

**SOCIETÀ ITALIANA DI GERONTOLOGIA E GERIATRIA – SIGG
ITALIAN SOCIETY OF GERONTOLOGY AND GERIATRICS, FLORENCE**

Palazzo Congressi 9-13 November 2005

Topics discussed: Cutaneous alterations, diabetes

DIABETIC PLANTAR ULCER TREATED WITH AN INNOVATIVE THERAPY - FREMS (FREQUENCY MODULATED ELECTRO-MAGNETIC NEURAL STIMULATION)

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FREMS (FREquency modulated Electro-Magnetic neural Stimulation) consists of transcutaneous electromagnetic neurostimulation by means of high negative potential, single-phase electric current pulses, with suitably modulated frequencies and very short durations, in dedicated sequences.

The electric signals transmitted by this innovative system promote, as documented by various studies, an important biochemical interaction with the peripheral and deep tissues stimulated, determining the **release and synthesis of various growth factors**, such as *VEGF*^{1, 2} (Vascular Endothelial Growth Factor), *b-FGF* (basic Fibroblastic Growth Factor), *PDGF* (Platelet Derived Growth Factor) and *EGF* (Epithelial Growth Factor) and an **important anti-inflammatory and anti-phlogistic effect on tissues**, with a reduction of edema by direct action on the immune system (long-term effect), by the direct mechanism of **modulation of specific cytokines**, such as *interferon-α* and *TNF-α*, as well as the effect of lymphatic drainage (immediate effect).

The purpose of this study was to verify the capacity of FREMS treatment in stimulating granulation and the healing of a large torpid plantar ulcer which had remained the same size from 1998 to August 2004, when treatment commenced.

The objective to achieve was particularly ambitious as the patient refused any kind of offloading orthoses or surgical treatment.

In late July 2004, Mr D.G.M. attended our clinic to treat a large, oval, plantar ulcer measuring 9 cm², 2 cm deep, with maximum diameters of 4 x 3 cm, with a hyperkeratotic border which was extremely painful at rest and on deambulation. The arch of the foot was flattened with claw toes.

The ulcer could be classified as a Wagner class 3 ulcer and a Grade III – Stage D ulcer according to Lavery's Texas wound classification system.

We requested the following diagnostic tests: LeukoScan scintigraphy, Doppler ultrasonography and electromiography of the lower limbs, routine blood tests. These tests enabled us to formulate the following diagnosis: mixed, infected ulcer. Suspected infection of the soft tissues and osteomyelitis of the left forefoot.

Mr D.G.M. was immediately treated with advanced dressings and FREMS, with daily sessions lasting 40 minutes. The hyperkeratotic border of the lesion was periodically removed.

After 10 days the pain disappeared and in 2 weeks it was possible to observe new granulation tissue. After six months, the size of the ulcer was reduced to 8 cm² with perfect reepithelization of over 2/3 of the wound.

After attending our clinic for only 3 months, the patient consented to the start of specific antibiotic treatment, with ciprofloxacin and rifampicin for 6 weeks. So far, the patient has never used offloading orthoses for his foot and has only partially reduced his working activity.

We can clearly define the result as excellent if we consider the characteristics of the ulcer, the patient's lack of cooperation in resting and using offloading orthoses and the absence of side effects following treatment.

The action of FREMS was instrumental, with its trophic and analgic action enabling us to achieve this outstanding result.

BIBLIOGRAPHY

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