# THE EFFECTS OF WIRELESS MICRO CURRENT STIMULATION FOR THE TREATMENT OF PARTIAL THICKNESS BURN INJURY

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# INTRODUCTION

#### **Bioelectric System**

- The body has its own bioelectric system
- This system influences wound healing
  - attracting the cells of repair
  - changing cell membrane permeability
  - enhancing cellular secretion through cell membranes
  - orientating cell structures
- A current termed the "current of injury" is generated between the skin and inner tissues when there is a break in the skin (The current will continue until the skin defect is repaired)
- Healing of the injured tissue is arrested or will be incomplete if these currents no longer flow while the wound is open



**NO Current** 

A weak flow of a negative charge attracting cells of repair

Absent/weak flow of current

# BACKGROUND

- "Wireless Micro-current Stimulation (WMCS)"
  - $\rightarrow$  Current carried by Oxygen
  - $\rightarrow$  releases electron
  - $\rightarrow$  Creating the current of Injury
- Skin bioelectricity influences wound healing by attracting the cells of repair
  - Macrophages
  - neutrophils
  - stimulating cell proliferation e.g., fibroblasts
  - enhancing cellular secretion through cell membranes
  - orientating cell structures
- it mimics the natural current of injury and will jump start or accelerate the wound healing process

# ELECTRICAL STIMULATION AFFECTS THE PHASES OF WOUND HEALING

#### Inflammation phase

- Initiates the wound repair process by its effect on the current of injury
- Increases blood flow
- Promotes phagocytosis
- Enhances tissue oxygenation
- Reduces edema perhaps from reduced microvascular leakage
- Attracts and stimulates fibroblasts and epithelial cells
- Stimulates DNA synthesis
- Controls infection (Note: HVPC proven bacteriocidal at higher intensities than use in clinic and may not be tolerated by patient)
- Solubilizes blood products including necrotic tissue

# ELECTRICAL STIMULATION AFFECTS THE PHASES OF WOUND HEALING

#### • Proliferation phase

- Stimulates fibroblasts and epithelial cells
- Stimulates DNA and protein synthesis
- Increases ATP generation
- Improves membrane transport
- Produces better collagen matrix organization,
- Stimulates wound contraction

#### • Epithelialization phase

- Stimulates epidermal cell reproduction and migration
- Produces a smoother, thinner scar

# CASES

- March 2011 to May 2011, 6 cases of second degree burn patients were included
- The wounds cleansed with normal saline only
- In the Burn Unit Cipto Mangunkusumo General Hospital, they were treated with WMCS/ES alone
- Stimulation on wounds one hour daily
- Wounds were cleansed conventionally with moist gauze before and after the stimulation

### MALE / 28 YO



a) Admission 22-03-11. b) 7 days after treatment with WMCS



# GIRL / 3 YO



#### a) Admission 29-03-11. b) 3 days after treatment with WMCS



### **GIRL / 2 YO**



a) Admission 16-04-11. b) 8 days after treatment with WMCS



# MALE / 37 YO

(a)



a) Admission 16-04-11. b) 8 days after treatment with WMCS



## GIRL / 3 YO





a) Admission 16-05-11. b) 9 days after treatment with WMCS



## FEMALE / 43 YO



a) Admission 18-05-11. b) 6 days after treatment with WMCS

# RESULTS

- Very fast pain relief
- Rapid healing of the wound
- Very little use of analgesia medication
- Minimal risk of infection
- Minimal use of dressing
- WMCS technology is easy in administration
- Fast discharge of the patient from the unite
- Huge cost savings opportunities
- → However, we still need further prospective study to prove this results and approve the evidence based.



# THANK YOU