

## Article

# A study on role of autologous platelet rich fibrin matrix in treatment of non-healing ulcer

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**Abstract:** Non-healing ulcers can cause significant health problems and impair quality of life. Standard treatment procedures have been found to be ineffective in curing such lesions. Autologous platelet-rich fibrin matrix (PRFM) has been cited in many research papers as an effective treatment for non-healing ulcers. This study aims to evaluate the efficacy of PRFM in treating chronic non-healing ulcers. A prospective study was conducted in patients with trophic ulcers due to Hansen's disease or diabetes mellitus, traumatic ulcers, and venous ulcers, aged between 18-85 years. PRFM was applied to healthy ulcers at weekly intervals, repeated for a maximum of five sittings as per requirement. Photographs were taken before treatment and at every subsequent sitting, and area and volume were calculated at baseline and every subsequent sitting until closure was achieved. The results of the study will help to determine the efficacy, feasibility, and cost-effectiveness of PRFM in the treatment of non-healing ulcers.

**Keywords:** Non-healing ulcers; Autologous platelet-rich fibrin matrix (PRFM); Efficacy; Chronic wounds; Treatment.

## 1. Introduction

**A** non-healing ulcer is a chronic wound that fails to heal even after three months of continuous treatment. The prevalence of non-healing ulcers ranges from 1.9% to 13.1% worldwide [1]. The condition is highly prevalent among adult males and poses significant health problems, leading to a substantial impact on the quality of life due to debilitating symptoms like pain, restricted mobility, and impaired sleep. Non-healing ulcers can occur secondary to various underlying conditions, including arterial disease, venous disease, diabetic neuropathy, metabolic disorders, haematological disorders, traumatic injuries, and infections.

Non-healing ulcers, most commonly affecting the lower limbs, are difficult to treat because of their prolonged treatment duration, increased management costs, and unpredictable outcomes that may lead to severe disability. Traditional treatment procedures are seen to be ineffective in curing the lesion completely. Research papers have cited autologous platelet-rich fibrin matrix (PRFM) as an effective treatment option for healing chronic non-healing ulcers [2]. PRFM provides the necessary polypeptide growth factors that enhance tissue healing, including transforming growth factor beta (TGF- $\beta$ ), which is profibrotic and highly potent. These growth factors stimulate fibrosis and subcutaneous collagen deposition, increase biomechanical strength, and promote epithelial resurfacing and differentiation [3,4].

This study aims to evaluate the efficacy of autologous PRFM in treating chronic non-healing ulcers. The study intends to demonstrate the effectiveness of PRFM in enhancing wound healing by promoting cellular proliferation, angiogenesis, and tissue remodeling. The evaluation of PRFM's effectiveness will involve assessing the rate of wound healing, wound area reduction, and the incidence of wound recurrence.

Furthermore, the study will investigate the safety of PRFM treatment, including potential adverse effects, complications, and patient satisfaction with the treatment. The study results will provide valuable insights into the use of PRFM as a promising therapeutic option for chronic non-healing ulcers, ultimately improving patients' quality of life.

In conclusion, non-healing ulcers are a prevalent and challenging medical problem associated with various underlying conditions. Autologous PRFM is emerging as an effective treatment option that promotes wound healing by enhancing tissue regeneration and repair mechanisms. This study aims to provide evidence-based data on the efficacy of PRFM in treating chronic non-healing ulcers, ultimately leading to improved patient outcomes and better quality of life.

## 2. Materials and Methods

This study aims to evaluate the efficacy of autologous platelet-rich fibrin matrix (PRFM) in the treatment of non-healing ulcers. PRFM will be applied once a week for a maximum of five sessions, depending on the needs of each patient.

Measurements will be taken by photographing the ulcers before treatment and at every subsequent session. Area and volume will be calculated at baseline and every subsequent session until the ulcer is healed.

The study is a prospective trial conducted at the Department of Surgery, PRM MCH, Baripada, with the approval of the Institutional Ethics Committee (IEC).

### 2.1. Participants

The study will include patients who meet the following inclusion criteria:

1. Trophic ulcers due to Hansen's disease or diabetes mellitus
2. Traumatic ulcer
3. Venous ulcer
4. Age between 18 and 85 years

The following patients will be excluded from the study:

1. Patients under 18 years of age
2. Patients with a history of bleeding disorders
3. Patients with anemia or other hematological disorders
4. Patients with a platelet count less than 1.5 lakhs/cu mm
5. Patients on anticoagulant medications (aspirin, warfarin, heparin)
6. Patients with malignant ulcers
7. Pregnant and lactating females

By providing more context and using clear and concise language, the revised section aims to improve the presentation of the materials and methods of the study.

## 3. Preparation of PRFM

After obtaining informed consent, the dimensions of the ulcer were measured under aseptic conditions. Venous blood (8-10 mL) was collected from the patient's median cubital vein into a sterile centrifugation tube without any anticoagulant. The tube was then rotated at 3,000 rpm for 10 minutes. This process resulted in three layers - the acellular layer (platelet-poor plasma or PPP) at the top, the middle layer consisting of PRFM, and the bottom layer containing red blood cells (RBCs). The top layer (PPP) was discarded, and the PRFM was separated from the RBCs at the base using sterile forceps and scissors. The PRFM was then placed on a sterile gauze and applied to the ulcer. A secondary non-absorbable dressing was applied, and the patient was advised to rest. The dressing was removed after a minimum of 5 days, and the procedure was repeated every week for a minimum of five sittings. Photographs were taken, and the ulcer's area was calculated using the formula for an ellipse:  $\text{length} \times \text{width} \times 0.7854$ , which is a more accurate method for wound measurement than using a square or rectangle.

#### 4. Conclusion

The present study aims to evaluate the efficacy, feasibility, and cost-effectiveness of PRFM for treating non-healing ulcers. The healing progress of treated patients will be assessed by calculating the area and volume of the ulcer and taking photographs at the beginning and end of every week. The results of this study will contribute to the existing knowledge regarding the use of PRFM in the treatment of non-healing ulcers.

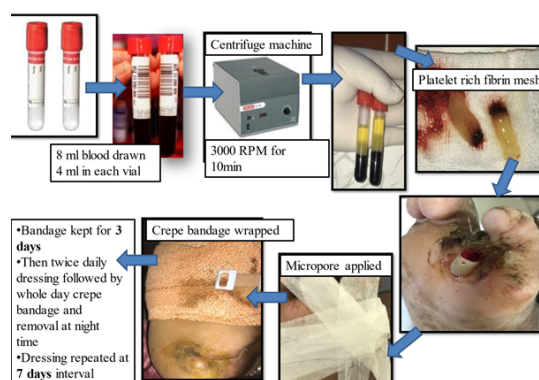
**Ethical issues:** Patient consent form has to be taken for data storage and protection and use in future studies. The details of the patients are to be kept confidential. **Author Contributions:** All authors contributed equally to the writing of this paper. All authors read and approved the final manuscript.

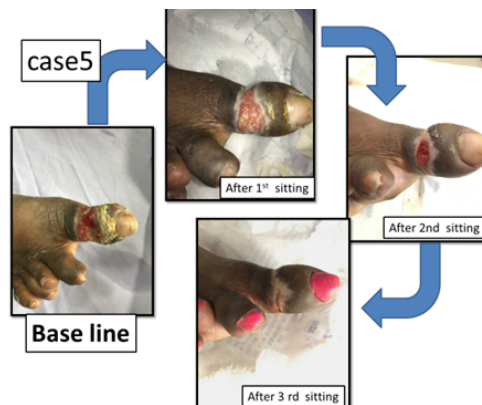
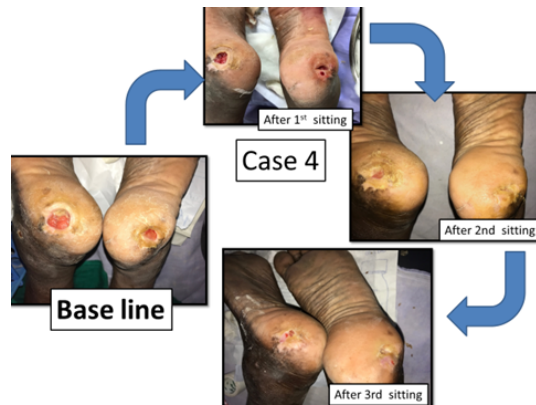
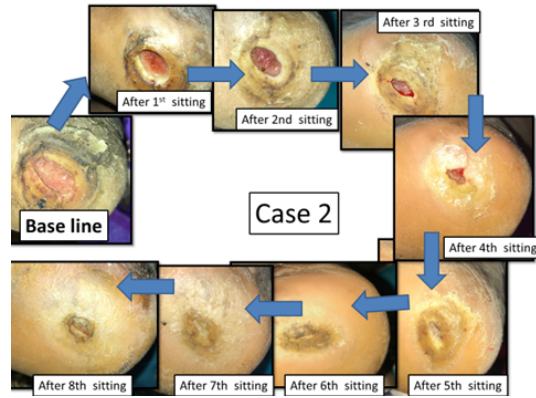
**Conflicts of Interest:** "Authors declare that they do not have any conflict of interests."

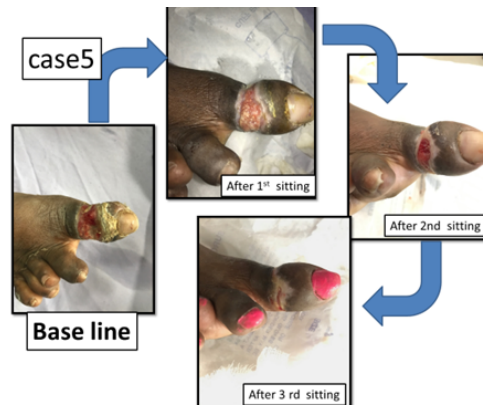
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#### Appendix Images







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