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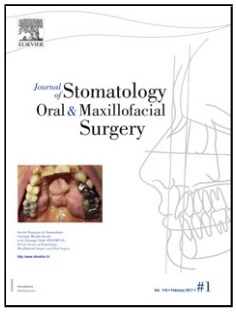

Title: Use Of Autologous Fat Graft And Fractiononal Co_2 Laser To Optimize The Aesthetic And Functional Results In Patients With Severe Burn Outcomes Of The Face<!–<RunningTitle>Effect of lipofilling and CO_2 laser on burn scars</RunningTitle>–>

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Title Page

USE OF AUTOLOGOUS FAT GRAFT AND FRACTIONONAL CO_2 LASER TO OPTIMIZE THE AESTHETIC AND FUNCTIONAL RESULTS IN PATIENTS WITH SEVERE BURN OUTCOMES OF THE FACE.

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ABSTRACT

Background: Facial burn outcomes are often difficult to treat. Residual scars represent a problem for aesthetic and functional concerns as well as for patient's social and psychological life. Autologous fat graft can be used in the treatment of burn outcomes, providing a sensitive improvement in the quality of the burned areas. The aim of our report is the discussion of the value of lipofilling and fractional CO_2 laser in optimizing aesthetic and functional results of burn sequelae.

Methods: We treated twenty four patients with post burns scars who underwent to autologous fat graft followed by CO_2 fractional laser treatment.

Results: At one year follow up all the patients noted an improvement of their clinical condition, with a better texture, softness, color and elasticity of the skin.

Conclusions: Lipofilling combined to CO_2 laser can complete and improve the results of the standard surgical approach used in burned patients.

Keywords: Lipofilling, Burn, Liposuction, Scar, Stem cells, CO2 laser, autologous fat graft

INTRODUCTION

Post-burn sequelae still represent a remarkable issue, especially when face is involved. Residual aesthetic and functional outcomes can heavily affect patient's social life and psychological well-being. Late onset second and third degree burn complications are represented by hypertrophic scars or keloids. The standard surgical techniques used in the treatment of these patients are represented by scar revision, skin graft or skin flap, with or without the use of a tissue expanders (1).

Previous studies have demonstrated the benefits of lipofilling for burn outcomes (2;3).

Adipose tissue is rich in mesenchymal stem cells that are able to divide indefinitely, producing various cellular lines (4-6). Stem cell-derived fibroblasts could replace cells lost in atrophied tissues, improving the mechanical and biologic properties of the damaged skin (7;8).

Lasers can be safely added to post-burn facial scars treatment algorithms. However a widely recognized and accepted protocol using lasers hasn't been presented yet (9).

It has been demonstrated that CO_2 laser specifically targets water in abnormal collagen, several millimeters below the surface of the skin. If applied in a fractional pattern, columns of abnormal scar are ablated. This allows to new collagen deposition, in a controlled manner, with rapid re-epithelialization of damaged skin (10).

In the current literature no report discusses the combination of these techniques to treat burned patients. We present the protocol we have developed to optimize the aesthetic and functional results of burns sequelae, and the role of lipofilling followed by fractional CO_2 laser in tissue regeneration.

MATERIAL AND METHODS

Twenty-four patients with hypertrophic scars and keloids, resulting from second and third – degree burns of the face, have been enrolled in the study, from November 2011 to January 2013 (Table 1). They have previously received a mean of 4.3 (2 to 7) restorative operations before the first fat graft. Fractional CO_2 laser was used to reduce stiffness and abnormal texture of the burn areas after fat transfer. This combined-procedure was performed every-time by the same surgeon.

Patients were assessed one day before the first combined fat graft-laser procedure and one year later by a five items questionnaire developed by the authors (Table 2). Each item grade was defined to range between 0 (poor) and 10 (excellent). Each scale score was used to obtain a final score ranging between 0 and 50. The pre and one year post operative scores obtained by each patient were compared using a paired T test.

A value of $p < 0.05$ was considered significant. Continuous variable normal distribution was analysed using the Kolmogorove Smirnov test. All analyses were performed using PRISM, version 5 (Graph Pad, USA). All the authors had full access to and take full responsibility for the integrity of the data Preoperative and postoperative digital photographs were used to assess the clinical results.

Written informed consent for research publication of patient-related data was obtained from each patient. Our study protocol was conformed to the ethical guidelines of the 1975 Declaration of Helsinki as reflected in approval by the institution's or an independent human research review committee.