

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/burns

Active range of motion outcomes after reconstruction of burned wrist and hand deformities

Ahmed M. Afifi^{a,b,*}, Tarek A. Mahboub^b, Amr Ibrahim Fouad^b, Kodi Azari^c,
Haitham H. Khalil^d, James E. McCarthy^a

^a University of Wisconsin, Madison, WI, USA

^b Cairo University, Cairo, Egypt

^c David Geffen School of Medicine at UCLA, Los Angeles, CA, USA

^d Heart of England NHS Foundation Trust, Birmingham, UK

ARTICLE INFO

Article history:

Accepted 2 February 2016

Keywords:

Hand burn

Hand reconstruction

Flap

Reconstruction

ABSTRACT

This work's aim is to evaluate the efficacy of skin grafts and flaps in reconstruction of post-burn hand and wrist deformities. A prospective study of 57 burn contractures of the wrist and dorsum of the hand was performed. Flaps were used only if there was a non-vascularized structure after contracture release, otherwise a skin graft was used. Active range of motion (ROM) was used to assess hand function. The extension deformity cohort uniformly underwent skin graft following contracture release with a mean improvement of 71 degrees ($p < 0.0001$). The flexion deformity cohort was treated with either skin grafts (8 patients) or flaps (9 patients) with a mean improvement of 44 degrees ($p < 0.0001$). Skin grafts suffice for dorsal hand contractures to restore functional wrist ROM. For flexion contractures, flaps were more likely for contractures >6 months. Early release of burn contracture is advisable to avoid deep structure contracture.

© 2016 Elsevier Ltd and ISBI. All rights reserved.

1. Introduction

Burn contractures of the hand are commonly seen worldwide in spite of the great advances in acute burn care [1]. Treatment of the burn contracture involves the release of the contracted skin and soft tissues, with or without a release of the deeper structures (i.e. joints and tendons), and coverage of the resultant skin defect [2]. Many flaps have been described flap for coverage of these defects [3,4]. In many cases where flap

coverage is deemed indicated, a free flap is considered the only option due to paucity of local tissues [5,6]. However, many burn patients have few donor sites, and undergo multiple operations for deformities throughout their body. The surgeon should therefore use the simplest treatment options that will restore form and function with the least morbidity. Skin grafts, although the simplest and most economical method, may not allow for release of deeper structures and may be associated with a high incidence of recurrence of the contracture. In this prospective study, our aim was to evaluate the efficacy of skin

* Corresponding author at: University of Wisconsin Hospital and Clinics, Department of Surgery, Division of Plastic and Reconstructive Surgery, 600 Highland Avenue, G5/356 Clinical Science Center, Mail Code 3236, Madison, WI 53792, USA. Tel.: +1 608 265 2535; fax: +1 608 265 9695.

E-mail address: ahafifi@yahoo.com (A.M. Afifi).

<http://dx.doi.org/10.1016/j.burns.2016.02.004>

0305-4179/© 2016 Elsevier Ltd and ISBI. All rights reserved.

grafts and flaps in improving active range of motion in the wrist and MP joints for reconstruction of burn deformities and examine factors that may affect the outcome.

2. Methods

Patients presenting with burn contractures involving the wrist or the MP joints between 2002 and 2007 were prospectively analyzed. Exclusion criteria included extension deformity of the MP joints secondary to collateral ligament contracture (without a skin contracture), and evaluation of less than 6 months. The patients were divided into flexion and extension contractures. Data collected included age, gender, duration since the initial injury, method of coverage, postoperative splinting and need for secondary surgery. All patients signed a written informed consent, the study followed the Declaration of Helsinki, and this submission is approved by the Department of Surgery.

The active range of motion (ROM) of the wrist and the MP joints was measured before and after surgery using a lateral goniometer. For the MP joint, the mean ROM between the four digits was recorded. The ROM was described as a range between maximum passive flexion and extension with the neutral position of the joint described as zero; flexion movements from that position were described as positive numbers and extension movements were described as negative numbers. The mean difference between pre and postoperative ROM was analyzed using a paired Student's t-test (α 0.05). Several studies have reported that the functional range of wrist motion for activities of daily living is between 40 degrees of flexion and 40 degrees of extension [7]. Therefore, the proportion of functional active range of motion was compared pre and postoperatively using a Student's t-test (α 0.05). A Fisher's exact test was used to analyze statistical significance for the odds ratio of developing recontracture for each postoperative splinting technique and whether duration longer than six months was more likely to require flap coverage following contracture release.

2.1. Surgical technique

All procedures were done under tourniquet with the use of a Bier Block if an adequate vein was found or under general anesthesia.

2.1.1. Release of the contracture

The procedure started by generous release of the contracted skin and subcutaneous tissues through a transverse incision. If this failed to achieve adequate position and ROM in the joint, the release was extended to deeper structures.

For the *flexion deformities of the wrist*, a tenolysis of the flexor tendons was performed liberating the tendons from the surrounding cicatrix. The hand was then examined to identify the structure preventing further extension. If one of the flexor tendons was the cause, it was lengthened by a Z-plasty. The procedure was terminated when the structure limiting further extension is the wrist joint or the median and ulnar nerves.

For *extension deformities*, an arthrolysis of the MP joint was done by release of the collateral ligaments. If this release of the MP collateral ligaments was anticipated, the transverse

release incision was placed proximal to the level of the joint and the skin elevated distally to achieve access to the joint. This allowed the elevated skin flap to cover the exposed joint and the skin graft to be placed proximal to the incision used to access the joint.

2.1.2. Skin coverage

The choice of coverage (flap or graft) relied on the defect created by the release; if there was no exposure of bare



Fig. 1 – a and b: Medial and lateral views of severe extension deformity of the right (dominant) hand of an 8 year old female 11 months after a flame burn. c: After adequate release and split skin grafting patient is able to create a complete grip and has regained almost normal ROM in the wrist and the MP joints.

Download English Version:

<https://daneshyari.com/en/article/3104086>

Download Persian Version:

<https://daneshyari.com/article/3104086>

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