

# LENGTHENING OF REPLANTED OR REVASCULARIZED LOWER LIMBS: IS LENGTH DISCREPANCY A CONTRAINDICATION FOR LIMB SALVAGE?

Fatih PARMAKSIZOGLU<sup>1</sup>, Tahsin BEYZADEOGLU<sup>2</sup>

<sup>1</sup>Yeditepe University, School of Medicine, Department of Orthopedics and Traumatology Istanbul - TURKEY

<sup>2</sup>Private Umut Hospital, Department of Orthopedics and Traumatology, Istanbul - TURKEY

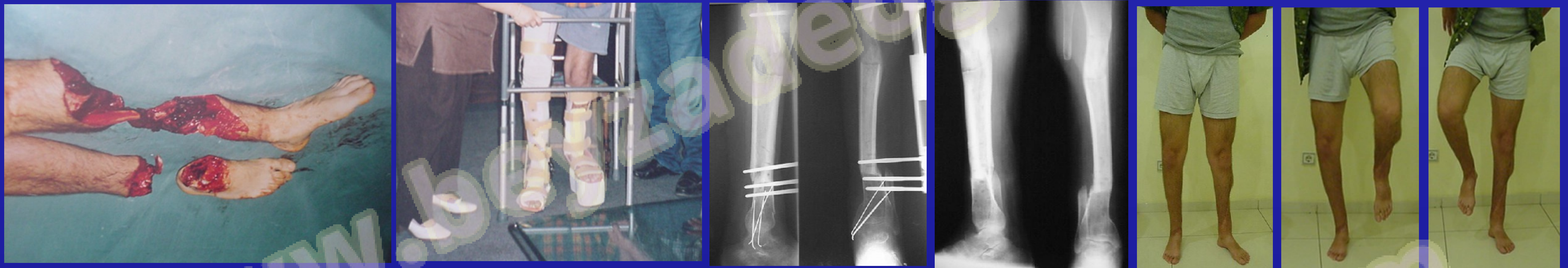
In our clinic we consider three factors to evaluate the replantation or revascularization chance of below-knee amputations: A stable knee that can control joint motions; Preservation of the sensibility of the sole; Leg-length discrepancy that can be restored in the future.

## MATERIALS AND METHODS:

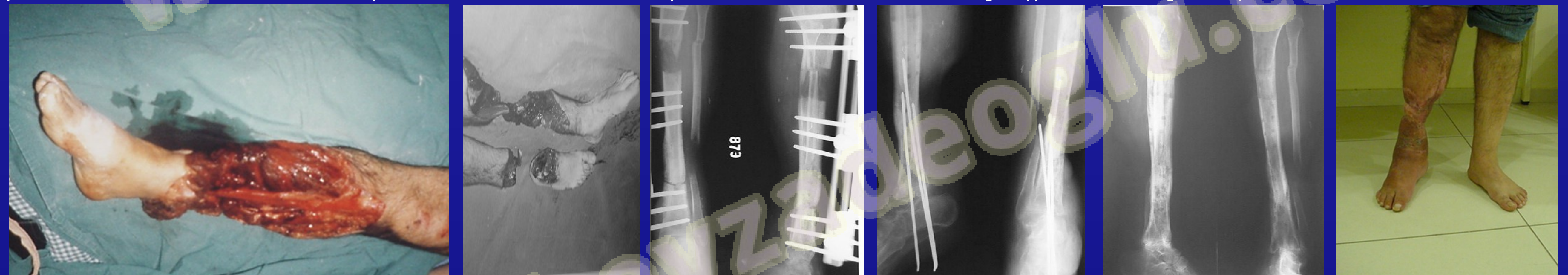
Between 1991 and 2000, four patients with four total and two sub-total below-knee amputations had replantation or revascularization for their severely damaged lower extremities. All of them had extensive debridement, vascular repair, bone shortening and nerve repair for sensibility of their soles. One of the replanted extremities was failed and had to be below-knee amputated because of the sepsis. After bony consolidation, four legs were lengthened; for elimination of the length discrepancy in three cases and for obtaining balanced body proportion in one case in which the other leg was also amputated. In all operations unilateral dynamic axial external fixator was used. The lengthenings were performed from the proximal tibial metaphysis with a subperiosteal osteotomy. The mean follow-up period was 56 months (range 21-124 months).

## CASE REPORTS AND RESULTS:

**Case 1:** A male aged 20 years had bilateral below knee amputations with a MESS score of 19 in a car accident. He had bilateral replantations of his lower extremities with end-to-end anastomoses of tibialis anterior arteries performed by two different surgical teams. He had a 7-cm. of length difference between two extremities and valgus deformity of the ankle of his shortened left leg. 9 months after the replantation, following the bony consolidation, his left leg was lengthened 6 cm. by external fixator in 6 months' time and the valgus deformity was corrected by osteotomy of the distal tibia and fixing with K-wires. He also had arthrodesis of his right ankle. After the treatment the patient can walk with short heel wedge support for his left foot while wearing ordinary shoes.



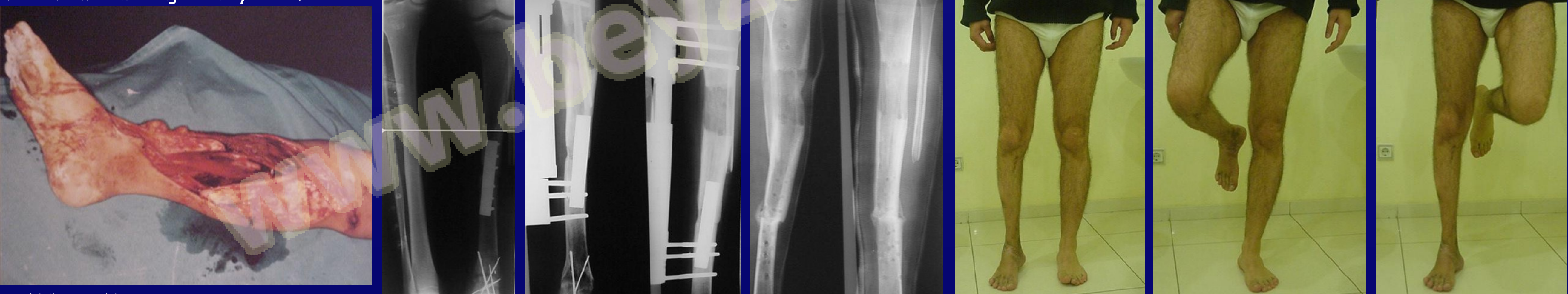
**Case 2:** A male aged 44 years had subtotal amputation of his right distal cruris with a MESS score of 19 after a train accident. He had revascularization with end-to-end anastomoses of tibialis anterior artery. He had 5-cm. of length difference. 12 months later, the patient injured from a second car accident resulting the fracture of his tibia at the revascularization site. Both the lengthening from the metaphysis of proximal tibia and also treatment of the fracture of the distal tibia were performed with a dynamic axial fixator in the same period. Lengthening of 5 cm. was performed in 5 months' time. Arthrodesis was performed to stabilize his ankle. The patient could walk with a short heel wedge support while wearing ordinary shoes.



**Case 3:** A male aged 21 years had bilateral below-knee total amputations in a car accident with a MESS score of 20 for each side. Bilateral replantation of the amputated parts were performed, but early failure of the right lower extremity was obtained and below knee amputation was performed at the 28th day, because of the sepsis. He had an unbalanced body proportion with below knee amputated right and shortened, replanted left lower extremities. After 8 months his left leg was lengthened for 7 cm. in 6 months' time and a balanced proportional body was obtained. The patient could walk with a right below knee prosthesis.



**Case 4:** A male aged 19 had below knee subtotal amputation of his right leg after a car accident and the revascularization of the tibialis anterior artery was performed by grafting the saphene vein. Arthrodesis of the ankle was also performed during revascularization. Bony consolidation was obtained after 5 months. His 5 cm. shortened lower extremity was lengthened 5 cm. in 6 months' time. He had arthrodesis of his MP joints and tenotomies of the flexor tendons as stabilizing procedures. He had a fracture of the tibia from the lengthening site that was treated conservatively. He could walk wearing ordinary shoes.



## CONCLUSION:

The Mangled Extremity Severity Score (MESS) is a guide for the salvage decision and bone and soft tissue shortening increases the score, decreasing the possible replantation chance. While a score of less than 7 points suggests that salvage should be attempted, bone loss more than 6 centimeters adds 6 points to the score. Evaluation of the injury according to MESS would cause the surgeon to avoid salvage surgery with a shortened extremity because of the debridement of the soft tissue and bone. But shortness is an avoidable problem and does not form a contraindication for replantation or revascularization as below knee traumatic total or subtotal amputations can be salvaged by replantation or revascularization following extensive debridement with deliberate shortening. The restoration of the leg length discrepancy can be performed after bony consolidation. We think the amount of limb shortening is not a major criterion in evaluating a traumatic total or subtotal below-knee amputation for salvage replantation or revascularization. A knee that has stable joint motions and possibility of preservation of sensibility of the sole broadens the scope of indications for limb salvage even with deliberate shortening that can be restored by lengthening and length discrepancy is not a contraindication for limb salvage.