VHS Clinical Meeting

Healing by PULSED ELECTRO MAGNETIC FIELD ENERGY THERAPY (PEMFE) IN DIABETIC FOOT INFECTION

(Dr. N.S. Murali’s Last case of Diabetic Foot – Salvage)
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- Senior Consultant Physician and Diabetologist.
- Head of the V.H.S Diabetes Department – Voluntary Health Services, Chennai.
- Chairman, TAG-VHS Diabetes Research Centre.
- Formerly Honorary Clinical Professor – Government Stanley Hospital & Medical College, Chennai, Tamil Nadu, India.
Mr.V. Ramanathan, Male, aged 71 years – DM (T2) x 17 years, with Triopathy and Diabetic Foot ASCVD/HTN/CAD-Post PTCA Status (since 2001). Developed a Trophic ulcer in the Left great toe which got infected in July 2008.

He presented to me in February 2009 with a highly swollen, infected digit pouring out pus (in patients’ own words “a huge rotten potato and stinking foul smell emanating from the wound”
Infection & Disarticulation of toe. Infection persisting with upward spread, systemic toxaemia, hyperglycemia & hyperpyrexia

Charcot's changes with distortion of the digits - Advanced condition with bony involvement in the diabetic foot
Decompression surgery done at the right time saves the limb from amputation

The route of spread of infection in the diabetic foot
Big toe with part of it missing

Doppler study showing AV shunting in the diabetic foot and the fast forward flow
V.R – Picture . 2
PEMFE Therapy

PEMFE therapy using EM Pulse Device was first introduced in India, at Chennai (and Mangalore) in December 2008, by Prof. B.M. Hegde the renowned Cardiologist and former Vice-Chancellor of Manipal University (and a close friend of Late Dr. Glen A. Gordon the inventor) on an elderly doctor with advanced coronary artery disease and intractable recurrent LV failure – this successful response has been reported elsewhere. Since then over a hundred cases with different clinical presentations have been given this modality of therapy with much significant success (e.g.) In CAD, with and without Angina, Neurological problems like Cerebrovascular stroke, speech difficulties, Ataxia, failing memory, G.I. Problems like Acute Abdomen (due to adhesions), Acid peptic Diseases including GERD) Brittle Diabetic state in IDDM Cases (Type 1) due to erratic insulin absorption, and a variety of skin conditions and Diabetic foot infection etc., have been benefited by the use of PEMFE.
Chronic Wound Management

THE EVIDENCE FOR CHANGE

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Changes in chronic wound management: perspectives from Tamil Nadu, India

C. V. Krishnaswami, N. S. Raji, K. M. Ramakrishnan and M. Babu

INTRODUCTION

Susruta (1000 BC), the great Hindu teacher and surgeon in India, introduced the concept of cosmetic surgery by reconstructing a chopped nose using a skin flap from the cheek. Wound healing was practiced by the Ayurvedic physicians (using the system of Indian medicine) starting from Charaka (500 BC)\(^1\); they used various herbal and plant products to accelerate healing of chronic wounds, mostly traumatic or surgical wounds. There are records of the usage of the powder of Sappan-wood, liquorica, barberry plant and cotton soaked in sesame oil. Susruta's Samhita (compendium) mentions the use of black ants for suturing\(^2\).

The aim of this chapter is to introduce some of the common denominators as well as changes related to chronic wound management in Chennai, Tamil Nadu, a south-eastern state in India.

DEFINITION AND NATURAL HISTORY

A wound is a break in the continuity of skin or mucous membrane. Wounds must be treated as individual entities since they may be acute or chronic, have different etiologies, be differently located or they may be infected.

The healing process will be adversely influenced by comorbid conditions, systemic deficiencies and environmental (external) factors.

Proper wound treatment requires knowledge both of the normal healing process and of the various factors influencing it. Treatment is often based on tradition and experience, though it ought to be evidence-based. It is difficult in India as elsewhere to adopt such an approach without local evidence. This chapter illustrates some evidence that could be influential in changing local concepts towards wound management.

The basic aspects of wound healing are similar in soft tissues. Continuity and strength are restored by formation of connective tissue and by epithelial overgrowth forming a fibrous scar.

This is a continuous process, which for simplicity can be divided into three phases. The first phase is inflammation, also sometimes referred to as the lag phase; the second phase is proliferation, also sometimes referred to as the phase of fibroplastic and the third phase is maturation.

The immediate response to wounding is vascular (briefly, initial vasoconstriction followed by vasodilatation, changes in capillary blood flow and permeability).
Chronic Wound Management

Peripheral occlusive vascular disease is uncommon relative to Western societies, less than 10% in the over 60 years age group. The management is medical, i.e. antibiotic therapy, and, when indicated, early surgical decompression of the infected diabetic foot using a technique pioneered by Murali.

Surgical decompression of the infected diabetic foot is indicated when pus and gas (in the presence of anaerobic infections) accumulate in the mid compartment of the sole between the plantar fascia and the fourth layer. This causes compression of the plantar vascular arch which in turn leads to distal digital ischemia and gangrene; proximal spread of the infection medially and upwards above the ankle (through the tarsal tunnel) to the soleal region causes thrombosis of the subsoleal venous plexus, arterial compression and systemic toxemia, very often resulting in major amputation of the limb. The decompression technique has yielded all-round improvement, preventing amputation in over 90% of the cases.
Figure 6.2 A 45-year-old woman from Singapore, a known diabetic for 14 years, NIDDM with polyneuropathy (diminished ankle jerks), preserved sensations of pain, vibration, heat and cold, full foot pulses present bilaterally, presented with a large 6.0 x 4.5 cm non-infected chronic ulcer and hypertrophied edges of more than 2 years' duration and failed skin grafting twice.

Figure 6.3 The same patient as in Figure 6.2 was treated with pulsed galvanic stimulation using silver-mesh stocking electrodes for 4-6 h daily in an outpatient setting.

Figure 6.4 After 4 months, the ulcer in Figures 6.2 and 6.3 reduced in size from 6.5 cm to 2.5 cm.

Figure 6.5 A 53-year-old female NIDDM (but presently insulin-requiring) patient had a severe degree of sensorimotor polyneuropathy and classical diabetic foot. She presented with acute thermal injury to the lateral three toes of the right foot (dorsal aspect). After 2 weeks of dressings and medication, skin grafting was considered to accelerate healing. This was unsuitable as she had cardiomopathy and other problems. She did not want to undergo anesthesia and opted for the alternative modality of therapy. She responded well to daily application of the silver mesh stocking electrodes with pulsed galvanic stimulation to the affected foot. The bluish coloration of the third digit at presentation improved in color with 1 week's therapy and the entire dorsal ulcers, which had exposed the tendons, epithelialized within 4-6 weeks.
International Consensus on the Diabetic Foot

by the International Working Group on the Diabetic Foot
Diabetic Foot: General
Infection, ulceration and/or destruction of deep tissues associated with neurological abnormalities and various degrees of peripheral vascular disease in the lower limb (based upon the World Health Organization definition).

Deep Infection: Evidence of abscess, septic arthritis, osteomyelitis or septic tenosynovitis.

Osteitis: Infection of the bone without involvement of bone marrow.

Osteomyelitis: Infection of the bone, with involvement of the bone marrow.
International Consensus on the Diabetic Foot

Epidemiology of the diabetic foot:

- Approximately 40-60% of all (non)-traumatic amputations on the lower limb are performed on patients with diabetes.

- 85% of diabetes-related lower extremity amputations are preceded by a foot ulcer.

- Four out of five ulcers in diabetic subjects are precipitated by external trauma.

- The prevalence of foot ulcer is four to ten percent of the diabetic population.
# International Consensus on the Diabetic Foot

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<th>Factors associated with foot ulcer</th>
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International Consensus on the Diabetic Foot

Social and economic factors:

- Diabetic foot complications are expensive due to prolonged hospitalization, rehabilitation and increased need for home-care and social services.

- Given the high cost of diabetic ulcers and amputations to both the individual and society, the relatively low cost interventions of foot-care are likely to be cost-effective in most societies.

- Information regarding the long term prognosis of diabetic foot ulcers is scarce.
Dr. N. S. Murali
Artificial limbs now grow without surgery

Sumitra Deb Roy | TNN

Mumbai: It’s now possible to make artificial limbs grow without going in for surgery.

Twelve-year-old Delhiite Gude Tejaswini, who suffers from bone cancer, has become one of the 100-odd patients in the world to get her artificial limbs to grow in size — non-surgically — by a few millimetres in a few minutes.

She flew in from the capital on Friday, following which doctors at the PD Hinduja Hospital put her through a 16-minute procedure to increase the length of the implant in her right leg. The success of the procedure has ensured that the 12-year-old does not have to go through painful surgeries every few months to increase the size of the implant when the rest of her limb grows. What’s more, the implant allows Tejaswini to walk, cycle and go to school like any other kid in her class.

Costing about Rs 11.5 lakh, it was custom-made for Tejaswini in Britain using her CT scan and X-ray images. The implant comes with a screwdriver-kind of mechanism that is activated by an external electromagnetic coil, which can increase the length of the limb. Tejaswini’s limb was increased by 4 mm in 16 minutes.

A simple fall while cycling two years ago left Tejaswini writhing in pain and resulted in a swelling that refused to heal for days. The child specialist suspected the worst and referred her to Tata Memorial Hospital, where she was diagnosed with osteosarcoma (a cancer of the bones affecting mostly children and adolescents during their growth between 10 and 20 years).

> Magnet Magic

> Tejaswini, who lost a chunk of her thigh bone to cancer, fitted with an implant with a magnet and motor inside

> As the 12-year-old grows, a simple external procedure involving a coil generating an electromagnetic field will expand the implant to keep up with her growth. It will cut the need for repeated surgeries

> Technology to the rescue. P 8
Thank You