

A Case Report on Salvaging Complicated Leg Wound: Going Back to Basics of Reconstructive Ladder

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ABSTRACT

This article presents a complicated leg defect with exposed tibia and fibula stabilized with an external fixator with a MESS score of 6 in which we could not use the higher rungs of a reconstructive ladder and had to escalate to the basics of the reconstructive ladder i.e., Debridement, Dressing, Primary closure, Skin graft and local flap.

Keywords: Leg wound, Reconstructive ladder, Amputation, Salvage

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INTRODUCTION

A complicated leg wound comprises a composite defect involving skin, subcutaneous tissue, bone, nerves and vessels. Such a wound raises two questions. Firstly, whether the limb should be salvaged or amputated? There are few scores given in the literature to help with this decision but these scoring systems are not absolute. One of them is Mangled Extremity Severity Score (MESS). A score below 7 indicates salvage of limb with good specificity and a score equal to or more than 7 denotes amputation but it has very poor sensitivity. Once the decision of limb salvage is made the next question arises: what reconstructive plan can be made to cover the wound? For any complex leg wound with exposed bone, we directly escalate to higher rungs of the reconstructive ladder comprising free flap, perforator-based flap, muscle flap or cross leg flap. This article presents a complicated leg defect with an exposed tibia and fibula stabilized with an external fixator with a MESS score of 6 in which we could not use the higher rungs of a reconstructive ladder and had to escalate to the basics of reconstructive ladder i.e., Debridement, Dressing, Primary closure, Skin graft and local flap.

CASE REPORT

A 29-year-old male patient met with a road traffic accident and sustained a left lower limb injury and was diagnosed with a shaft of femur tibia and fibula fracture. The external fixator which was applied to the femur was removed and nailing was done one month later. Ilizarov external fixator was later applied to the left tibia and fibula fracture. On presentation, there was a wound of 16*5 cm size with slough and exposed lustreless 6 cm of tibia and 14 cm of the fibula.

There was a cavitory defect with unhealthy granulation tissue. Ilizarov was *in situ* and there was evidence of muscle atrophy and foot drop (Figure 1).

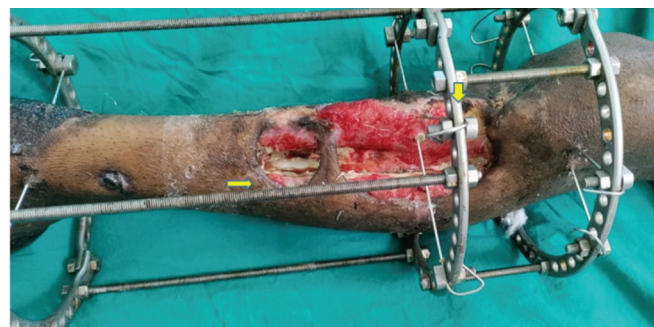


Figure 1: Wound at presentation with exposed tibia (downward arrow) and fibula (sideways arrow).

The dorsalis pedis artery and anterior tibial artery were not palpable but the posterior tibial artery was palpable. There was reduced sensation over the dorsum and sole of the foot. Movements at the knee were restricted and those at the ankle and toes were absent.

Initially, it was planned to fill the cavity with negative pressure wound therapy (NPWT) followed by debridement and gastrocnemius flap cover. But we encountered some challenges in this. As the pin tract of Ilizarov was within the wound it was difficult to maintain negative pressure of NPWT and out of three sittings only once the negative pressure was maintained—the inability of NPWT to maintain led to the development of pus pocket (Figure 2). In the Operation Theatre

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on debridement and exposing the gastrocnemius, the muscle was found to be necrotic so the procedure was abandoned rather a formal debridement was done.



Figure 2: Pus pocket after failed NPWT.

With this we came back to the pavilion with same wound but with inability to use higher rungs of reconstructive ladder. Perforator-based flaps and free flaps could not be used because of dubious vascularity which could not be checked with CT angiography as there was artefact effect of Ilizarov. Cross leg flap could not be done because of presence of external fixator and inability to take it down. Also there was still a cavity left. As muscles were necrosed muscle flaps could not be used.

To overcome collection of pus in the pocket a posterior incision was kept. We removed a segment of fibula to allow surrounding skin and soft tissue to be used to close the cavity and regular dressing with NPWT led to the wound contraction (Figure 3). Primary closure of the distal part was done. Debridement and skin graft of middle part was done and bone debridement and local transposition flap was done for upper part (Figure 4).

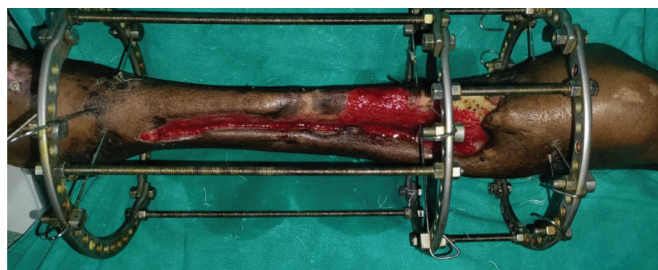


Figure 3: Wound after fibulectomy, NPWT and repeated dressings.

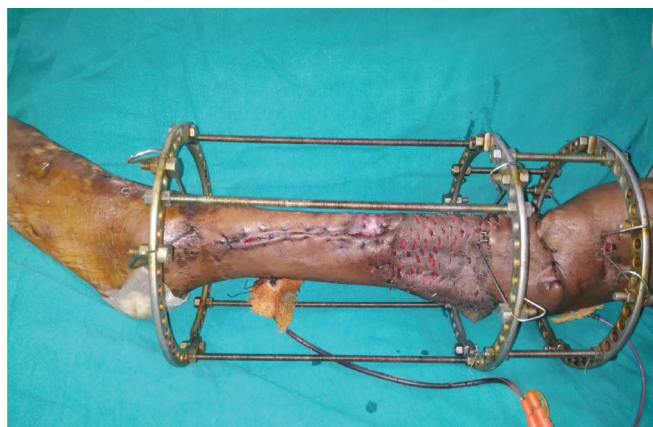


Figure 4: Primary closure for distal part + Debridement and SSG for middle part + bone debridement and Local transposition flap

DISCUSSION

The original MESS was developed in 1990¹ with the MESS for salvaged limbs ranging from 3 to 6, whereas the MESS for the amputated limbs ranged from 7 to 12. These authors concluded that in their hands, a MESS of 7 or greater predicted amputation with an accuracy of 100%. Due to a lack of reproducibility alternative scoring systems were developed. These systems include the Limb Salvage Index; the Predictive Salvage Index; the Nerve Injury, Ischemia, Soft-tissue Injury, Skeletal Injury, Shock and Age of Patient Score (NISSA); and the Hannover Fracture Scale.² Each contains various elements of patients' characteristics at presentation (e.g., age, presence of shock), structural injury (e.g., concomitant bone, muscle, skin, nerve, vascular, injury, degree of contamination), and treatment factors (e.g., warm ischemia time, time to treatment).³⁻⁶ These five scoring systems were prospectively evaluated in 2001 by Bosse *et al.*⁷ as part of the Lower Extremity Assessment Project (LEAP) study group. This extensive analysis could not validate the clinical use of any of these scoring systems. The scores did have high specificity in predicting limb salvage potential but had low sensitivity in predicting the need for amputation. A subsequent study by the LEAP group showed that none of these scoring systems were predictive of functional recovery in patients who underwent successful limb reconstruction.⁸

Of the two the decision of limb salvage was chosen using MESS score of 6 for our patient. Once the decision was made the reconstructive options were explored. NPWT was not working as the pin tract was hindering the device's seal. This was leading to pus pocket formation. As the muscles were also necrosed we could not do any muscle flap. The vascularity of the leg was very dubious and since there was an external fixator CT angiography could not be done as it was causing an artefact. Since the vascularity was not guaranteed the question of free flap and perforator flap was out of reach. As the highest rungs of the reconstructive ladder were exhausted, we were left with the lower rungs. After thorough debridement and fibulectomy repeated dressing interspersed with vacuum dressing was done which resulted in the obliteration of the cavity and shrinkage of the wound. This way the lower part could be primarily closed. The middle part which was wider but devoid of bone and covered with healthy pink granulation tissue split skin grafting was done. And we could do a small transposition flap at the uppermost part where the tibia was exposed.

As the wound got covered the journey was half end. A few more future challenges need to be encompassed such as-

- Bone healing and ilizarov removal
- Prevention of tendoachillis contracture and/or its treatment
- Nerve/sensation status
- Future vascularity

CONCLUSION

A complicated wound of a leg always raises the question of whether it is salvageable and if yes how? One need not always look higher up in the reconstructive ladder the answers are often at ground level i.e., lower rungs of the reconstructive ladder.

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