# Diabetic Finger Ulcer Cured by Autologous Platelet Gel

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## Abstract

Diabetic finger tip ulcer associated with osteomyelitis is common in clinic. Traditional dressing therapy is difficult to heal. We use autologous platelet gel to seal wounds at one time. The method is simple and effective for treating wound.

## Introduction

Diabetic patients often suffer from wound infection associated with osteomyelitis, especially finger tip infection [1]. Because osteomyelitis is more difficult to heal wounds, eventually some parts of the limbs have to be removed, which greatly affects the quality of life of patients. Traditional dressing therapy for diabetic ulcers with osteomyelitis is not ideal and the amputation rate is high. Autologous platelet-rich gel (APG) not only has the properties of accelerating hemostasis and sealing wounds, but also contains rich growth factors and anti-inflammatory factors, which promotes diabetic wound healing [2]. We have recently used autologous platelet gel technique to treat a one-month refractory diabetic finger wound with osteomyelitis, and only once the treatment has healed the wound. This method is simple and effective and is worth popularizing.

## Case report

A 28-year-old man was obese and scratched his left thumb skin more than a month ago. After handled himself at home several days, the wound did not improve, but purulent secretion appeared. After going to the local clinic, the doctor gave blood sugar test and found that he got diabetes. The routine use of oral metformin to reduce blood sugar, local debridement and dressing therapy for one month, the wound was not healing. Attempts to suture the wound also failed because of high local tension. After hospitalization in our hospital, local X ray scanning revealed a bone destruction at the distal end of the thumb (Fig.1), a fasting blood glucose of 15 mmol/L and a

glycosylated hemoglobin 10.6%. We applied insulin hypoglycemic therapy and antibiotic, gave local APG treatment. First, autologous venous blood 10ml was collected and purified by 2 times centrifugation and then platelet-rich plasma (PRP) 1ml was prepared. PRP and calcium thrombin (thrombin 5000U dissolved in 10% $CaCl_2$ 5ml) [3-4] were mixed according to 10:1 ratio, namely APG, connecting them to double pass syringe. Second, slowly and evenly injected into the deep sinus at a certain speed, covered with vaseline gauze, and sterile gauze bandaging. The natural healing of the wound was observed 3 days later (Fig.2). After discharge, he continued oral antibiotics for 2 weeks, hypoglycemic guidance, and 1 months follow-up. No recurrence was found and no side effects were observed.

## Discussion

Due to peripheral vascular disease and neuropathy, diabetic patients can easily cause local skin damage and ulcers. Diabetic wound deferred difficult, combined with osteomyelitis is more difficult to heal, eventually part of the limb have to be cut off, greatly affecting the quality of life of the patient. Traditional methods for treating ulcerative osteomyelitis include local debridement, drainage, dressing application, and anti-inflammatory. However, antibiotics usually take 6-8 weeks or even longer, so that osteomyelitis can be recovered. The treatment cycle is long, the effect is not ideal, and the amputation rate is high. In recent years, autologous growth factors such as APG have been used to promote healing of diabetic ulcers. This method can greatly shorten the healing process of wounds and reduce the disability rate of patients. Patients with diabetic wounds were strictly controlled by local standard treatment of blood sugar, blood pressure, anticoagulant, anti-infection and ulcer treatment (debridement, drainage, decompression, exchange dressing, etc.) for 2 weeks, whenever no improvement or deterioration of ulcers were defined as refractory ulcers, APG technique could be involved.

APG is a mixture of PRP and thrombin-calcium. PRP contains a large number of growth factors, which could promote cell proliferation and endothelial cell regeneration

[5, 6]. Preclinical study demonstrated that PRP could activate migration of endothelial cells, increase the production of collagen fibers I and III, and improve the density and homogeneity of collagen [7-8]. Picard F summed up all the relevant articles about the therapeutic effect of PRP on chronic diabetic wounds (1978-2015), and found that PRP is effective for healing of the wound [9].

Besides features of accelerating hemostasis and sealing wounds, APG is also rich in growth factors, which can accelerate wound healing. It has been widely used in the treatment of oral and maxillofacial surgery, orthopedics, burn and plastic surgery and other trauma and chronic ulcers [10]. One prospective study showed that APG treatment of diabetic chronic skin ulcers is safe and has no side effects compared with traditional therapy, and its effect is remarkable [11]. We pioneered the use of APG in the treatment of diabetic finger wounds with osteomyelitis, and achieved good clinical results.



**Compliance with Ethical Standards**

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**Conflict of Interest:** None declared.

**Ethical approval:** All procedures performed in the study involving human participants were in accordance with the ethical standards of Xiang`an Hospital of Xiamen University and/or China research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent:** Informed consent was obtained from the patient included in the study.

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## Figure Legends

Fig.1 The left hand x-ray before treatment of APG

Fig.2 A: Before treatment of APG; B: 3 days later after APG treatment

Fig.1



Fig.2 A

Fig.2 B