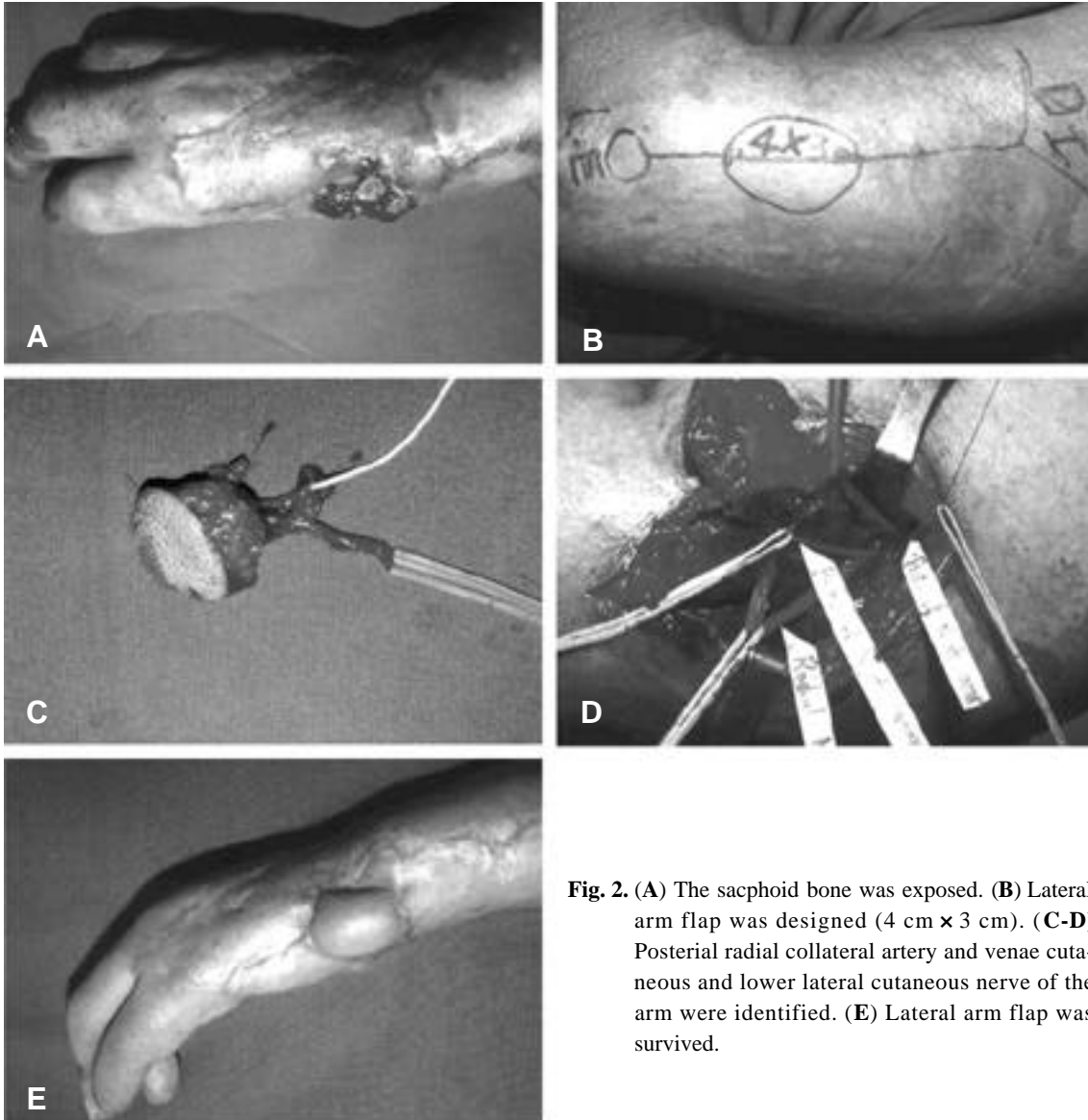


Fig. 2. (A) The scaphoid bone was exposed. (B) Lateral arm flap was designed (4 cm × 3 cm). (C-D) Posterior radial collateral artery and venae cutaneae and lower lateral cutaneous nerve of the arm were identified. (E) Lateral arm flap was survived.

(posterior cutaneous nerve of forearm) 가 2 14 mm 34 mm
 20.5 mm 2
 2
 (deltoid tuberosity) 가 2
 (lateral head) 2 (S1)
 가 .⁹ 가
 2 가 6 cm ¹¹ 가
 가 8 cm
 1.5 2.0 mm 2
 5. 6 (pos-
 16 cm terior cutaneous nerve of forearm)
 2.2 mm, 2.0 mm 6
 25 cm 15 5
 cm . Moffett 가 .¹² 5 74
¹⁰ 1 4
 (spiral groove) (outlet)
 1.25 mm 1.75 mm 1.55 (posterior cutaneous nerve of forearm)
 mm 가 ,
 7 cm, 4 cm 가
 5 cm ,
 8 5
 2.0 mm, 2
 2.3 mm, 1.23 mm 가
 , 2 가
 , 1 가 ,
 5 ,
 가 1 1
 .⁷ (defatting)
 (lower lateral cutaneous nerve of arm) (posterior
 Buncké radial collateral artery)
 8 1 (lower lateral cutaneous nerve of the arm)
 8

REFERENCES

- 1) Park MC, Park DH, Lee BM, Kim KS: *Lateral arm flaps: its clinical applications and superiority. J Korean Micro Surg* 5:62-69, 1996.
- 2) Gray H: *Muscles and fasciae of the upper limb. In Gray 's anatomy, 38th ed. p. 842, Philadelphia: Lea and Febiger, 2000.*
- 3) Yousif NJ, Warren R, Matloub HS and Sanger JR: *The lateral arm fascial free flap: its anatomy and use in reconstruction. Plast Reconstr Surg* 86:1138-1145, 1990.
- 4) Summers AN, Sanger JR and Matloub HS: *Lateral arm fascial flap: microarterial anatomy and potential clinical applications. J Reconstr Microsurg* 16:279-286, 2000.
- 5) Buncke HJ: *Transplantation-replantation. The lateral arm flap: Microsurgery p. 187-204, Lea & Febiger, 1991.*
- 6) Ahn HC: *Revision of lateral arm free flap; can it be a substitute for radial forearm free flap? J Korean Micro Surg* 6:80-86, 1997.
- 7) Jobe MT: *Microsurgery. In Campbell 's Operative Orthopaedics. p.3297-3304, Mosby, 2003.*
- 8) Kim DC, Kim SS, Ha DH, Yoo HJ and Lee DH: *Reconstruction for the soft tissue defect of heel using free lateral arm neurosensory flap. J Korean Micro Surg* 8:15-21, 1999.
- 9) Jobe MT and Martinez SF: *Peripheral nerve injuries. In Campbell 's Operative Orthopaedics. p.3222-3229, Mosby, 2003.*
- 10) Moffett TR, Madison SA, Derr JW and Acland RD: *An extended approach for the vascular pedicle of the lateral arm free flap. Plast Reconstr Surg* 89:259-267, 1992.
- 11) Katsaros J, Shustermann M, Beppu M, Banis JC and Acland RD: *The lateral upper arm flap: Anatomy and clinical applications. Ann Plast Surg* 12:489-500, 1984.
- 12) Culbertson JH and Mutimer K: *The reverse lateral upper arm flap for elbow coverage. Ann Plast Surg* 18:62-68, 1987.