



ORIGINAL ARTICLE

# Microsurgery in 46 cases with total hand degloving injury



Jihui Ju, Jianning Li, Ruixing Hou\*

Department of Orthopaedics, Ruihua Hospital Affiliated to Soochow University, Suzhou 215104, China

Received 1 December 2013; received in revised form 24 September 2014; accepted 9 January 2015  
Available online 14 March 2015

## KEYWORDS

degloving injury;  
flap;  
microsurgery;  
reconstruction;  
replantation

**Summary Objective:** To summarize the characteristics of total hand degloving injury and investigate the curative effect of microsurgery.

**Methods:** A total of 46 patients with total hand degloving injury were enrolled in this study. The injury classification and treatment methods were as follows: Type I (11 cases), treated by replantation of the gloved skin; Type II (6 cases), treated by reconstruction using thumb wrap-around flap and second toe; Type III (4 cases), treated by reconstruction using bilateral second toe with dorsal foot flap; Type IV (9 cases), treated by replantation *in situ* or reconstruction; Type V (16 cases), treated by replantation or abdominal flap reconstruction.

**Results:** Of the patients who received Type I treatment, five completely survived, whereas eight had finger necrosis. In Type II, both the reconstructed fingers and hand flaps survived. For four patients who received Type III treatment, eight reconstructed fingers survived. In Type IV, two patients with reconstructed fingers survived, whereas the six with replantation *in situ* had necrosis of the partial palmar or hand dorsum skin. In Type V, nine patients with reconstructed fingers survived, and five cases with abdominal skin flap reconstruction and one case with anterolateral femoral flap survived. The restoration of hand appearance and function was the best in patients who received replantation. For reconstruction cases, however, the hand function was recovered to the basic self-care level. In cases with abdominal flap reconstruction, the hand function showed poor recovery.

**Conclusion:** Total hand degloving injury can be classified into different types according to the injury degree. The appropriate microsurgical treatment based on these types can produce better curative effect.

Copyright © 2015, Asian Surgical Association. Published by Elsevier Taiwan LLC. All rights reserved.

Conflicts of interest: All contributing authors declare no conflicts of interest.

\*Corresponding author. Department of Orthopaedics, Ruihua Hospital Affiliated to Soochow University, Number 5, Yunta Road, Wuzhong Economic Development Zone, Suzhou 215104, China.

E-mail address: [jhndoc@126.com](mailto:jhndoc@126.com) (R. Hou).

<http://dx.doi.org/10.1016/j.asjsur.2015.01.004>

1015-9584/Copyright © 2015, Asian Surgical Association. Published by Elsevier Taiwan LLC. All rights reserved.

## 1. Introduction

Total hand degloving injury is one of the most serious hand injuries.<sup>1,2</sup> When the wrist is injured while operating a high-speed rolling or a weight-pressing machine, the individual pulls his/her hand outward with a jerk due to conditional reflexes. At this point, the skin of the hand has been pressed by the machine or weight. The injury mechanism is that the loose connections between the superficial soft-tissue structure of the skin and the deep bone, joint, and tendon are broken, resulting in separation of superficial tissues (e.g., skin and subcutaneous tissue) from deep tissues (bone, joint, and tendon), subsequently causing degloving injury of the hand.<sup>3</sup>

A majority of total hand degloving injuries are mechanical injuries, and the degree of injury is related to the force of tearing, extrusion, and rolling.<sup>4</sup> The degloving plane of the hand generally lies in the superficial flexor or extensor tendon. However, it is difficult to perform dermoplasty for these type of injuries because of the structural integrity of the underlying skeleton.<sup>5,6</sup> Examination of cases with complete degloving of the hand shows that the dorsal hand vein and the palmar artery are usually retained in the proximal end, and thus, it is possible to replant this end; however, the distal end cannot be replanted as no vessels are generally retained here. In certain cases, the degloved skin cannot be used again because of extensive damage or contusion. Thus, there are certain difficulties while treating such patients.

Degloving injury of the hand can cause exposure of bones, joints, tendons, and other important structures in the wound surface. This requires early repair. Otherwise, the condition will cause necrosis of the bones, joints, and tendons, which may seriously affect the recovery of hand function.<sup>7</sup> A number of treatment methods are available for degloving injury of the hand. Wrap-around abdominal flap reconstruction is a simple operative method, and can help cover the wound; however, the postoperative function recovery is not ideal.<sup>8,9</sup> Although a combination of an anterolateral thigh flap and pedicled groin flap was useful in reconstructing an injured hand, the restoration of function and appearance of the hand was not good.<sup>10</sup> Multiple free contiguous toes for repairing degloving injury of the hand restores part of hand functions and has been reported to have better curative effect. However, the complicated surgical procedures and multiple vascular anastomotic stomas will cause poor blood supply, wide donor site, large trauma, and other defects. Therefore, this treatment is still controversial.<sup>11,12</sup> In this study, five kinds of surgical methods were performed on 46 patients with total hand degloving injury in Ruihua Hospital Affiliated to Soochow University from December 1999 to May 2012. The characteristics of total hand degloving injury were summarized, and the curative effect of microsurgical treatment was investigated.

## 2. Patients and methods

### 2.1. Patients

A total of 46 patients [33 men and 13 women; age, 18–58 years (average 32 years)] with total hand degloving injury

were enrolled in this study. Of the 46 patients, 23 were injured in the left hand, and the remaining 23 were injured in the right hand. The injury was caused by a roller or roller crush ( $n = 25$  cases), printing machine ( $n = 14$  cases), and noodle press ( $n = 7$  cases). The time from injury occurrence to surgery was 1–10 hours (average, 3 hours).

### 2.2. Injury classification

Based on severity, the total hand degloving injury was classified into the following five types: (1) Type I (11 cases): The degloved skin was from the wrist to the proximal plane of fingers 1–5. The degloved skin was complete, without contusion (7 cases) or with light contusion (4 cases). The entire musculoskeletal unit of the finger was intact, with normal blood circulation in fingers 1–5. (2) Type II (6 cases): The degloved skin was from the wrist to the proximal plane of fingers 1–5. The degloved skin was seriously contused or with defect. The entire musculoskeletal unit of the thumb was intact, with defect from the distal to proximal plane of fingers 2–5. (3) Type III (4 cases): The degloved skin was from the wrist to the proximal plane of fingers 1–5. The degloved skin was seriously contused or with defect. There was defect distal to all the five planes of the metacarpophalangeal joint or finger body was damaged. (4) Type IV (9 cases): The degloved skin was from the wrist to fingertips 1–5 or completely gloved, and the gloved skin was complete. The entire musculoskeletal unit was intact, but without blood circulation in fingers 1–5. (5) Type V (16 cases): The degloved skin was from the wrist to 1–5 fingertips or completely degloved. The degloved skin in this type was seriously contused or with defect. The entire musculoskeletal unit of the thumb was intact.

### 2.3. Microsurgical treatment methods

The microsurgical treatment methods adapted for different types of injury in this study were as follows: (1) Type I: The patients were treated by replantation of gloved skin, with revascularization. The dorsal hand vein, palm-side vein, and ruptured common palmar digital artery were anastomosed. The dorsal skin and palmar skin of the hand were slightly thinned and dressed with light pressure. (2) Type II: The replantation was constructed using thumb wrap-around flap with dorsal foot flap and second toe with dorsal foot flap. (3) Type III: The replantation was constructed using bilateral second toes with dorsal foot flap. (4) Type IV: Gloved skin replantation with revascularization was performed in seven cases. For two cases with seriously contused skin, the replantation was constructed using thumb wrap-around flap with dorsal foot flap and second toe with dorsal foot flap. (5) Type V: The replantation was constructed using thumb wrap-around flap with dorsal foot flap and second toe with dorsal foot flap in nine cases. Replantation using bilateral free anterolateral femoral flaps was performed in one case. The remaining six cases received abdominal wrap-around flap reconstruction after amputation of the middle finger segment distal to the flexor digitorum superficialis tendon.

The area of the dorsal foot skin flap was from 9 cm × 6 cm to 17 cm × 11 cm. The great toe was

Download English Version:

<https://daneshyari.com/en/article/4282560>

Download Persian Version:

<https://daneshyari.com/article/4282560>

[Daneshyari.com](https://daneshyari.com)