

Ender

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Ender

Ender

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20 cm 가

가 Gustilo-Anderson⁵⁾ Grade IIIa

13 cm가 (Fig. 1).

2 Ender 가

Ender 가

Ender 2 (Fig. 2A), 1 3

Ender

가 1

K- 18 93 4

(Fig. 2B). 4 4 6

Table 1. Enneking functional score system in lower limb

Score	Pain	Function	Emotional Acceptance	Support	Walking	Gait
5	None	No Restriction	Enthused	None	Unlimited	Normal
4	-	-	Intermediate	-	-	-
3	Modest	Recreational Restriction	Satisfied	Brace	Limited	Minor Cosmetic
2	-	-	Intermediate	-	-	-
1	Moderate	Partial Disability	Accepts	1 Cane Crutch	Inside Only	Major Cosmetic Minor HCAP
0	Severe	Total Disability	Dislikes	2 Canes Crutches	Unable Unaided	Major HCAP

: Score of the patient in our case



Fig. 1. 19 year male patient had a segmental fracture and bone loss of femoral midshaft.

1.8 cm
1 (Fig. 3B) 2.5 cm, 3 (Fig. 3C) 2.7 cm,
8 (Fig. 3D) 3.1 cm 81.6%
, 8 CT
(Fig. 4).
Enneking³⁾
30 28 (93%)
(Table 1).
1975 Taylor⁹⁾
가 , ,
1,7,8,10) 62
de Boer¹⁾
가 가 가

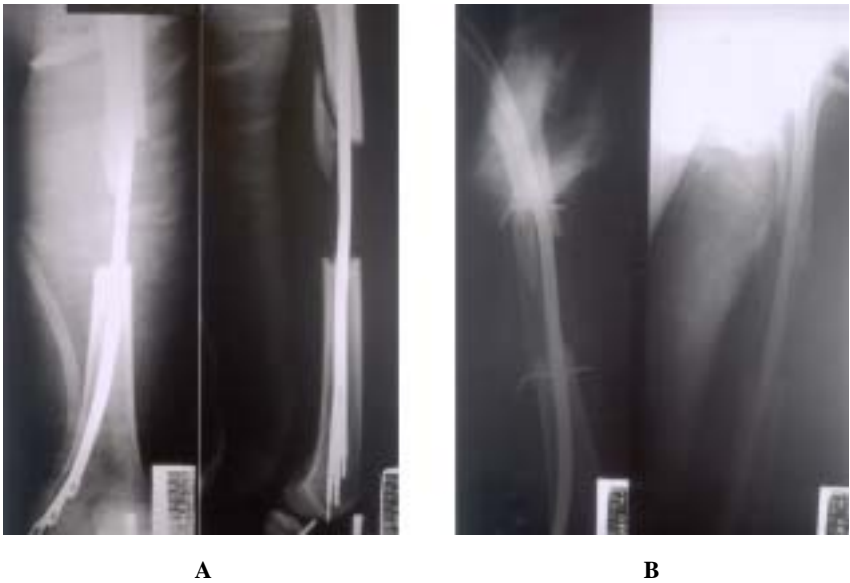


Fig. 2A. Retrograde Ender nails were inserted.
2B. At postop. 3 weeks, vascularized fibular bone graft was added.



Fig. 3A. Postop. 6 months, radiologic union was obtained.

3B. Postop. 1 year.

3C. Postop. 3 years.

3D. Postop. 8 years.

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28%

de Boer ¹⁾
40% , Ihara ⁷⁾
. Chew ²⁾ 7 9

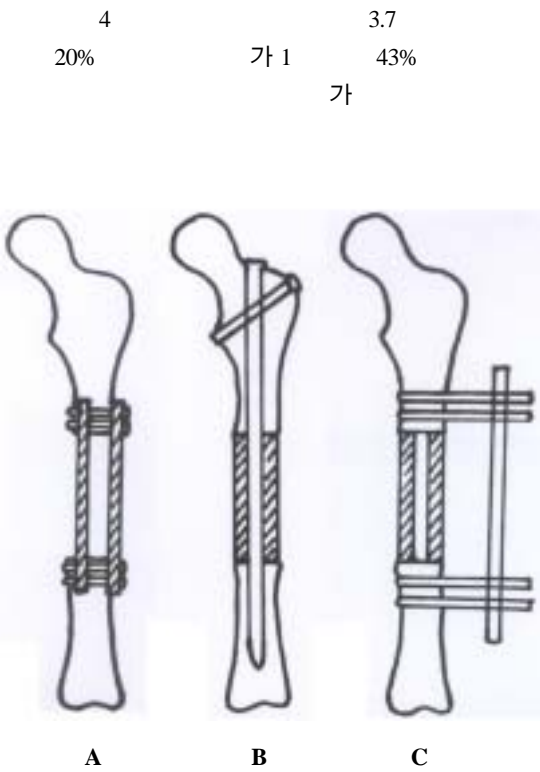


Fig. 4. At postop. 8 years, CT axial veiws shows medullary widening and cortical hypertrophy.

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Tomita ¹⁰⁾
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(Fig. 5A) Hou ⁶⁾
(Fig. 5B, 5C).

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. de Boer
1
. Kasashima
1
가
가
. Fujimaki ⁴⁾

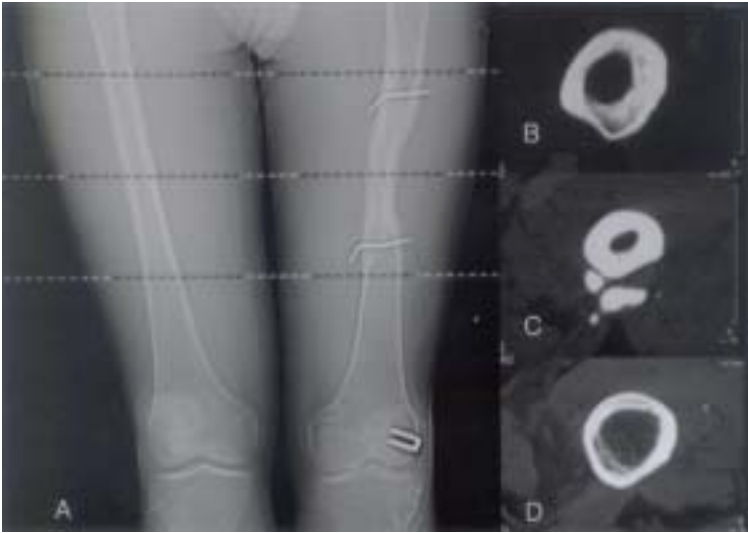


Fig. 5A. Tometa Y's two-strut free vascularized bone grafts with screw fixation.
5B. SH's two-strut free vascularized bone grafts with interlocking nailing.
5C. SH's two-strut free vascularized bone grafts with external fixator.



Fig. 6. At postop. 8 years, patient shows good functional result.

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(stress)

REFERENCES

- 1) **De Boer HH, Wood MB and Hermans J:** Reconstruction of large skeletal defects by vascularized fibular transfer. Factors that influenced the outcome of union in 62 cases. *Int Orthop*, 14: 121-128, 1990.
- 2) **Chew WYC, Low CK and Tan SK:** Long term results of free vascularized fibular graft. A clinical and radiographic evaluation. *Clin Orthop*, 311: 258-261, 1995.
- 3) **Enneking WF, Dunham W, Gebhardt MC, Malwar M and Pritchard DJ:** A system for functional evaluation of reconstruction procedures after surgical treatment of tumors of the musculoskeletal system. *Clin Orthop*, 286: 241-246, 1993.
- 4) **Fujimaki A and Suda H:** Experimental study and clinical observation on hypertrophy of vascularized bone grafts. *Microsurgery*, 15: 726-732, 1994.
- 5) **Gustilo RB, Kyle RF and Templeman D:** Fractures and dislocations. St Louis. Mosby, 1993.
- 6) **Hou SM and Liu KT:** Reconstruction of skeletal de-

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Ender

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De

Boer가

66%

81.6%

0 ,

120 (Fig. 6) 93% Enneking

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fects in femur with two-strut free vascularized fibular grafts. *J Trauma*, 33: 840-845, 1992.

- 7) **Ihara K, Doi K, Sakai K, Kuwata N and Kawai S:** Fracture of free vascularized fibular grafts. *J Jps Soc Reconstr Microsurg*, 5: 86-92, 1992.
- 8) **Kasashima T, Minami A and Kutsumi K:** Late fracture of vascularized fibular grafts. *Microsurgery*, 18: 337-343, 1998.

- 9) **Taylor GI, Miller GDH and Ham FJ:** The free vascularized bone graft. A clinical extension of microvascular technique. *Plast Reconstr Surg*, 55: 533-544, 1975.

- 10) **Tomita Y, Murota K, Takahashi F, Moriyama M and Beppu M:** Postoperative results of vascularized double fibular grafts for femoral pseudoarthrosis in the large bone defect. *Microsurgery*, 15: 316-321, 1994.

Abstract

**Treatment of Large Bone Defect of Femoral Shaft with
Vascularized Fibular Graft and Ender Nail
- A Case Report -**

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Vascularized fibular graft is one of the well accepted methods in the treatment of large bone defect of femoral shaft. But bone fixation with Ender nails through the same incision of bone graft has never been reported. We performed vascularized fibular graft and bone fixation with Ender nails through single medial skin incision and permitted physiologic stress. We achieved early radiologic union and medullary widening and the patient could return to work 9 months after the accident. We would like to report such an experience of treatment with the reference of literature.

Key Words: Bone defect of femoral shaft, Vascularized fibular graft, Ender nail

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