Late reconstruction of a traumatized hand with loss of multiple fingers

Reconstrução tardia na mão traumatizada com perda de múltiplos dedos

ABSTRACT

Mutilating hand injuries are a challenge to both the hand surgeon and the patient. The surgeon must make decisions ranging from the initial debridement to which fingers and joints will be preserved and the appropriate use of the parts to be removed. Late reconstruction constitutes the second part of this difficult task. The difficulty attributed to the characteristics of each lesion, the large number of treatment possibilities, and the different levels of complexity must be adapted to the personal needs and motivation of each patient. This case report describes a late hand reconstruction with index and middle finger loss, using metacarpophalangeal joint transplantation of the index finger to gain the proximal interphalangeal function of the middle finger.

Keywords: Microsurgery; Hand joint; Finger joints; Acquired hand deformities; Hand deformities; Hand trauma.

RESUMO

As lesões mutilantes de mão são um desafio para o cirurgião de mão e o paciente. O cirurgião deve tomar decisões desde o debridamento inicial, escolhendo quais dedos e articulações serão preservadas e uso apropriado das partes a serem retiradas. A reconstrução tardia é a segunda parte dessa difícil tarefa. Dificuldade que se atribui à particularidade de cada lesão, do grande número de possibilidades de tratamento e seus diversos níveis de complexidade que devem ser adequados à necessidade e motivação pessoal de cada paciente. Este relato de caso apresenta uma reconstrução tardia de mão com perda de indicador e dedo médio com transplante de articulação metacarpofalângica de indicador para função de interfalangeana proximal de dedo médio.

Descritores: Microcirurgia; Articulação da mão; Articulações dos dedos; Deformidades adquiridas da mão; Deformidades da mão; Traumatismos da mão.
INTRODUCTION

Mutilating hand injuries are a challenge to both the hand surgeon and the patient. The surgeon must make decisions ranging from the initial debridement to which fingers and joints will be preserved and the appropriate use of the parts to be removed.

Late reconstruction constitutes the second part of this difficult task. The difficulty attributed to the characteristics of each lesion, the large number of treatment possibilities, and the different levels of complexity must be adapted to the personal needs and motivation of each patient.

CASE REPORT AND DISCUSSION

A 61-year-old, right-handed male sustained trauma to the left hand, caused by a circular saw. This resulted in the amputation of the 2nd and 3rd fingers (F) and an injury at the base of the 4th finger. The patient was initially managed by another service, where he underwent surgical debridement and stabilization of the 2nd finger at the base of the middle phalanx and the 3rd finger at the distal third of the proximal phalanx (Figure 1). He was referred to our service due to motor and sensory deficits of the 4th finger.

Superficial and deep flexor radial band tenorrhaphy was performed, in addition to radial digital nerve neurorrhaphy and A2 pulley reconstruction.

One year after surgery, the patient presented with restricted range of motion (ROM) of the metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints, with 10-60 and 40-50 degrees of flexion, respectively. In addition, he complained of radial side hypoesthesia and pain while moving the 4th finger. He had difficulty with thumb-index finger pinch, which was very limited despite normal range of motion (ROM), and thumb-4th finger pinch, due to residual dysfunction.

The patient underwent joint transfer of the index finger MCP to gain the PIP function of the middle finger in the following stages (Figures 2 to 5):

- Osteosynthesis of the 2nd metacarpal to the proximal phalanx of the 3rd finger with 1.5 mm Kirschner wire;
- First flexor digitorum superficialis tenorrhaphy using the 3rd flexor digitorum superficialis at the forearm;
- Extensor indicis hood suturing on the middle finger lateral bands;
- Stabilization of the extensor indicis proprius and 1st extensor digitorum, and tenorrhaphy of the common extensor tendon toward the middle finger;
- First radial digital artery anastomosis to the 3rd radial digital artery, along with vein grafting;
• Neurorrhaphy of the 3rd radial and ulnar digital nerves;
• Residual defect coverage with partial skin grafting, one week after the joint transfer.

The patient received hand therapy for 6 months, and has 20 to 60-degree ROM at the MCP and 10 to 20-degree flexion at the “new PIP” (Figures 6 and 7).

The hand has 6 basic functions, according to Moran and Berger1: precision pinch, key pinch, lateral and directional pinch, hook grip, grip, and spaced grip.

Three basic functions were impaired in this patient: directional pinch, hook grip, and spaced grip. This loss was due to the absence of the PIP of normal fingers, in addition to the loss of sensibility and mobility in the 4th finger.

It was necessary to construct an “acceptable hand”2, a concept suggested by Del Piñal, in which 3 fingers are aesthetic and functional, with nearly normal length, adequate PIP ROM, and good sensitivity, in addition to a functional thumb. Therefore, in this case, it was necessary to reconstruct at least one finger that
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The microsurgical transfer of the MCP to achieve PIP function is a bold solution, and few reports can be found on this subject in the current literature. Further studies need to be carried out to validate this approach. If verified in the future, this may be an alternative to the surgeon's arsenal in the reconstruction of a mutilated hand.

COLLABORATIONS

RLT Analysis and/or interpretation of data; final approval of the manuscript; writing the manuscript or critical review of its contents.

HAN Final approval of the manuscript; conception and design of the study; completion of surgeries and/or experiments; writing the manuscript or critical review of its contents.

FCI Completion of surgeries and/or experiments.

JCN Completion of surgeries and/or experiments.

BAV Completion of surgeries and/or experiments.

THW Final approval of the manuscript.

REFERENCES


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