

## Case study: C140

L-Mesitran®

### Deep thermal forearm and hand burn

Scientific evidence and biological cell culture studies, supported by peer review publications, strongly suggest that mono-floral, medical grade honey (*L-Mesitran*) has definitive advantages and benefits over nano-crystalline silver preparations in *ex-vivo* tissue-culture, and relevant to clinical practice regarding selection of burn-dressings<sup>1</sup>.

*Ex-vivo* tissue-culture indicates that nano-crystalline silver implants, compared to medical grade honey, are cytotoxic to keratinocytes and fibroblasts, key components of the skin, thus potentially inhibiting epithelial healing during burn wound healing<sup>1</sup>. Compared to platelet rich plasma (PRP), silver implants introduced to cellular tissue culture *ex-vivo* can interfere with newly cultured cells, epidermal cell proliferation and migration of keratinocytes, dermal fibroblasts and adipose derived stem cells (ADSC)<sup>2</sup>. Both epidermal and dermal elements are potentially inhibited during wound healing by the uncontrolled topical application of silver impregnated preparations. These objective cell tissue findings would favour selection and consideration of medicinal honey impregnated dressings over silver when treating burns in clinical practice.

The following case report illustrates the unequivocal efficacy of the medicinal honey burn dressing and its clinical application in the treatment of a deep upper extremity burn during 2013.

**Product:** L-Mesitran Hydro.

**Case study done by:** Prof. Don du Toit, PhD, FCS (SA), FRCS, Emeritus Professor, University of Stellenbosch, South Africa (dfdt@iafrica.com)

### Case study

An adult (42 years), white male, was admitted as an emergency to Panorama Medi Clinic, Durbanville, South Africa, during June 2013, with an accidental burn sustained to the right upper extremity, including hand after falling into an uncontrolled fire. (He slipped on a wet varanda of smooth Italian tiles; the fire drum fell over and the arm landed in the coals.)

First-aid therapy at home included emersion of the arm in cold-water because of the extremity open fire burn and severity of pain. Emergency room care and early treatment by a multi disciplinary medical team consisting of general and plastic surgeons included hospitalization, pain medication, antibiotics, burn resuscitation to prevent burn related shock and hypovolaemia.

Emergency clinical assessment using established burn parameters confirmed a 5% Total Body Surface Area (TBSA) burn, deep thermal burn involving the right upper extremity (forearm) and hand, left-hand and two fingers with volar surface involvement.

Anatomically, the burn involved the cutaneous innervation regions on the dorsum represented by the medial, lateral and posterior cutaneous nerves of the forearm. Both radial and dorsal innervation areas were affected on the posterior aspect of the right hand. The burn surfaces included the flexor and extensor forearm surfaces,



1. The deep thermal burn right forearm, wrist and hand within the first week of sustaining the burn. Note extremity burn swelling and granulations, although the burn was not circumferential.



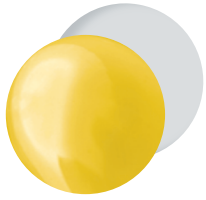
2. L-Mesitran® Hydro applied aseptically and directly to the burn surface.



3. Comfortable supportive dressing covers the L-Mesitran® Hydro and facilitates active movements of the elbow, wrist and hand.

and the burn on the right-extremity was larger than on the left side. On the right-volar surface, the burn infringed on the medial and lateral cutaneous nerve regions of the forearms, all being terminal-branches of the brachial-plexus. These surfaces were in the distribution of C6, 7 and 8 cutaneous dermatomes of the right upper extremity<sup>3</sup>.

The depth, type, and grading together with the "The Rule of Nine" parameters helped establish burn severity scoring prior to surgical burn-wound debridement<sup>4,5,6</sup>. The conservative principles of burn wound treatment and care were applied including the use of moist wound-dressings<sup>5,6</sup>. Tangential excision or skin grafting was not



## Case study: C140

L-Mesitran®

indicated and the wounds were initially dressed with in-hospital, silver impregnated dressings before intentional conversion to medical grade honey dressings (*L-Mesitran*® Hydro) after hospital discharge.

A minor, reversible compartment syndrome, due to swelling, affected the right-thumb, but resolved without need for a surgical-fasciotomy or escharotomy. Distal radial nerve neuralgia recovered slowly. Nosocomial and MRSA surveillance was performed, but no resistant burn-surface bacteria were detected during the exposure of the burn-surface to medicinal-honey manufactured dressings.

Twice-weekly burn dressings, after hospital discharge were supervised by a medical-specialist, over a period of 60 days on an out-patient basis. A hydro-active antibacterial barrier island-dressing with honey was selected as the dressing of choice (*L-Mesitran*® Hydro, Theo Manufacturing B.V., Maastricht, The Netherlands). Smaller areas were managed thereafter with topical application of a hydro-active, antibacterial honey ointment in conjunction with hydro-ap-

plication to facilitate burn-wound healing (*L-Mesitran*® Ointment). Before and after burn dressing treatment with the honey based dressings, and clinical outcome in this patient, are reflected in figures 1-5.

Satisfactory wound healing and burn epithelialization was complete in 60 days, and the rehabilitation at home was successful and facilitated by strict sepsis surveillance and nutritional support. Both a positive subjective and objective end result or measured-outcome followed the use of the honey based dressings of choice.

Three month follow-up after the burn showed minimal depigmentation, hyperpigmentation and hyperplastic scar tissue resulting in no elbow, wrist or finger contractures (fig. 5). A patient satisfactory cosmetic result was expressed after the use of the honey dressings. Temporary disability due to burn pain, anxiety and causalgia was present for about two months, but reversed completely once the burn healed.

### Discussion and recommendations

Skin-charring of the deep thermal burn surface necessitated elective and scheduled surgical debridement under general anaesthesia, within one week of sustaining the burn and admission to a Cape Town-based private hospital. Consensus and evidence based decision agreed that the burn surface could granulate up and re-epithelialize from the edges, hair follicles and stem cells, without need for tangential excision, escharotomy, fasciotomy and skin-grafting.

Burn surface wound healing was affected by secondary intention and the use of topical medicinal honey based moist dressings, active movements of both extremity joints and hand to avoid contracture and stiffness. The application of *L-Mesitran*® Hydro antibacterial barrier island dressings facilitated rapid burn wound re-epithelialization, curtailment of pain and burn associated sepsis at the skin denuded areas, without need for other dressings.

Application of *L-Mesitran* reduced the period of functional disability in this burn patient and the healing of the deep thermal burn was accomplished within 60 days. Patient satisfaction was expressed with a high level of burn wound healing and regained full functionality of the forearm and hand.

### References

1. Du Toit DF *et al.* An in vitro evaluation of the cell-toxicity of honey and silver dressings. *J Wound Care* 2009; 18; 383-9
2. Du Toit DF *et al.* An in vitro tissue-culture evaluation of the cell-toxicity of Platelet-Rich Plasma and Silver Dressings. *Journal of US-China Medical Science* 2010; 7; 1-19
3. Last R. Anatomy. Regional and Applied. 4 th edition, J. & A. Churchill Ltd, London. 1966
4. Schwartz SI *et al.* Principles of Surgery, 7th edition, Mc Graw Hill, New York. 1999.
5. Du Toit DF. Manual of Intermediary Surgery for Southern Africa, Chapter on Burns, pp 211-216. Mainline, Cape Town, 1994.
6. Lyerly HK *et al.* The Handbook of Surgical Intensive Care. Mosby, St Louis, 3 rd edition, 1984.



4. Deep thermal burn of the same patient after 29-days after home treatment with *L-Mesitran*® Hydro, without skin-graft, showing epithelialization and healing process of burn on the extensor surface of right fore-arm. Compare with figure 1.



5. Close-up and lateral view. Right fore-arm burn of same patient. Day 60 after deep thermal burn and treatment with *L-Mesitran*® Hydro showing complete epithelialization and healed burn surface by application of the moist-dressing principle. At 3-months follow-up after this image the burned-surface has remained healed and the epithelium stable. Compare with figures-1 and 2.