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Extended Abstract

Management of Scar Contracture of the Fingers with Percutaneous Needle Aponeurotomy and Fat Lipofilling

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Abstract

The hand is a crucial element for the proper functioning of an upper limb, both sensory and motor. Hand injury represents up to 10% of hospital emergency room visits [1,2]. Proper knowledge of hand anatomy and physiological function - including grips, opposition, and fine motor skills - combined with experience in physical examination of the hand is essential for appropriate management and for cutting down morbidity and disability rates [3,4].

Hand contracture constitutes a major form of disability and is defined as an inability to perform the full range of hand movement due to permanent shortening of the muscles and/or joints [5]. Scar contractures following burn injury (postburn contractures), in particular, represent a surgical dilemma that often necessitate multiple interventions and the supplementation with physical therapy [6]. Excessive scarring may involve the healing of deeper tissues after high-degree burns; this often begins as puckering but can advance to thick bands of hypertrophic scarring that may restrict or preclude joint movement and permanently impair its function [7]. Other causes of scar contractures of the hand include mechanical and chemical trauma [8].

Severity rating of postburn contracture of the hand has been proposed: grade I includes cases with symptomatic tightness but no visible anatomical changes, grade II includes cases with mild decrease in motion range, grade III includes cases with functional defects and mild change in architecture, and grade IV includes cases with severe functional defects and major architectural change [9]. The conventional primary treatment modality has long been surgical release with graft or flap coverage, with the latter including a variety of options such as split-thickness or full-thickness skin grafts, Z-plasties, cross-finger flaps, local transposition flap, radial forearm flap, ulnar artery flap, Baker's flap, or abdominal flap [10]. Muscle, tendon, and/or joint capsule procedures may also be required [11].

Percutaneous needle aponeurotomy (PNA) has recently been popularized with the rise of non-invasive procedures for the management of contractures [12]. The technique was proven safe, effective, and cost-efficient in managing hand contractures, especially Dupuytren's contracture [12-14]. Dupuytren's contracture is a relatively common, bilateral proliferation of the fibrous tissue in the hand that occurs in the elderly and leads to progressive disabling contracture of the fingers - most often the ring and little fingers [15]. Recently, the use of PNA associated with lipofilling has been proposed for usage beyond Dupuytren's contracture, such as in cases with postburn contractures of the hand [16]. The goal of the procedure is both functional rehabilitation of the affected finger by releasing the

scar tissue together with cosmetic improvement through the lipofilling [17]. If proven effective, the technique would disregard the need for invasive flap reconstruction with all accompanying risks and would provide a better aesthetic outcome [16].

Scar contractures of the fingers represent a major functional and aesthetic burden to many patients with hand injury. Managing such condition is often challenging and various techniques have been proposed, with flap-based techniques being the conventional options. Percutaneous Needle Aponeurotomy (PNA) combined with lipofilling represent a novel, non-invasive method for managing scar contractures.

This prospective study included 10 patients with scar contractures of the fingers who were managed with PNA and lipofilling at a single center from March 1st, 2015 till March 1st, 2016. Six patients had postburn scars and 4 patients had post-traumatic scarring.

Furthermore, this was the situation and to the Casa Austria All patients had significant improvement in contractures postoperatively at the median follow-up, the mean improvement of contracture was 21 degrees (± 9 degrees) for the MP joint, and 31 degrees (± 12 degrees) for the PIP joint. Functional improvement was recorded in 6 out of 8 patients (75%), and cosmetic improvement was reported by 9 out of 10 patients (90%).