Microcurrent as an Adjunct Therapy in Helping Wound healing and Reducing Pain in Patients with Chronic Wound Ulcers

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Chronic Wounds

- Chronic wounds are defined as those wounds that have failed to proceed through the reparative phases of healing in less than 42 days.

- There are various factors that can delay wound healing such as diabetes, vascular insufficiency, age, and nutritional status.

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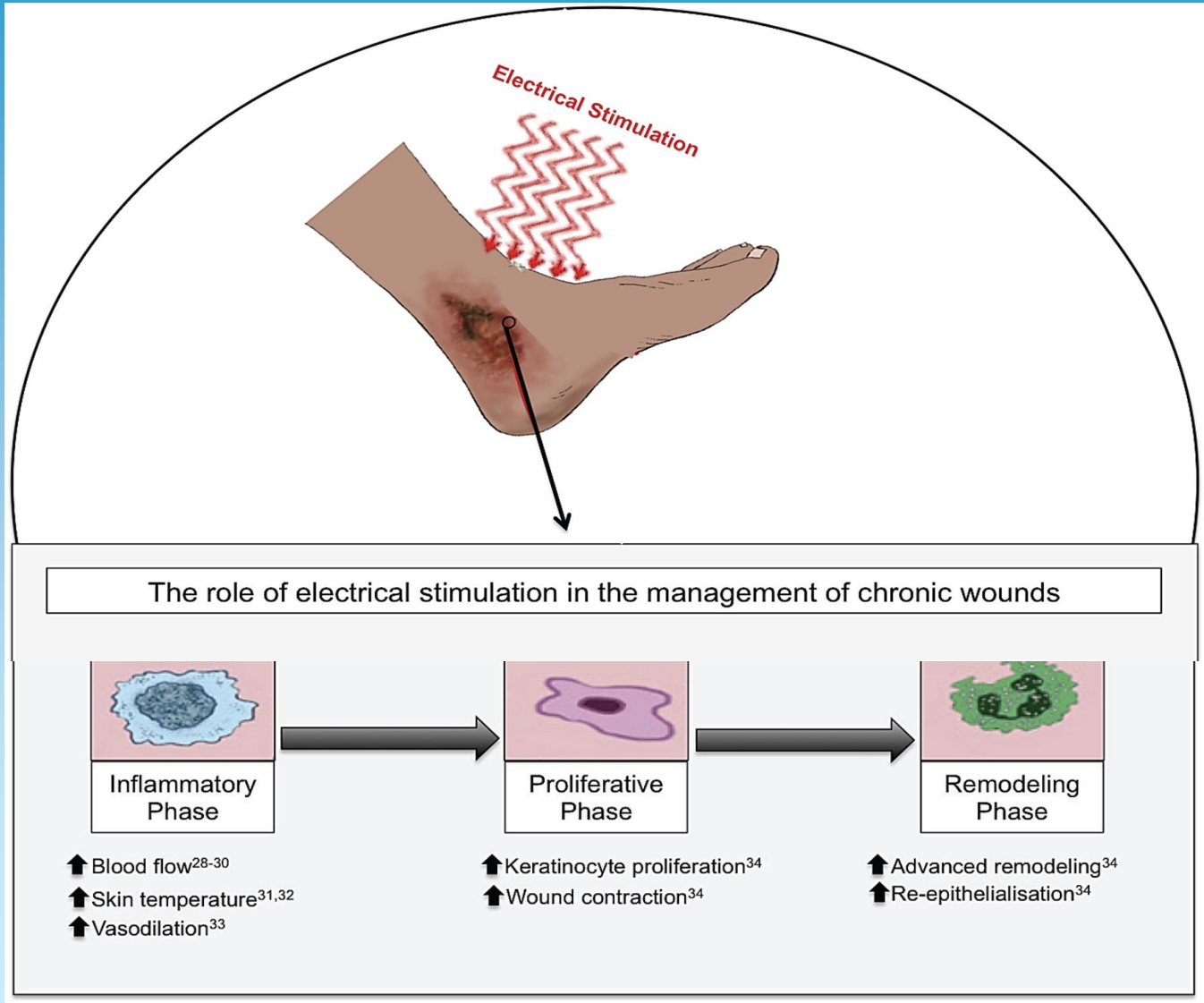
When Electrical stimulation is applied to chronic wound, this produces beneficial effects throughout three phases of wound healing:

- **Inflammatory phase**: ES increases blood flow, tissue oxygenation and stimulates fibroblasts whilst reducing oedema and providing an increased antibacterial effect.
- **Proliferative phase**: ES increases membrane transport, collagen matrix organization wound contraction and the stimulation of DNA and protein synthesis.
- **Remodelling phase**: ES increases epidermal cell proliferation, and migration as well as stimulation of fibroblasts thus enabling enhanced wound closure


Electrical Stimulation
The role of electrical stimulation in the management of chronic wounds
Inflammatory Phase
Proliferative Phase
Remodeling Phase
Blood flow[28-30]
Skin temperature[31,32]
Vasodilation[33]
Keratinocyte proliferation[34]
Wound contraction[34]
Advanced remodeling[34]
Re-epithelialisation[34]

Aim

To study the effect of microcurrent therapy for assessing the following parameters in chronic wound ulcer:

- Pain
- Size
- Discharge
- PH

Methodology

- **Recruitment of study participants:**

- Recruitment of patients for the present study was coordinated by Dept. of Surgery, I.M.S., B.H.U.

- Six patients with chronic wound were enrolled by using simple randomized sampling technique.

- Informed consent was obtained from these patients for the treatment with micro current as an adjunct therapy.

- **The results were analyzed using SPSS version 20 using pair t-test method.**

Contd.

Inclusion criteria

- The patient with diabetic foot ulcer
- Wound surface area must be $\geq$ 0.5 cm Sq.
- Able to comply with daily visits to hospital or patients willing for admissions.

Exclusion criteria

- The patient other than diabetic foot ulcer.
- Electrical implant such as pacemaker or neural stimulator.
- Low blood pressure
- Malignancies (cancers) underlying treatment or any malignancies (in remission or not) with involvement musculoskeletal system.

Procedure

Each patient had microcurrent therapy delivered while having their wounds cleansed. The setting used with the microcurrent therapy were :

- Anti-inflammatory frequency
- Vasodilation frequency

55 yrs. Old with left diabetic foot ulcer for more than two months. After 4 weeks of therapy there is 30% significant pain reduction and wound bed become healthier with reduction in the size of wound 20%.

1st week

2nd week

3rd week

4th week

65 yrs. Old male with ulcer over the left sole for last one month After 4 weeks of therapy there is 80% significant pain reduction and wound bed become healthier with reduction in the size of wound 60%.

1st week

2nd week

3rd week

4th week

67 yrs. Old male with ulcer over the sole for last one month After 4 weeks of therapy there is 90% significant pain reduction and wound bed become healthier with reduction in the size of wound 95%.

1st week

2nd week

3rd week

4th week

45 yrs. Old male with ulcer over the dorsum right foot for last one month After 4 weeks of therapy there is 70% significant pain reduction and wound bed become healthier with reduction in the size of wound 40%.

1st week

2nd week

3rd week

4th week

60 yrs. Old male with ulcer over the right toe for last one month After 4 weeks of therapy there is 30% significant pain reduction and wound bed become healthier with reduction in the size of wound 20%.

1st week

2nd week

3rd week

4th week

35 yrs. Old male with ulcer over the right ankle for last one month After 4 weeks of therapy there is 85% significant pain reduction and wound bed become healthier with reduction in the size of wound 25%.

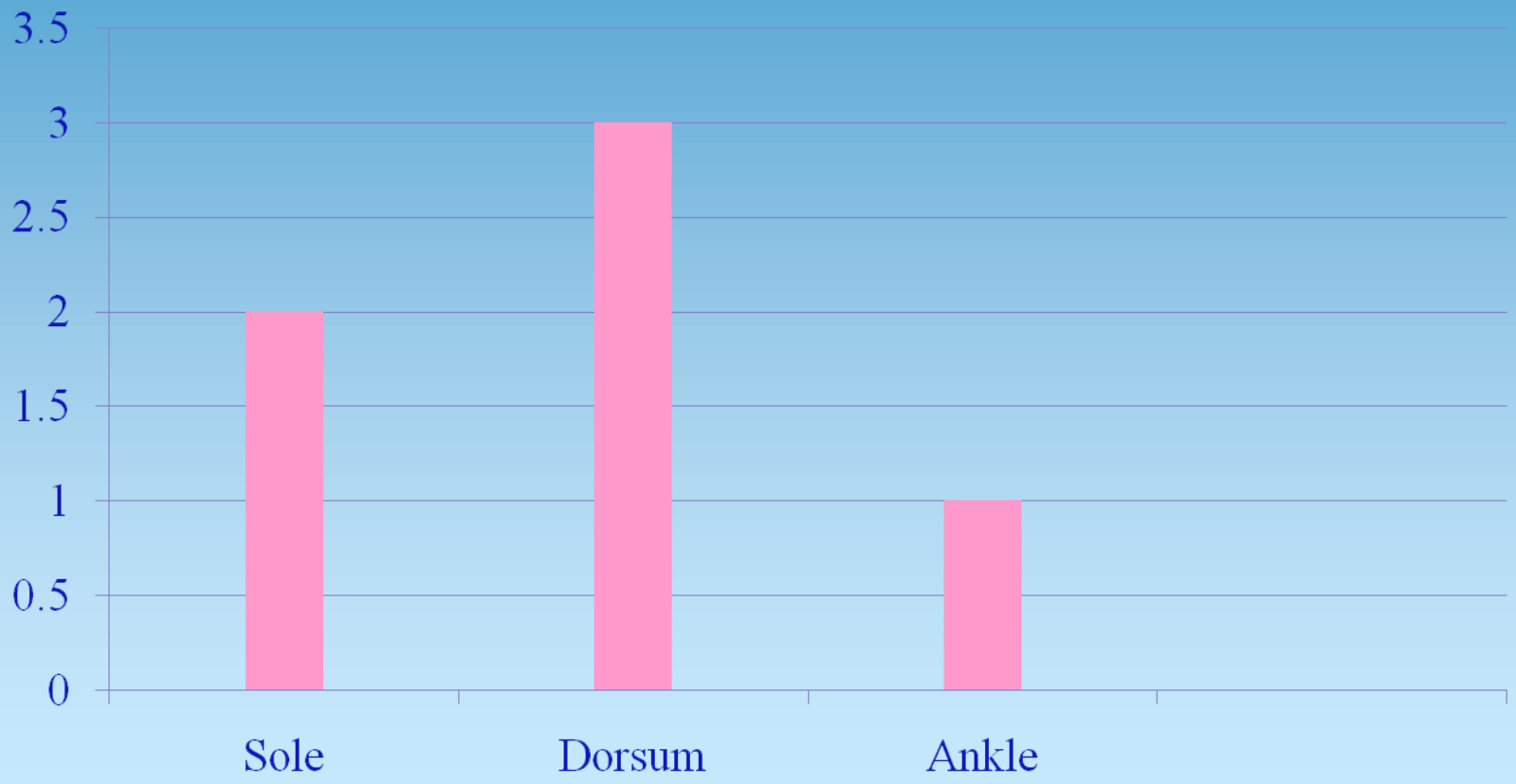
1st week

2nd week

3rd week

4th week

Area wise distribution of ulcer

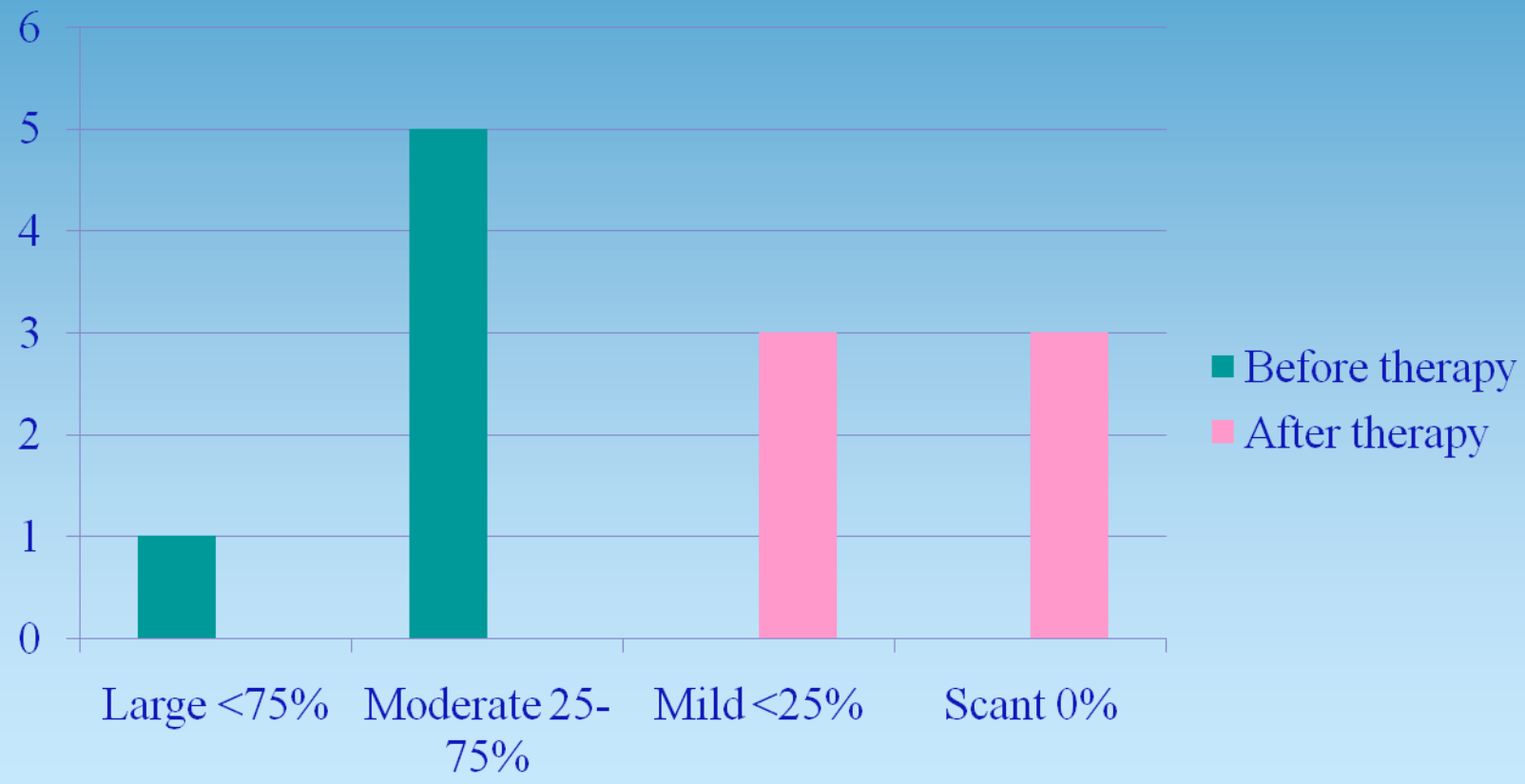


Outcome analysis

	Before Adjunct therapy		After adjunct therapy		t-value
Parameters	Mean	S.D.	Mean	S.D.	
Pain	52.50	19.56	10.33	7.06	7.84**
Reduction in size	22.95	24.89	10.23	15.84	3.19*
PH	7.56	.388	5.95	.437	13.85**

**P<0.001
*P<0.05

Outcome analysis - Discharge



Conclusion

- The microcurrent as an adjunct therapy along with the combination of good wound care is significantly effective

a). In pain management and wound area reduction.

b). In reducing swelling, edema and maintaining normal PH required for wound healing

- Thus, microcurrent therapy advocates its use in accelerating wound healing.

Thank you