

# Studying The Effectiveness Of Prp Therapy To Treat Diabetic Foot Ulcer

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## Abstract

Platelet – Rich – Plasma (PRP) therapy has been effective in treating injuries and orthopaedic issues. Diabetic Foot Ulcer (DFU) needs to be studied since the population of diabetics suffering from chronic wounds is high. 85% of lower limb amputation begin with foot ulcers.

Over and above this chronic leg ulcers cannot heal thus, becoming a major cause for concern for the patients and doctors too. Leg amputation becomes the only solution to fall back on in such cases.

Diabetic Foot Ulcer majorly affects diabetics with devastating implications. With high mortality and disability rates it is a huge health challenge.

But, Platelet – Rich – Plasma (PRP) therapy could provide a less painful and natural solution. A study was conducted to test the effectiveness of PRP therapy in treating Diabetic Foot Ulcer.

The study involved a systematic approach by using the PRP therapy to treat 25 patients suffering from diabetic foot ulcer. More than 90% of reduction in the wound size was seen in maximum patients. So, PRP is safe and effective treatment for chronic non healing ulcers.

The guidelines were set for the treatment of each patiently and were strictly followed. The results make it apparent that Platelet – Rich – Plasma (PRP) therapy for Diabetic Foot Ulcer is effective and can avoid painful and traumatic amputations.

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Date of Submission: 18-03-2024

Date of Acceptance: 28-03-2024

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## I. Introduction:

Additions: Images to be sent

The research was conducted at their clinic and this research paper documents the process and probes the impact of PRP therapy on patients suffering from diabetic foot ulcers.

PRP Therapy is instrumental in providing support while healing ulcer But in the case of diabetic foot necrosis it might not render the expected results.

This paper studies the effectiveness of PRP therapy in treating diabetic foot ulcers.

## II. Literature Review

### Diabetic Food ulcer:

Chronic leg ulcer that cannot be healed is a major health issue. The impact of chronic wounds is high. 85% of lower limb amputations first begin with foot ulcers.

Infact, diabetes is the main reason for non-traumatic amputations. There are some orthodox methods or therapies to heal the wounds like dressing, skin grafting or surgical debridement. Though its true these treatments cannot give relief to the patient as the healing isn't satisfactory.

A chronic metabolic disease, Diabetes mellitus (DM) is characterized by hyperglycemia. Research reveals that 436 million people around the world suffered from DM in the year 2019. As per projections this number will escalate to 700 million till the year 2045.

PRP helps in healing wounds by seven growth factors present in it. They are:-

- Platelet derived growth factor
- Epidermal growth factor
- Transforming growth factor
- Fibroblast growth factor
- Vascular endothelial growth factor

15% of diabetic patients face the issue of ulcer. Out of all leg amputations 85% are related to diabetic foot ulcers. Vacuum assisted closure, hyperbaric oxygen and high voltage pulsed current electrical stimulation are the methods used to treat foot ulcer.

Autologous PRP is an effective method and safe to treat diabetic foot ulcer.

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### **What is regenerative treatment?**

Nature manifests its power in varied ways. Regeneration is one such manifestation that can amaze humans. For example, the lizards regrow tails and black bears regain kidney function after hibernation.

Regenerative medicine replaces the tissue that has been affected adversely due to disease, trauma or any congenital issue. There are many methods that can be applied like tissue engineering, and cellular therapies. At times other tools like artificial organs and medical devices are also utilized to heal the organ. These methods can be combined together to enhance the natural healing process wherever it is needed the most.

Regenerative medicine is an emerging field that has brought medical experts together from genetic, biology, engineering, and other fields to resolve the most impending medical issue faced by mankind.

Our body has an innate response and ability to heal when it is affected by an injury or disease. It would certainly help if it would be possible to support the body to heal and then quicken the process by using a clinically relevant method. It would support the body's healing process.

Regenerative Medicine is working towards restoring the structure and function of the damaged organs and tissues. It assists the body in healing organs that are damaged permanently. The goal is to heal and cure the untreatable injuries and diseases.

### **III. Materials And Methods:**

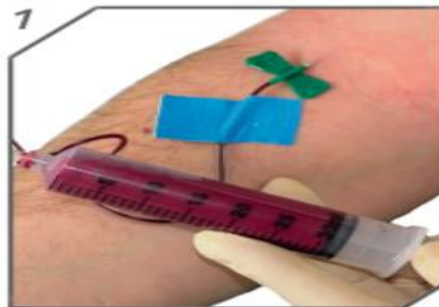
#### **Platelet Rich Plasma (PRP)**

#### **Pre-Treatment Instructions**

**A few simple guidelines before your treatment can make a difference.**

- If you develop a fever, cold, flu, or develop a cold sore, blemish, or rash, etc. in the area to be treated prior to your appointment, you must reschedule your appointment.
- It is recommended that if you have a special event or vacation coming up, you should schedule your treatment at least 1 week in advance.
- If you are being treated in the lip area and have a history of Herpes (cold sores) with outbreaks more than 4 times a year, you will need to be pretreated with anti-viral medication.
- We recommend Valtrex 2gm the day before or the morning of the treatment followed by another 2gm 12 hours after the first dose. Please let us know if you need a prescription if you do not have the medication on hand.
- Discontinue the use of anti-inflammatory agents (NSAIDs) such as Advil, Aleve, Aspirin, Ibuprofen, Motrin, Naprosyn, etc., at least 1 week before your treatment. One of the purposes of PRP is to induce inflammation and these medications limit or prevent inflammation. You may take Tylenol or other Acetaminophen-containing products as directed.
- Discontinue the use of any blood thinning agents such as Vitamin A, Vitamin E, Gingko Biloba, Garlic, Flax Oil, Cod Liver, Essential Fatty Acids (EPA, DHA), etc., for at least 1 week before treatment to minimize bruising and bleeding.
- You will not be able to undergo a treatment if you are or have been on systemic corticosteroids (Prednisone, Methylprednisolone [Medrol], etc.) within 2 weeks of treatment. Consult your physician for approval to discontinue use of corticosteroids for this procedure.
- It is recommended that you avoid alcohol, caffeine, niacin, spicy foods, and cigarettes 3 days before your treatment as these products may increase the risk of bleeding.
- Maintain a healthy diet and drink at least 64 oz. of water the day before and the day of the treatment. It is important to be well hydrated, as you will be giving blood.

#### ***Process Steps for Platelet Plasma Production.***



#### ***Step One:***

- **Prefill syringe with 1.5ml anti-coagulant (i.e. ACD-A)**

- Draw venous blood 13.5 ml



**Step Two:**

- Open ventilation cap
- Use a 18-21G needle to inject blood at 30 degree angle
- Close ventilation cap



**Step Three:**

- Loading centrifuge with Dr.PRP and opposing balance weight (equal weight = 1g)
- Close lid and run PROGRAM 1 (3200RPM/10min)



**Step Four:**

- Rotate RBC Chamber to raise Buffy Coat to desired location



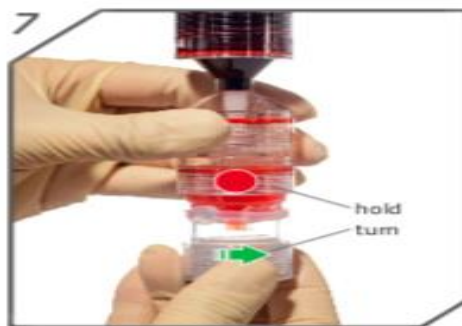
**Step Five:**

- Rotate lower Plasma Chamber completely to close RBC



**Step Six:**

- Separate PRP



**Step Seven:**

- Concentrated PRP



**Step Eight:**

- Centrifuge again for 10 mins at 3200 RPM



**Step Nine:**

- Separate concentrated PRP.



**Step Ten:**

➤ **Take out syringe to activate platelets.**

**IV. Conclusion:**

Results from our case studies show that PRP is safe and effective treatment for chronic non healing ulcers. It is an effective way to heal patients suffering from diabetic foot ulcers.

The study conducted in this paper 'Effectiveness of Injected Platelet-Rich Plasma in the Treatment of Diabetic Foot Ulcer Disease', shows the result that injected PRP is much effective than the conventional dressing method of managing diabetic foot ulcer. But more clinical trials are vital to further study the effectiveness of injected PRP to substantiate these findings.

**V. Summary:**

The study was done with the aim to understand how Diabetic Foot Ulcer can be painlessly cured through PRP therapy.

The study was conducted with the specific aim in observing the healing Diabetic Foot Ulcer (DFU). Thus, 25 patients underwent the PRP therapy and 90% of patients observed 73.91% healing of their wound. Conclusively, it was derived that DFU can be treated painless without amputation through PRP therapy.

Autologous Platelet Rich Plasma (PRP) has been suggested to be effective for wound healing. The aims and the study were to comprehensively examine the effectiveness, synergy and possible mechanism, PRP mediated improvement and acute skin wound repair.

PRP slowly improved skin wound healing, which was associated with regulation and local inflammation, enhancement, angio-genesis, and reepithelization.

PRP treatment significantly reduced the production and inflammatory cytokines interleukin 17 A and interleukin 1B.

An increase in local vessel intensity and enhancement and reepithelization were observed that were associated with enhanced secretion and growth factors such as vascular endothelial growth factor and insulin like growth factor - I

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