

## Management of a Sever Degloving Foot Injury: A Rare Presentation of food injury in Emergency Department

Geniş Eldiven–parmak Tarzı Ayak Yaralanmasına Bir Yaklaşım; Acil Serviste Nadir Görülen Bir Olgu Sunumu

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### Abstract:

Occupational crash injuries of the foot present a significant reconstructive challenge due to the superficial location of structures such as tendon, joint and neurovascular network essential for proper acceptance of weight bearing and shear forces associated with bipedal gait. We discussed here a rare case in which an extensive degloving injury of the foot and combined with knee traumatic dislocation and proximal fibula tip fracture that underwent amputation. The authors suggested that none of treatment modalities of degloving are entirely satisfactory, so that each case must be considered independently with cons and pros.

**Key words:** Foot, Injuries, Emergency Service

### Öz

Ayağın iş kazalarıyla ilgili parçalı yaralanmalarının rekonstrüksiyonu iki ayaklı yürüme ile ilişkili düzgün kabul edilebilir yük taşıma ve kesme kuvvetleri için gereken tendon, eklem ve nörovasküler ağ yapılarının yüzeysel yerleşimi nedeniyle çok zordur. Biz burada travmatik diz eklemi dislokasyonu ve fibula proximal uç fraktürünün eşlik ettiği ayak amputasyonu ile sonuçlanan ayağın nadir görülen geniş eldiven tarzı bir yaralanmasını tartıştık. Sonuç olarak yazarlar eldiven tarzı yaralanmalarda hiçbir tedavi yöntemi tümüyle tatmin edici olmadığından her vaka bağımsız olarak artı ve eksileriyle birlikte değerlendirilmesi gerektiğini önermektedir.

**Anahtar Kelimeler:** Ayak, Yaralanmalar, Acil Servis

### Introduction

Occupational and industrial injuries are important problems in public health due to fatality and destabilizing outcomes in particularly new-developing countries. More than 350,000 workers lose their lives each year due to unintentional occupational injuries at global level. The injury

results from accidents at work place and more than half of this injury burden occurs among workers, and were one of the most common surgical consultations in the outpatient or emergency room setting. Workers with persistent disabilities had a significantly higher incidence of occupational injuries and higher medical costs compared with workers without

persistent disabilities (1, 2). Trauma of the foot and knee are commonly encountered in the emergency departments. The most common mechanisms of injuries are motor vehicle accidents, falls, recreational and sports activity, and direct injuries from striking objects (3). Fractures and soft tissue injuries are common encountered settings in all age groups. Swelling of soft tissue, smoking and co-morbidities such as diabetes mellitus and peripheral vascular disease should be considered when planning management schedule. Careful attention should be paid to neurovascular status and the soft tissue envelope to effective management of these injuries especially where crush injuries have occurred. The core principles of management consist of to maintain the soft tissue envelope; to obtain appropriate alignment; restoration of joint surfaces; and rehabilitation to obtain optimum function (4). Amputation is one of the treatment options in acute trauma settings when the potential risks of the salvage efforts outweigh the potential benefits. A free-flap application can be planned as an alternative method to amputation. Nevertheless, the long-term outcomes of this protective procedure have been controversial yet (5).

A degloving injury is a type of avulsion of soft tissue in which shearing forces that lead to separation of the skin and soft tissues from the underlying bone and cause degloving injuries. Frequently the skin is disconnected and the injury is readily diagnosed. A large portion of skin is completely separated from underlying structures, cutting of its blood supply and exposing cartilage, the bone, tendon, or nerve (6, 7). In this study, we presented a case of total degloving injury of the foot to characterize this unusual and potentially very serious injury of the skin.

### Case

A 45-years-old male was presented to emergency room after sustaining isolated left lower extremity crash injury related to occupational trauma that was occurred via falling down an blunt object heighthed approximately 9 meter and weighted 4000 kilogram leading to vertical loading and shearing forces. Patient past medical history reevaluated one pack per day smoking history. The patient had no surgeries, and any procedure in past, any medications usage, and had no known drug allergies. He was coopered, oriented and agitated. Vital signs were as follows; blood pressure 125/76 mmHg, pulse rate 88 bpm and regular, auxiliary body temperature 37.6 Celsius and breathing rate 18/pm respectively. On physical examination reevaluated large soft tissue laceration, and all fingers had been degloved; left foot dorsal and plantar skin cover encircle, glove shaped full thickness had been avulsed to medially that lead to uncovering of metatarsal and phalanxes periosteum (image 1a, 1b and 1c) The plantar fat pad was also sheared laterally and medial margin of the foot displaced medially. Extensor tendons, dorsal nerves, and bones were uncovered because the dorsal foot soft tissues was seriously degloved from distal to the mid foot level. The great toe was fully degloved and envelope was putted on second toe phalanges (image 2). Left knee distorted and eventually dislocated (image 3). Patient's Arteria dorsalis pedis and Arteria tibialis posterior pulses were noted strong by doppler ultrasound method but venous return and tissue viability was compromised. Laboratory test results were all normal limits. Radiographic examination showed left knee dislocation and proximal fibula tip fracture ( image 4) and left foot 5th metatarsus fracture and 2th digit distal phalanx dislocation (Image 5).

Intravenous phentanyl was administered for severe

pain management. Tetanus anti-globulin 1000 U intramuscular and Cefazolin - gentamycin combination were administered intravenously for prophylaxis concomitantly the foot was thoroughly cleaned with 5 L of saline-antibiotic flush based on wound management. The patient's left lower limb underwent subtotal amputation finally and postoperative 20th day discharged uneventfully from hospital as an outpatient follow up.

### Discussion

In this case we reported an occupational accident related degloving injury and traumatic knee dislocation and proximal fibula tip fracture in which traditional wound-care treatment modalities had minimal effect on wound healing and eventually underwent amputation.

Degloving damage of the foot is a rare but severe wounding. The most common causes of degloving injuries are traumas such as motor vehicles, machinery, and occupational events. The level of separation of degloving injury typically seen between cutaneous tissue and superficial fascia of foot, but some anatomic areas where the tissue is intensely bounded to deep fascia, for example the heel and the sole, where both skin and profound fascia are commonly involved in the degloved portion. These injuries are in generally a large wound and usually related to intense tissue hazard, such as the bone and joint, blood vessels, tendons, and nerves. Our case was not involved in tendon and neural defect but had large soft tissue damage. The treatment of skin degloving injuries is a problematical theme yet, particularly in younger ages, because approaches of suturing of tissues back to its original position again may reduce tissue viability and leads to necrosis. Many treatment modalities have been used to maintain

limb function and preserve vital structures now, however the results, both functions and aesthetical acceptance, remained not all time favorable. The technique of treatment close depends on the operator's experience and predilection for a special practice of repair to skin damage of the limb (7, 8).

If the degloved finger soft tissue integrity is fully intact without sever hazard, in situ replantation can result in the most stisfying functional and aesthetic results. However, most of injuries, the degloved tissue is seriously injured, which result in inhibition of replantation. Commonly preferred technique for repairation of a degloving thumb injury consists of in situ replantation, great toenail flip flap, abdominal and combined flaps, or free-flaps. In the last few years, plenty of approaching techniques have been reported for characterization of new techniques for thumb restoration after a trauma permanent topics which have unsolicited status the procedure in the past but the same advances have not been noted to total degloving injuries of the foot. General approaching modality of degloving injuries is defatting and full-thickness replacement of the skin with a graft. But, some other approaching techniques, for example revascularization of the degloved tissue and free-flap reconstruction have also been advocated. Josty et al reported that vacuum-assisted closure therapy have been very encouraging and it may be that with the use of this machine a better reconstruction can be achieved than would be obtained by skin grafting using conventional dressings or by free-tissue transfer(8, 9).

There have been two treatment options for lower extremity traumas those that limb salvage procedures and extremity amputation (5). In literatures, partial degloving injuries of foot, such as involving just sole and dorsal foot, partial or full thickness flap rotation have been shown to be effective and some degree

satisfactory functional and aesthetical acceptance by some authors but the same results have not been reported for encircled degloving injuries yet(10,11). It was also suggested that the extremity rescue techniques were more probably to result in readmission and long term rehabilitation. Also, understanding the risk factors of lower extremity amputations in trauma patients can help in patient choice for limb protecting techniques. The success of salvage procedures is associated with careful patient selection. In our case, because of the soft tissue envelope was irreducible crushed and this injury represents a

significant insult to the vascular supply of the digits and there is great risk of digital necrosis (5,6) we recommended to total foot amputation, and was performed.

In conclusion although many techniques for the management of degloving injuries of hand and foot have been outlined, no one of those is fully satisfying. Each case must be considered independently each other and the advantages and disadvantages of each surgery must be carefully considered. We discussed here an occupation related crushed degloving foot injury and eventually underwent limb amputation.

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**Figure 1.1**a shows dorsa-lateral and 1b; plantar plane of degloving left foot.



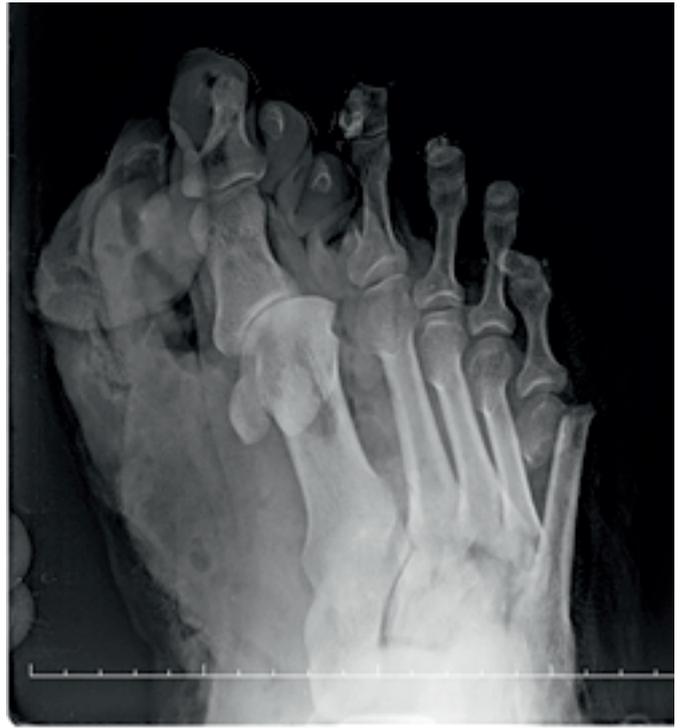
**Figure 2.** Shows that the great toe envelope was putted on second toe phalanges(black arrow)



**Figure 3.** Shows distorted and dislocated knee of the patient left lower limb.



**Figure 4.** Medial plane of left knee which shows knee dislocation and proximal fibula tip fracture



**Figure 5.** Shows 5th metatars fracture, and 2th digit distal phalanx dislocation.

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