

## Case report

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# High degree degloving injury of the lower limb: A case report and literature review

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## Introduction

Degloving injuries occur when shearing forces act parallel to the tissues, resulting in displacement of superficial layers and separation of the skin and subcutaneous tissue from deep structures, such as muscular fascia and muscles [1]. These types of injuries are considered severe, with high morbidity and mortality rates [2], due to the increased risk of infections, thermal dysregulation, and fluid loss [3]. The severity of a degloving injury depends on factors such as the mechanism of injury, patient comorbidities, anatomical region, and type of injury (open or closed) [4]. Such injuries must be treated as a life-threatening emergency.

## Case report

A 36-year-old woman with no prior medical history experienced an open degloving injury to the right leg and thigh, as well as an open fracture on the lateral side of the knee, after being hit by a bus. Advanced Trauma Life Support guidelines [5] were applied to stabilize patient conditions. The injury resulted in bone loss in the distal lateral femur condyle, lateral patellar face, and lateral tibial plateau, leaving the articular surface exposed. No other injuries were present (figure 1 and 2).



**Figure 1:** Degloving of the right inferior limb with femur and tibia open fracture.

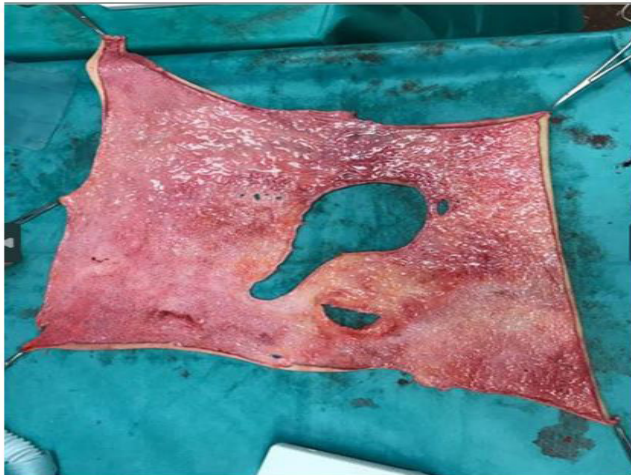


**Figure 2:** Degloving of the right inferior limb with femur and tibia open fracture.

The patient was immediately treated according to open fracture protocol, and the plastic surgery team was called in. Emergent surgery was performed to remove the damaged skin and assess its viability for use as an autograft. Suitable skin was defatted to create a full thickness skin graft (figure 3). An extended tight, leg and knee joint debridement was performed removing non-viable tissues, including part of the lateral and posterior thigh muscles. A gastrocnemius flap was carried out to cover the lateral articular surface since there was no suitable coverage (figure 4), leaving a drainage. The defatted skin graft from the same leg injury was reattached. Stab wounds were made to drain seroma and haematoma from the recipient bed. An external fixator was performed to bridge the knee and stabilize the open fractures (figure 5). A negative pressure system, ranging from 80-100 mmHg pressure, was then applied to promote skin grafting (figure 6). The patient was prescribed prophylactic antibiotic therapy upon arrival, which included an initial intravenous dose of 1.5 grams of cefuroxime. This was followed by a repeat dose of 1 gram every 8 hours for three days, in addition to a daily dose of 250 milligrams of gentamicin for three days.

After one week of admission, no signs of infection were pres-

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**Figure 3:** Defatted patient skin to use as skin autograft for deep tissue coverage.



**Figure 4:** Lateral gastrocnemius flap covering exposed knee joint surface.



**Figure 5:** Reattachment of skin autograft and stab incisions to drain seroma and hematoma.

ent. The patient underwent secondary surgery to remove small areas of necrotic skin and perform a conventional skin autograft from the non-injured leg. The external fixator was removed after knee stability was assessed. The patient was allowed to perform free, controlled, and progressive knee flexion after two weeks of accident. Progressive rehabilitation



**Figure 6:** External fixator and negative pressure system applied.



**Figure 7:** Final images of aesthetic leg.

therapy was prescribed and currently she achieved a range of movement 0/120°. The aesthetic result after 1 year follow-up is shown in figure 6-7.

## Discussion

The skin is a crucial element in maintaining physiological homeostasis [6]. It plays an essential role in shielding the body from external forces and infections, regulating fluid balance, and maintaining thermal equilibrium. Degloving is a serious injury that involves the tearing off the skin and subcutaneous tissue from the fascia and muscles. Although it is not common, the incidence of degloving injuries has been on the rise over the past century, largely due to traffic accidents and the use of heavy machinery [7]. These injuries can be classified as





**Figure 8:** Final images of aesthetic leg.

either open or closed, with Morel-Lavaille being a typical type of closed degloving. Hede Yan [8] has categorized degloving injuries into three patterns: pattern 1, which is a purely degloving injury; pattern 2, which involves the deep soft tissues; and pattern 3, which includes long-bone fractures along with the degloving injury. The case discussed in this article involves an open pattern 3 degloving injury, which is considered the most severe. These injuries pose a heightened risk of infection that can develop into serious conditions, such as necrotizing fasciitis or systemic sepsis, endangering patient's life [9].

Different treatments have been proposed for open degloving injuries, but research shows that the most effective coverage for the denuded areas is the immediate reattachment of the degloved skin as a skin graft [10]. To enhance the survival of the detached skin, it is recommended to thin it into a full thickness or split thickness [11]. After defatting, multiple stab wounds should be performed to allow for drainage of seroma and hematoma [12]. Other authors suggest the addition of vacuum sealing drainage [13], which is believed to increase granulation and decrease bacterial count.

Multidisciplinary emergent management involving orthopedic and plastic surgery is critical in the treatment of degloving injuries. Extended surgical debridement, immediate coverage and bone stabilization (if necessary) is key to successful treatment.

## Conclusion

Open degloving limbs are rare injuries but cases are increasing, especially due to traffic accidents and heavy machinery manipulation. They are severe lesions that can compromise limb viability or even patient's life. It is necessary to emphasize the need of emergent and appropriate treatment performed by a multidisciplinary team. Intensive debridement should be performed, removing all non-viable and necrosed tissue. Wound coverage can be carried out by reattaching the

patient's own skin (if available), thinning the skin into a full thickness skin graft by defatting it. Negative pressure system is recommended to improve skin attachment and decrease infection rate. Prophylactic antibiotic therapy should be prescribed following open fracture protocols.

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