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Skin Cellular Regenerative Treatment of Wounds and Burns - Nurses Programme
Saturday, 22 June 2013  Start 5:30pm  Duration: 30mins  Sportsdrome
Cellular Regenerative Treatment of Burns and Wounds

Moist Wound Healing
Disclosures

• I am fully employed as a practice nurse in Dunedin.

• For services rendered in my own time in the promotion of a specific wound healing therapy (CME lecturing to nurses and other medical groups) I am reimbursed for transport and accommodation costs by Access Health Care Ltd.
Healing Process

Injury → bleeding & bruising → non-specific swelling

Which increases during first 24-48 hours

Cells recover if good circulation
Epithelialization begins
Granulation tissue forms
Epithelial cells meet, form intact basal layer
Then proliferate vertically, single layer thickens to several layers
Burns and Wounds Natural Repair

- Keratinocytes
- New extracellular matrix
- Collagen & elastin fibres
- Fibroblasts
- Epidermis
- Dermis
Circulatory Deprivation Risk

• Injury can lead to tissue death, but necrosis can also occur as a result of swelling

• Several technical responses can assist **venous drainage** - improves circulation and chances of tissue survival.

1. Encouraging free drainage of sero-sanguinous fluid from the wound by gravity

2. General elevation

3. Reduction of tension and pressure

4. Great care using pressure dressings

5. Double bandaging technique for ambulation
Moist Wound Healing

• “There is growing evidence of improved healing of full and partial-thickness cutaneous wounds in wet and moist environments. Retention of biologic fluids over the wound prevents desiccation of denuded dermis or deeper tissues ... allows faster and unimpeded migration of keratinocytes over the wound surface. It allows ... naturally occurring cytokines and growth factors to exert their beneficial effect on wound contracture and re-epithelialization”. (2) (Atiyeh et al. publishing in American Dermatologic Surgery journal in 2003)
Maintaining a Moist Environment

• Despite documented benefits (of dressings), creating and maintaining a sealed moist environment over large surface areas such as large skin graft donor sites or extensive burns is technically difficult, if not impossible (2, 3).
Essential Principles of Wound Care

• Tissues must be handled *gently*
• Caustic solutions capable of sterilizing the skin should not be applied to the wound
• All devitalized tissues should be debrided
• Dead space must be removed/filled (4)
• Primary healing or tertiary (*delayed primary*) is by far preferable and superior to secondary healing
• Tissue gaps and poorly approximated edges will ultimately heal by *secondary* intention
Chronic Wounds

- Chronic wound - one that fails to heal because of some underlying pathologic condition, and will not heal until the underlying cause is corrected
- Classically subdivided into venous stasis ulcers, pressure ulcers, diabetic ulcers, and sometimes traumatic wounds
Chronic DM Foot

Peripheral neuralgia, loss of temperature, tactile sensation & pressure, severe oedema
Too often the end result is amputation
General Principles of Wound Care

- Proper cleansing
- Selective debridement of non-viable tissues
- Gentle handling of tissues to avoid additional injury
- Prevention of wound sepsis
- Cavities well drained and packed gently to avoid early closure of superficial layers
- Most antiseptics, particularly those containing cetrimide, have marked cytotoxic properties and should be avoided unless the wound is heavily contaminated. (4)
- “Povidone-iodine, acetic acid, hydrogen peroxide or sodium hypochloride are as likely to injure normal tissue as they are to destroy microorganisms and may delay wound healing and have adverse effects on surrounding normal skin.”(3,8)
- Avoid preparations which interfere with the inflammatory process - these will have a negative effect on wound healing (includes hydrocortisone).
Wound Care Dressings

- Low-adherent wound contact layers (paraffin gauze etc)
- Perforated Film absorbent dressings
- Foam dressings, alginate dressings, polysaccharide dressings
- Hydrocolloid dressings, hydrogel dressings
- SAM dressings (synthetic adhesive moisture-vapour-permeable), hydro-active dressings
- Negative pressure dressings (V.A.C)
- Honey, papaya remedies have some anecdotal success

- Selection of most appropriate dressing is complex, laborious, once selected may be impractical & almost impossible to apply
- Another dressing may be required to go on top
Acute Burn
Five Aspects to Evaluate Therapeutic Outcome of Burns/Wounds

- Pain Scale
- Degree of Disability
- Scarring
- Total Expenses
- Survival Rate *

Experts agree that allowing traumatized or ischemic tissue to dehydrate produces further tissue loss by transforming the “zone of stasis“ adjacent to the injured area into a “zone of necrosis” (12)
Thermal injury: Jackson’s Zones

Schematic representation of Jackson’s burn model

- Zone of hyperaemia
- Zone of stasis
- Zone of coagulation

Layers:
- Epidermis
- Dermis
- Subcutaneous tissue
Limitations of Current Burn Therapies

• Topical antimicrobial chemotherapy and surgical excision of burned tissue have reduced the occurrence of invasive burn wound infection

But ...

• Loss of body fluids is high
• Semi-viable cells are forced to die
• Topical antibiotics delay healing
• Relatively high scar formation (5)

Which is...detrimental aesthetically and functionally
Pain /discomfort may be significant
A Different Form of Wound Therapy:

- MEBO (Moist Exposed Burn Ointment) developed in mid-1980’s by Professor Xu Rongxiang (a surgeon) in Beijing, China as a result of observing wound healing in a moisture-rich environment.

- Ointment composed of β-sitosterol 0.25% as major active constituent, dissolved in refined sesame oil as a base, together with 18 amino acids, 4 fatty acids (incl. phytosterol, oleic acid, linoleic acid), 7 polysaccharides, and vitamins incl. Vitamin E; these are suspended in beeswax which is the framework and also a preservative. Other ingredients include baicalin (a flavonoid), berberine (an alkaloid) – all of natural herbal origin.
Properties of MEBO

• MEBO provides the “optimum physiological wound environment for healing”, reiterated by surgeons in Saudi Arabia, U.A.E; Jordan, Kuwait, Qatar, Egypt (Multicenter Study involving 33 surgeons, published in 1999)

• Isolates and protects wound bed from external environmental factors and markedly reduces fluid losses from the wound surface

• Intact skin rate of evaporation of 4.48g/m2h
Postburn increased 20x to 83.70g/m2h
Cover with MEBO, reduced to 5.69g/m2h
(Experimental Study Using Servomed Evaporimeter)
Cleaning Wound To Begin
Carefully remove dead tissue
Properties of MEBO Ointment

• Produces anti-inflammatory & anti-edema effect (9), improvement in local microcirculation, leads to recovery of semi-viable cells

• Controls bacterial and fungal invasion (anti-microbial)(5). Bacteriostatic action is proven although it is not an antibiotic ointment (similar action when compared in vivo to Silver Sulphadiazine in controlling burn wound sepsis and systemic infection with P. Aeruginosa - however MEBO promoted faster healing whereas SSD delayed it) (10)

• No adverse effect by MEBO on the humoral and cellular immune defense mechanisms (6); MEBO does not produce resistant organisms
Analgesic Properties of MEBO

• Reduces pain effectively and quickly (5-10 mins) (5)
• MEBO ointment has a “profound non-narcotic analgesic effect”, believed to be due to inhibitory action on smooth muscle cells in blood vessels, and on the arrectores pilorum muscles – contraction of these thought to be a major cause of pain in burn wounds(7,9)

• Analgesic effect of MEBO is dose-related; timing of application matters; not simply a soothing effect due to viscosity of the ointment.
• It protects nerve endings, relaxes spasm of arrectores pilorum, restores blood microcirculation.
Further Properties of MEBO

• Promotes autolytic drainage, and debridement of necrotic tissues in the wound (9)

• Physiologically moist environment can facilitate biochemical reactions (hydrolysis, enzymolysis, rancidity, saponification, lipidation, and esterification) = liquefaction. Active ingredients act as debridement agents-the sesame oil encircles the granules of necrotic tissues, foreign bodies and contaminated particles and enables them to be discharged from the wound (11)
Regenerative Healing Properties

- Active ingredients in ointment provide nutrition for cell regeneration at base of wound
- Promotes regenerative healing with minimal or no scarring; scars are more aesthetically acceptable (2,5)
- Better ‘quality’ scars are measured in terms of tensile strength, colour, retention of function (2,5) - that is, no contractures, movement not limited
Physiologically Moist Environment is the Key

- MEBO activates Potential Regenerative Cells (PRC’s) that lie deep in the wound to transform into stem cells
- These stem cells differentiate into epithelial cells, fibroblasts and vascular endothelial cells to promote the repairing of tissues
- MEBO moisturizes and liquefies necrotic tissues in advance of discharge process (liquefaction)
- It separates the parabionic tissues (layer between the necrotic tissues and unaffected tissues) without damage to the healthy tissues (11)
Wounds e.g. Diabetic Ulcer
Guidelines for Use of MEBO and antibiotics

• Do not use MEBO on heavily contaminated wounds – clean first (for example, sterilizing soln) to reduce bacterial count, then commence MEBO therapy (MEBT)
• OR Do use antibiotic ointment short term (1-2 days) and bring patient back to review and commence MEBO therapy for healing
• Do use systemic antibiotics short term (a few days) for acute infected wounds, preferably appropriate to the specific infecting organism, use MEBO ointment alongside with plain simple dressings
• Dressings are best done frequently, i.e. daily, or every 2 days for fresh MEBO application, faster wound healing, limits wound odour and obtain best results
• When changing dressings, no water/saline/antiseptic in the wound, instead blot with sterile gauze to remove debris, old ointment, serous ooze
• Maintain MEBO 1-2mm layer in wound applied with dry dressing e.g. perforated film dressing, gauze NOT Vaseline gauze. Debride devitalized tissue as necessary
• If you have to clean the area, use saline or dilute solution around the outside of the wound on healthy skin
• Keep your tube of MEBO clean by applying to the dressing, or with sterile cotton tipped applicators to wound
Teaching Patients to manage

MEBT/MEBO is useful in the treatment of chronic ulcerative states, such as diabetic ulcers, vascular ulcers, and bedsores when used as part of a structured clinical approach. When all team members understand and adhere to the new therapy, MEBT/MEBO can result in improved clinical outcomes, reduced hospital admissions, avoidance of surgery, and greater patient and practitioner satisfaction.

Application is simple and inexpensive; patients and their families can be taught to change the dressings themselves, eliminating the need for complicated and expensive dressings/ regimes, and frequent patient visits.
Chainsaw injury Almost Healed 2013
MEBO Gauze for packing, wrapping
Therapeutic benefits of MEBO burn repair and MEBO wound repair

Clinical and experimental investigations have concluded that MEBO has the following therapeutic benefits.

1. Provides analgesic: MEBO reduces pain in partial thickness burn wounds by micro protection of injured nerve endings and by the relief of hair arrectores pilorum spasm.

Pain Control in a Randomised, Controlled, Clinical Trial Comparing Moist Exposed Burn Ointment and Conventional Methods in Patients with Partial-Thickness Burns
Journal of Burn Care & Rehabilitation, 2003, 24 (5) 289-96

Comparative Study Between Sodium Carboxymethyl-Cellulose Silver, Moist Exposed Burn Ointment, and Saline-Soaked dressing for Treatment of Facial Burns

Evaluating the Role of Alternative therapy in Burn Wound Management: Randomised Trial Comparing Moist Exposed Burn Ointment with Conventional Methods in the Management of Patients with Second-degree Burns
Aesthetic Plastic Surgery, 2002, 26, 470-6

2. Prevents continued thermal injury: MEBO draws away the residual heat from the wound through a specially designed frame structure dosage.

Treatment of Toxic Epidermal Necrolysis with Moisture-Retentive Ointment: A Case Report and Review of the Literature
American Dermatologic Surgery, 2003, 29 (2) 185-8

3. Provides anti-shock treatment: MEBO reduces evaporation of water from the burn wound surface and improves microcirculation by decreasing peripheral and systemic capillary exudation.

Moist Exposed Therapy: An Effective and Valid Alternative To Occlusive Dressing for Postlaser Resurfacing Wound Care
American Dermatologic Surgery, 2004, 30 18-25

4. Promotes microcirculation in the stasis zone by relaxing the smooth muscle of the blood vessel:
Surgical Management of the Burned Hand: an Update and Review of the Literature
Annals of Burns and Fire Disasters, 2000, X111 (4) 230-233
5. Reduces evaporation from the wound surface:
Moist Exposed Therapy: An Effective and Valid Alternative to Occlusive Dressing for Postlaser Resurfacing Wound Care

6. Provides an anti-inflammatory action: Ingredients, including Beta-sitosterol contained in MEBO, have an anti-inflammatory effect.
A New Approach To Local Burn Wound Care: Moist Exposed Therapy.
A multiphasic, multicenter study
Journal of Surgical Wound Care, 2003, 2 (1) 18-19

7. Reduces the need for physical debridement of wounds:
A New Approach To Local Burn Wound Care: Moist Exposed Therapy.
A multiphasic, multicenter study
Journal of Surgical Wound Care, 2003, 2 (1) 18-27

Moist Exposed Therapy: An Effective and Valid Alternative to Occlusive Dressings for Postlaser Resurfacing Wound Care

8. Promotes liquefaction of non-viable, necrotic tissue:
A New Approach To Local Burn Wound Care: Moist Exposed Therapy.
A multiphasic, multicenter study
Journal of Surgical Wound Care, 2003, 2 (1) 18-27

9. Creates a physiologically moist environment: MEBO creates a moist environment to ensure the physiological repair and protection of residual skin tissues.
The Effect of Moist and Moist Exposed Dressings on Healing and Barrier Function Restoration of Partial Thickness Wounds
European Journal of Plastic Surgery, 2003, 26 (2) 5-11

Does Moist Exposed Burn Ointment (MEBO) Promote healing of Chronic Pressure Ulcers? – A multi-centred Randomised Clinical Study

10. Manages local infection (bacterial and fungal): MEBO changes the biological behaviour of bacteria, inducing a decrease in bacterial toxicity and invasive capacity, reducing sensitivity to antibiotics. It also increases the wound’s local and systemic immunity.
Burns Regenerative Medicine and Therapy, Karger, 2004, 70-4
11. Reduces the need for antibiotics:
The Efficacy of Moisture Retentive Ointment in the Management of Cutaneous Wounds and Ulcers: A Multicenter Clinical Trial
Indian Journal of Plastic Surgery, 2003, 36 (2)

MEBO Ointment in the Treatment of Burn Wounds: A Multicenter Study
Modern Medicine Mid-East, 1999, 16 (8), 46-50

12. Provides moisture and cell nutrition:
Clinical Use Of MEBO in Wound Management in the U.A.E.
Int. Journal of Cosmetic Surgery & Aesthetic Dermatology, 2000, 2 (1) 27-33

A New Approach to Local Burn Wound Care: Moist Exposed Therapy.
A Multiphase, Multicenter Study
Journal of Surgical Wound Care, 2003, 2 (1) 18-27

Moist Exposed Burn Therapy: evaluation of the wound healing process. An experimental model to assess the efficacy of local agents on wound repair in partial and full thickness wounds

Moist Exposed Burn Ointment (MEBO) in Partial Thickness Burns

Does Moist Exposed Burn Ointment (MEBO) Promote Healing of Chronic Pressure Ulcers? – A Multicentred Randomised Clinical Study

14. Reduces the need for over-lying, secondary dressings:
Scar Quality and Physiologic Barrier Function Restoration After Moist and Moist-Exposed Dressings of Partial-Thickness Wound
American Dermatologic Surgery, 2003, 29 (1) 14-20

Comparative Study Between Carboxymethyl-Cellulose Silver, Moist Exposed Burn Ointment and Saline Soaked Dressing for Treatment of Facial Burns

Moist Exposed Therapy: An Effective and Valid Alternative to Occlusive Dressings For Postlaser Resurfacing Wound Care
American Dermatologic Surgery, 2004, 30 18-25
15. Reduces scar formation: MEBO contributes to the formation of smooth, thin, and aesthetically acceptable scars thus preventing the formation of hypertrophic scars.

The Effect of Moist and Moist Exposed Dressings on Healing and Barrier Function Restoration of Partial Thickness Wounds
European Journal of Plastic Surgery. 2003, 26 (2) 5-11

Improved Scar Quality Following Primary and Secondary Healing of Cutaneous Wounds
Aesthetic Plast. Surg. 2003; Dec 4

Scar Quality and Physiologic Barrier Function Restoration After Moist and Moist Exposed Dressings of Partial-Thickness Wounds
American Dermatologic Surgery, 2003; 29, (1), 14-20

16. Minimises the need for skin grafting:

MEBO Ointment in the Treatment of Burn Wounds: A Multicenter Study
Modern Medicine, Mid-East, 1999, 16 (8) 45-50

17. Reduces treatment and hospitalisation costs:
Benefit-Cost Analysis of Moist Exposed Burn Ointment
Burns, April 2002, 28, 659-63

Role of MEBO (Moist Exposed Burn Ointment) in the Treatment of Fournier Gangrene

Comparing Oil Based Ointment versus Standard Practice for the Treatment of Moderate Burns in Greece: A Trial Based Cost Effectiveness Evaluation

Moist Exposed Burn Therapy: evaluation of the wound healing process. An experimental model to assess the efficacy of local agents on wound repair in partial and full thickness wounds

The above published papers are a small selection of the available clinical papers published globally.
References


