Management of Post Traumatic Hand defects

Thesis

Submitted in partial fulfillment of Master Degree in General Surgery
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2008

بسم الله الرحمن الرحيم

Abstract

Hand surgery is rising as a separate specialty abroad, but in Egypt its management remains based on individual experience only and lacks a definitive approved protocol. The aim of this work is to enlight the principles for skin coverage of hand defects putting in consideration total restoration of hand function.15 patients with sever untidy injuries were chosen and different coverage techniques were used with evaluation of their outcome.

KEY WORDS:

Hand injuries, Examination of the injured hand, Untidy injuries, Tidy injuries.

Acknowledgements

Praise to **god** who helped me accomplish this work, and all other things in life.

I would like to express my deepest gratitude to ***Prof. Dr. Gamal Mostafa,*** *Professor of Surgery, Faculty of Medicine, Cairo University,* for his supervision, support and expert advice.

I am deeply indebted to ***Prof. Dr. Ahmad Elsharkawi,*** *Professor of Plastic Surgery, Faculty of Medicine, Cairo University,* for his meticulous supervision, continuous guidance, valuable advice and remarks throughout this work.

My special thanks are dedicated to ***Prof. Dr. Hatem Helmy***, assistant Professor of *Plastic* surgery, Faculty of Medicine, Cairo University, for his extreme kindness and extensive support.

I am also obliged to all my professors, my seniors and my colleagues for their continuous help and endless encouragement.

To my family

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Introduction

Hand surgery is rising as a separate specialty abroad, but in Egypt its management remains based on individual experience only and lacks a definitive approved protocol.

Despite the pioneering efforts of individual surgeons, many others still show inexperience and lack of knowledge in this very important field. **(Rintoul, 1978 - Lille et al, 2000).**

Also it is to note that the management of injuries of this very delicate and sophisticated organ, the importance of which cannot be overstressed to the surgeon, is commonly assigned to the most junior member of the managing team.

Unfortunately many patients end up unnecessarily with a stiff functionless finger or hand, which poses a significant problem to the affected individual as well as to the society **(Rintoul, 1978 - Lille et al, 2000).**

The function of the hand is founded upon two basic characters: unique sensibility and extreme mobility. The importance of the slightest improvement and return of function should be remarkable in patients having hand trauma. This is not always the case however. The wrong misbelieve that following a single operation immediate cure will be achieved, and the failure to realistically forecast the prolonged postoperative splinting, physiotherapy, and rehabilitation programs often distract the expectations of the patient away from the field of reality. **(Walton and Neumeister, 2000).**

Full explanation of the present injury and its sequelae, the proposed procedure and its limitations, the postoperative program, and the possible complications and the need for physiotherapy is mandatory prior to intervention.

Occupational injury of the hand accounts for 55% of crushed hand injuries, 30% of skin injuries, 43.7% of tendon injuries, 10% of nerve injuries, and 42.8% of complex and mutilating injuries. **(Reid, 1984).**

Skin loss constituted about 18% of the injuries. The dorsal skin was the most commonly affected with injury comprising about 52% of the patients. The dorsal skin is probably more vulnerable to injury than the volar skin, due to its thinness, its loose adherence to the underlying structures, and due to the constant flexed position of the hand in rest and also in function. Grafting with split and full thickness grafts and Flap coverage, and reuse of displaced tissues (spare part coverage) are methods of coverage of skin loss on the dorsum of the hand.

Additionally their take requires a healthy bed, which is free from infection, and a period of immobilization is essential. These are obvious limitations of the technique **(Walton and Neumeister, 2000).**

The volar aspect of the hand requires a tough stable skin that can withstand the wear and tear and friction of everyday use. The options of reconstruction thus include a full thickness graft from the instep area of the foot, forearm flaps, distant pedicled flaps, and distant free flaps **(Walton and Neumeister, 2000).**

In the management of hand injuries, one should always bear in mind the function of the hand while deciding upon the modality of treatment. The hand serves as an organ of prehension, which is tactile

grasping combining great strength with fine delicacy and accuracy facilitated by its unique sensibility

In this study we try to enlight the principles for coverage of skin defects of the hand putting in consideration the total functional restoration of hand in its extremes.

Anatomy of the Hand

The hand is formed of numerous structures that have an important role in normal hand function. Conditions that change the way these structures work can greatly impact whether the hand functions normally. When our hands are free of problems, it's easy to take the complex anatomy of the hand for granted.

The important structures of the hand include; skin and subcutaneous tissue, bones and joints, ligaments and tendons, muscles, nerves and blood vessels.

Skeleton of the hand:

The skeleton of the hand is subdivided into three segments: the carpus or wrist bones; the metacarpus or bones of the palm; and the phalanges or bones of the digits. **(Williams and Dyson, 1992) (Fig.1)**

A. The Carpus:

The eight carpal bones are arranged in two rows. Those of the proximal row, from the radial to the ulnar side, are named the scaphoid, lunate, triangular, and pisiform; those of the distal row, in the same order, are named the trapezium, trapezoid, capitate, and hamate.

The hamate and pisiform provide the medial attachment side for the flexor retinaculum. The distal row of the carpal bones joins to the metacarpal bones to form the carpometacarpal joint. The carpus is cartilaginous at birth. The capitate begins to ossify during the first year, and the others begin to ossify at intervals thereafter until the 12th year, when all bones are ossified. **(McMinn, 1994)**

B. Metacarpal bones:

The hand has 5 metacarpal bones. From proximal to distal, each has a base, a shaft, and a head. The first metacarpal bone constitutes the skeleton of the thumb and is the shortest and most mobile. It is in contact with the trapezium proximally. The other 4 metacarpals contact with the trapezoid, capitate and hamate, and lateral-medial surfaces of metacarpal bones. **(Moore, 2006)**

The heads of the metacarpal bones, which form the knuckles, articulate with the proximal phalanges. The shaft of each metacarpal bone is slightly concave forward and is triangular in transverse section, with medial, lateral, and posterior surfaces. **(Moore, 2006)**

C. Phalanges:

The hand has 14 phalanges. Each finger contains 3 phalanges, but each thumb only has 2. Each consists of a body and two extremities. The body tapers from above downward, is convex posteriorly, concave in front from above downward, flat from side to side; its sides are marked by rough which give attachment to the fibrous sheaths of the Flexor tendons. **(McMinn, 1994)**

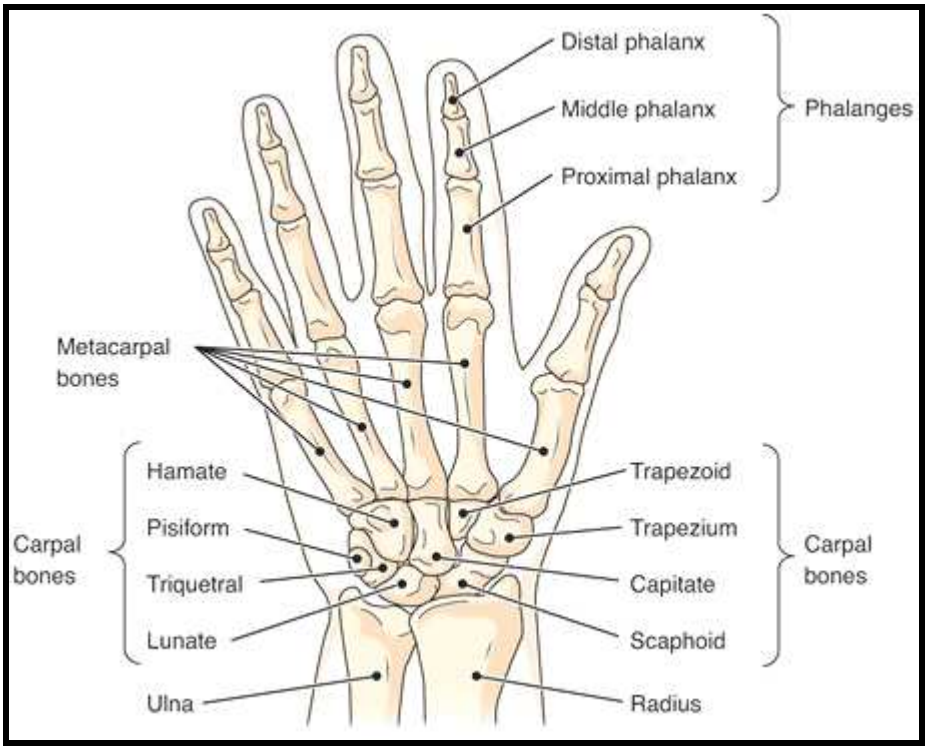

FIGURE 1.Bones of the hand. **(Hartwig, 2008)**

Skin and subcutaneous tissue of the hand:

The major difference between the skin on the dorsum of the hand and that of the palm is an example of the high specialization of hand structures necessary to fulfill their specific functions.

The palmar skin is thick and relatively immobile, providing stability for grip and pinch functions. The palmar skin is fixed to the underlying palmar fascia, digital tendon sheaths, and skeleton by a series of osseous cutaneous ligaments **(Naam, Cohen, and Johnson, 2000).**

The palm of the hand is richly supplied with sweat glands but contains neither sebaceous glands nor hair. **(Moore, 2006).** A moderate amount of fat underlies the skin of the hand and fingers, enhancing its pliability **(Naam, Cohen, and Johnson, 2000).**