Case Report

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Nailbed Debridement of the Finger Degloving Injury: Two Case Reports

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Abstract

Degloving injury is a serious trauma of the fingers. It is difficult to establish an adequate extent of debridement at the time of initial surgery. Therefore, additional surgery for necrotic areas related to circulatory failure is required in many cases. In this study, we performed replantation for degloving injury of 3 fingers in 2 patients, and obtained findings regarding nailbed debridement on initial surgery. Considering nailbed hemodynamics, when performing replantation for degloving injury, in which the nailbed remains, being adhered to the distal phalanx, but not to an amputated finger, debridement of the nailbed and distal phalanx region to which the nailbed is adhered to on initial surgery may facilitate the avoidance of unnecessary surgery, shortening the treatment period and leading to early rehabilitation.

Keywords: degloving injury, replantation, debridement

Introduction

Degloving injury is the most serious among various types of finger trauma[1, 2]. The bone and skin/soft tissue are markedly damaged in many cases, and it is difficult to establish an adequate extent of debridement on initial surgery. Therefore, several sessions of surgery, such as additional debridement for necrotic tissue related to the progression of circulatory failure, are required in many cases. In this study, we performed replantation for degloving injury in 2 patients and obtained findings regarding nailbed treatment on initial surgery.

Case

[Case 1] A 39-year-old male.

Degloving injury of the right thumb and index finger. During work, the right thumb and index finger were mis-involved in the roller of a printing machine, and injured (Figure 1). Replantation was performed. In both the thumb and index finger, end-to-end anastomosis of a single ulnar digital artery and dorsal cutaneous vein was performed, respectively. Furthermore, finger nerves on the ulnar side of the thumb and radial side of the index finger were sutured. Drainage from the thumb nail margin was observed 19 days after surgery, and nail removal was conducted. Subsequently, survival of the nailbed of the index finger was achieved, but the nailbed of the thumb became necrotic, and the distal phalanx was exposed. The distal phalanx of the thumb exposed to the nailbed area was resected 36 days after surgery, and amputation stump plasty was performed.

[Case 2] A 21-year-old male.

Degloving injury of the right index finger. His right index finger was involved in a roller for paper tube preparation, leading to degloving injury. The exfoliated skin was connected with the center, but there was no circulation. The radial digital artery remained on the exfoliated skin side, and this was anastomosed with the central digital artery. The ulnar digital artery remained on the exfoliated skin side was anastomosed with the central digital artery by use of venous transplantation.

Necrosis of the nailbed appeared 5 days after surgery. Furthermore, the distal phalanx was exposed from the same site 11 days after surgery. Debridement of the necrotic nailbed and distal phalanx was performed 21 days after surgery, and reconstruction with an abdominal wall flap was conducted.

Discussion

Degloving injury refers to serious trauma of the fingers. For initial treatment, replantation, amputation, free skin grafting, negative pressure wound therapy, or grafting of remote flaps, such as abdominal or inguinal flaps, or free flaps is selected. In any case, adequate debridement of the tissue in which recovery is not expected must be performed.

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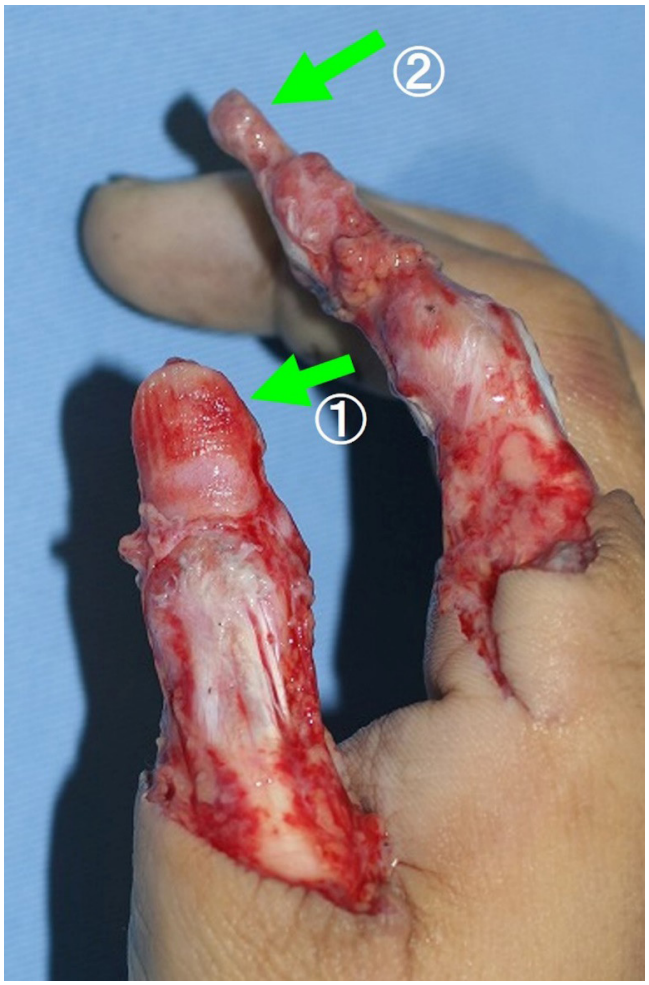

Figure 1: Before surgery, the nailbed was macroscopically confirmed in the Arrow-area. In the Arrow-area, the cortex of the distal phalanx was exposed, and the nailbed could not be confirmed.

We retrospectively examined photographs and X-ray films regarding necrosis of the nailbed after surgery in 2 of 3 fingers with degloving injury. In Case 1, necrosis of the thumb nailbed occurred, but graft survival of the index finger was achieved. We reconfirmed photographs/plain X-ray films at the time of injury (Figure 2)., as well as plain X-ray films 20 days after surgery (Figure 3). In the nailbed of the thumb, a shadow of soft tissue was observed on plain X-ray. Macroscopically, the nailbed was adhered to the distal phalanx, whereas there was no shadow of soft tissue in the area corresponding to the nailbed of the index finger. When confirming plain X-ray films 20 days after surgery, avulsion fracture was observed; therefore, the nailbed of the index finger may have remained in the soft tissue exfoliated with avulsion fracture. This may have contributed to graft survival of the nailbed of the index finger, in which circulation from the soft tissue after revascularization may have been present, and necrosis of the thumb nailbed adhered to the distal phalanx. In Case 2, the nailbed remained at the distal phalanx of the index finger, as demonstrated for the thumb in Case 1. Necrosis of the nailbed occurred 21 days after surgery, requiring additional debridement.

Figure 2: Plain X-ray on the day of injury in Case 1. In the Arrow-area, a shadow of soft tissue suggestive of the nailbed was observed. There was no shadow in the Arrow.

Nailbed circulation involves the course of lateral vessels branching from the digital artery to the periphery along the lateral margin of the distal phalanx, intra-nailbed anastomosis/arch formation/microvascular network formation with dorsal vessels running through the lateral intraosseous membrane and lateral margin of the distal phalanx to the dorsal side, and anastomosis with the palmar vascular network at the end of the microvascular network[3-5]. Circulation to bones exposed due to degloving injury depends on the medullary cavity, periosteum, and peripheral soft tissue. Even when revascularization for an exfoliated tissue is performed, bone atrophy occurs through bone resorption in most cases. As demonstrated in Cases 1 (thumb), 2 (nailbed remaining in the distal phalanx), proximal and distal nailbed circulation ruptures despite reconstruction by vascular anastomosis and covering with a tissue with circulation. Furthermore, there is

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Figure 3: Plain X-ray 20 days after initial surgery. At the end of the index finger (Arrow), avulsion fracture was noted.

no contact point of the nailbed with the skin after revascularization, differing from the distal phalanx in contact with the skin after revascularization; therefore, prompt circulation may not be achieved. For this reason, concerning replantation for degloving injury in which the nailbed remains in the bone at the time of injury, debridement of the nailbed and distal phalanx to which the nailbed is adhered to on initial surgery may facilitate the avoidance of unnecessary surgery.

There are various opinions regarding the indication of surgery for degloving injury or methods. When performing replantation of an amputated finger for degloving injury, whether or not this procedure should be indicated must be examined, considering functional problems of the finger over a long course, the admission period, hospital visits, and several sessions of additional surgery.

Conclusion

Degloving injury is a serious trauma of the fingers. It is difficult to establish an adequate extent of debridement on initial surgery. Concerning degloving injury in which the nailbed remains in the bone, debridement of the nailbed and distal phalanx to which the nailbed is adhered to on initial surgery may facilitate the avoidance of unnecessary surgery, shortening the treatment period and leading to early rehabilitation.

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