



## CLINICAL STUDY TO COMPARE THE EFFICACY OF SILK PROTEIN DRESSING VERSUS CONVENTIONAL DRESSING IN CHRONIC LEG ULCERS.

### General Surgery

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### ABSTRACT

**Aims and Objectives:-** To compare the efficacy of silk protein dressings in chronic leg ulcers with the conventional dressings. **Methods:-** this study was a prospective comparative study conducted on 40 patients with chronic leg ulcers in the department of general surgery Narayana medical collage and hospital from may 2022 to may 2023. Data such as age distribution, sex distribution, reduction in ulcer size, duration for complete healing in weeks was collected and evaluated. **Results:-** Out of 40 patients, 24(60.0%) were males and 16(40.0%) were females with a male to female ratio of 1.5 : 1. And it was observed that patients receiving silk protein dressings had rapid wound healing of 43.40% (S.D +/-3.74) as compared to the control group of 14.03% (S.D +/-3.45). **Conclusion:-** The wounds in subjects treated with silk protein dressing has more rapid healing than the wounds in the control group which indicates silk protein dressing is an effective modality to facilitate wound healing in patients suffering from chronic leg ulcers and can be used as an adjunct to conventional mode of treatment (conventional dressings) for healing of chronic leg ulcers.

### KEYWORDS

### INTRODUCTION

- Chronic leg ulcers are defined as ulcer persisting for more than 6 weeks and show no tendency to heal after 3 (or) more months. Now they are major health challenge, represent significant costs to health care system. They are debilitating and greatly reduce patient quality of life. The prevalence of leg ulcers is well documented to be vary between 0.18% and 1%.
- Apart from conventional methods to facilitate on healing, various new methods are emerging such as silk protein dressings which facilitates rapid healing and improves the quality of life for the patient.
- Silk Fibroin is a natural protein derived from bombyx mori cocoons. The unique properties of silk fibroin, such as its biocompatibility, biodegradability, high water and oxygen uptake, low immunogenicity, and robust mechanical properties, make it good choice for healing.
- SF-based dressings can also be used as carriers for delivering drugs, growth factors, and bioactive agents to the wound area, while providing appropriate support for complete healing. This dressing is expected to promote good health and well-being of patients at an affordable cost.
- These dressing has silver nanoparticles embedded in combination with silk protein to control microbial growth and promotes faster healing by fibroblast proliferation and Collagen deposition.

### Aims and Objectives:

To compare the efficacy of silk protein dressings in chronic leg ulcers with the conventional dressings.

### Inclusion Criteria

- Age group of 25 to 70 years with long-standing ulcers (pressure sores, diabetic ulcers, venous ulcers).
- Non-diabetic and diabetic patients (Type 1 & Type 2)

### Exclusion Criteria

- Patients with known or suspected osteomyelitis.
- Patients in renal failure.
- Patients with immunodeficiency.
- Severe infection, presence of cellulitis, in adequate perfusion, ischemia & gangrene.
- Patients unwilling to participate in the study

### MATERIALS AND METHODS

- The present Study was a Prospective comparative study conducted on 40 patients with chronic leg ulcers in the Department of General Surgery, Narayana medical collage and hospital from may 2022 to may 2023.
- Materials used were  
Silk protein- powder forms. Silk protein sheets, Silk protein- foam sheets, Silk protein-mesh forms. Silk protein sheets coated with silver.

**Dressing Technique:** Ulcer cleaned with NS and silk protein forms applied over the wound area twice weekly.

### RESULTS

The mean age in the study group was 51.77 years whereas in the control group was 50.48 years.

- Out of 40 patients, 24(60.0%) were male and 16(40.0%) were female with a male to female ratio of 1.5 : 1.
- The present study it was observed that patients receiving silk protein dressings had rapid wound healing of 43.40% (S.D +/-3.74) as compared to the control group of 14.03% (S.D +/-3.45).
- 20 patients in study group observed for 3 months duration shows
  - In 10 (50%) patients— 100% reduction in wound
  - In 8 (40%) patients— 60% reduction in wound
  - In 2 (10%) patients— 30% reduction in wound

**Table 1: Comparing Various Parameters Of Wound Healing**

| Parameter                                |        | Study group   | Control group |
|------------------------------------------|--------|---------------|---------------|
| Age                                      |        | 51.78+/-12.29 | 50.48+/-11.58 |
| Sex                                      | Male   | 56.5%         | 34.8%         |
|                                          | Female | 43.5%         | 65.2%         |
| Reduction in ulcer size                  |        | 43.40+/-3.74  | 14.03+/-3.45  |
| Duration for complete healing (in weeks) |        | 3.74+/-0.45   | 6.26+/-0.54   |

### DISCUSSION

- Chronic leg ulcers management is still challenging in this advanced medical era as it depends upon multiple factors. The idea of the dressing is to keep the wound moist and provide environment for healing and to prevent the infection.
- Many arthropods, such as spiders and silkworms produce silks in the epithelial cells of the specialized glands which are basically proteins, having glycine, alanine and serine arranged in sheets.
- It confers hydrophilicity, water uptake ability and cell adhesion properties. Silk protein have been successfully utilized for wound healing tissue engineering and wound healing applications for their high mechanical resistance, enzymatic-driven biodegradability and favorable cell attachment.
- Bombyx mori silkworm derived fibroins are acquired from cocoon and separated from sericin by degumming in alkaline boiling water and following solubilization in hot LiBr solution. Upon modification of the helical chain arrangement into sheets via alcohol treatment or water vapor annealing the regenerated silk water soluble form can be converted into insoluble silk.
- Pignatelli and co-workers encapsulated human platelet lysate into electrospun silk-PEO patches to prolong the growth factor shelf life and ease its handling during wound management. It acts via down regulation of pro-inflammatory cytokines IL1a and IL-6.

It has been found that silk protein promoted more cellular proliferation and cellular recruitment towards the wound bed and accelerated the

healing process

## CONCLUSION

The wounds in subjects treated with silk protein dressing has more rapid healing than the wounds in the control group which indicates silk protein dressing is an effective modality to facilitate wound healing in patients suffering from chronic leg ulcers and can be used as an adjunct to conventional mode of treatment (conventional dressings) for healing of chronic leg ulcers.

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