

## TISSUE MECHANOSTIMULATION IN THE TREATMENT OF SCARS

UGO MAJANI, ALDO MAJANI  
MIAS Surgery Outpatient Unit, Catania

[Meccano-stimolazione tessutale nel trattamento delle cicatrici]

### ABSTRACT

**Objective:** For several years now, tissue mechanostimulation techniques have been used in rehabilitation medicine, aesthetic medicine and reconstructive and aesthetic plastic surgery<sup>(1)</sup>.

The devices consist of a system of rollers and mechanized fins that act in conjunction with an adjustable suction unit. The many studies that have followed over the years, while showing the validity of the method in the treatment of scars and burns, have underscored the limits consisting mainly in the contraindications to treat patients at an early stage and the slowness of results, which all too often depended on the operator's skill<sup>(2-5)</sup>. The aim of our study was to evaluate whether those limits have been overcome by the latest generation of equipment, which should allow for immediate intervention and standardized and hence repeatable treatments, using new handpieces and computerized protocols.

**Methods:** A total of 26 patients, aged between 16 and 82 years, were assessed: 12 patients suffered from post-traumatic scars, 6 patients from burns, and 8 patients had cosmetically unsatisfactory surgical scars in exposed areas of the body. The mechanostimulation sessions, performed biweekly, ranged from a minimum of 8 to a maximum of 20.

**Results:** All patients completed treatment, while one patient did not come for check-ups. The method has proven to have absolutely no side effects except a slight tenderness shown during treatments by two patients with burns. All patients showed an improvement of at least one of the subjective symptoms (pain, paresthesia, feeling of paperlike skin). The majority of patients also noted improving scar appearance: in 9 subjects there was no need for lipofilling or previously scheduled revision surgery.

**Conclusions:** The new handpieces, due largely to the fins and pulsed stimulation, allow for early treatment, depend less on the operator, and enable faster and more predictable results than those that are obtained from previous generation equipment.

**Key words:** LPG endermologie, Endermolab.

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### Introduction

The LPG endermologie technique, known for many years now around the world, works as follows<sup>(6)</sup>:

- It increases vascularity and skin oxygenation and hence also cellular exchange and nutrition.
- It allows for a physiological restructuring of connective tissue by acting on the extracellular matrix.
- The action of the rollers and fins, combined with the suction, favors effective tissue and lymphatic drainage.
- The stimulation of elastin fibers along with tissue decongestion help restore skin tone.
- Suction allows for the separation of the dermo-epidermal plane from the muscle plane.

### Materials and methods

The 26 patients who received the treatment had, in descending order, the following symptoms:

- Change in skin softness and smoothness
- No sensitivity to pain
- Feeling of paperlike skin
- Tenderness upon palpation;
- Edema
- Functional limitation.

From an aesthetic and psychological point of view, scars were badly accepted, especially if related to the face or exposed body surfaces. The scar tissue often featured signs of excessive fibrosis, keloid formations and adhesions on the deeper layers. The goal of our tissue mechanostimulation protocols was to check the reparative processes of the

dermis and hypodermis with a draining action on the edema surrounding the lesion, the improvement of vascularization and a restoration of mobility of the surface layers compared with the underlying tissues. Patients suffering from post-traumatic scars would come to us with scars already stabilized. Subjects presenting post-surgical scars were treated immediately in the presence of scarring still undergoing remodeling thanks to the extremely delicate suction heads. As regards the subjects with burns, proper reepithelialization was needed before treatment. In every case, recent scars were treated with the pulsed mode, using frequencies of 8 to 16 Hz for an action on vascularization and to preserve soft tissue mobility around the lesion and frequencies of 4 Hz for an anti-swelling action. First the healthy tissues around the lesion were treated, followed later by the scar. Mature scars were treated more intensively and in continuous mode.

Symptom	Excellent	Good	Fairly good	None
Change in skin softness and smoothness	28%	48%	16%	8%
No sensitivity to pain	12%	44%	32%	12%
Feeling of paperlike skin	44%	40%	16%	0%
Tenderness upon palpation	32%	48%	4%	16%
Edema	72%	8%	16%	4%
Functional limitation	24%	44%	24%	8%
Aesthetic improvement according to the patient	24%	28%	20%	28%
Aesthetic improvement according to the physician	28%	40%	20%	12%

**Table 1:**

## Results

The results achieved 30 days since the last session were assessed by comparing pre-and post-treatment life-size photos and with 20x and 50x zooms. A histological study performed in eight patients showed how mechanostimulation was able to restore vascularization especially in the superficial vascular plexus. Another noteworthy result was the decrease in interstitial space in seven of the eight biopsies. This is undoubtedly the result of mechanical stimulation on the skin induced by LPG treatment. The histological examination also showed a partial recovery of the elastic fibers in the papillary dermis that from a clinical point of view led to enhanced trophism of the dermis and epider-

mis resulting in better function of all cutaneous and subcutaneous areas. As regards the subjective symptoms, patients assessed the degree of improvement obtained as shown in table 1.

## Conclusions

Mechanostimulation treatments performed with last generation equipment make it possible to act promptly on scars, mobilizing and preventing adhesion to the deep layers. This preventive action can be carried out without pain and without risks thanks to the movable fins that exert a rhythmic action. Tissue mechanostimulation proves useful even on mature scars, improving the aesthetic appearance and relieving painful symptoms and the functional limitations often reported by patients. Treatment protocols loaded in the equipment's software make the achievable results less operator-dependent. In conclusion, it seems appropriate to recall that since LPG treatments are known and appreciated especially in aesthetic medicine, it is absolutely necessary to avoid emphasizing the results too much and then creating false expectations. Nowadays, it is impossible to completely erase a scar and very often there is no way to erase the event that caused it from memory.

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