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CASE REPORT
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Chronic Equine Distal Limb Wound: Treatment with Platelet-Rich Fibrin

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ABSTRACT

***Background*:** Distal limb wounds are common in horses and are often associated with delayed healing, contamination, and exuberant granulation tissue, particularly when managed by second intention. Conventional treatment focuses on wound cleansing, infection control, and protection, but these approaches may be insufficient in chronic lesions. Platelet-rich fibrin (PRF) is an autologous biomaterial that provides a fibrin scaffold and sustained growth factor release and has been proposed as an adjunctive regenerative therapy. This case report aimed to describe the clinical applicability of PRF for 2nd-intention healing of a chronic equine distal limb wound.

***Case*:** A 15-year-old mixed-breed mare was referred with a 60-day history of a chronic wound located on the medial heel bulb of the left hind limb. According to the owner, the lesion originated from a laceration evolved with delayed healing and developed exuberant granulation tissue that was removed by surgical excision 15 days before referral. On admission, the mare was alert, presented a body condition score of 7/9, and showed mild lameness (grade 1/5). The wound measured 13.5 cm^2 and exhibited exuberant granulation tissue, focal necrosis, and purulent exudate originating from the frog and sole regions. Treatment consisted of routine wound cleansing combined with weekly application of autologous platelet-rich fibrin and protective bandaging. PRF was obtained from whole blood without anticoagulant and applied as fibrin membranes directly onto the wound bed. Wound progression was monitored weekly through standardized photographic documentation and image-based area measurement. Progressive wound contraction, improvement in tissue homogeneity, reduction of necrotic tissue, and enhanced vascularization were observed throughout the treatment period. After 4 weeks, the wound area had decreased by 79.3%, epithelialization was evident, no signs of infection were present, and functional healing was achieved without residual lameness.

***Discussion*:** This case describes the favorable evolution of a chronic distal limb wound treated with conventional wound management associated with platelet-rich fibrin. Distal limb wounds in horses are known to present prolonged healing times due to reduced vascularization, increased contamination, and mechanical stress, frequently resulting in exuberant granulation tissue and delayed epithelialization. In this context, adjunctive regenerative approaches have gained interest as complementary strategies to conventional care. Platelet-rich fibrin is an autologous biomaterial characterized by a dense fibrin matrix that acts as a scaffold for cell migration and allows the sustained release of growth factors involved in tissue repair. In chronic wounds, this biological environment may contribute to modulation of persistent inflammation, angiogenesis, and fibroblast activity, supporting more organized healing. The consistent week-by-week improvement observed in this case, including wound contraction and tissue maturation, suggests that PRF may positively influence the wound microenvironment. Although the healing outcome cannot be attributed exclusively to PRF due to its association with standard wound care, the observed clinical progression supports its potential role as an adjunctive therapy. As a single case report, the findings are descriptive and cannot be generalized. Nevertheless, PRF preparation is simple, low-cost, and based on materials commonly available in equine practice, making it feasible for use under both hospital and field conditions. Within these limitations, this case highlights PRF as a practical adjunctive option for the management of chronic distal limb wounds in horses and supports further clinical investigation.

Keywords: wound management, regenerative medicine, horse, lacerations, limb.

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INTRODUCTION

Lacerative wounds are common lesions in horses and may compromise the animal's life and welfare, resulting in significant financial losses for owners [2,13]. As this condition is frequently encountered in routine equine veterinary practice, veterinarians must be equipped with therapeutic strategies to provide optimal treatment, aiming to achieve rapid wound healing as well as functional and aesthetic outcomes [2,12].

Wounds on the distal aspect of the limb, distal to the carpus and tarsus, account for more than 60% of all wounds in horses [13]. These lesions are located in close proximity to the ground and, consequently, a higher likelihood of contamination by vegetal material and feces from the environment; these regions also exhibit marked mobility, which hinders the healing process; furthermore, the distal limbs present lower vascularization compared with other body regions, thereby contributing to delayed wound healing [1,5,10].

Due to the inability to perform suturing in contaminated wounds, or as a result of dehiscence following an attempt at primary intention healing, wounds must often be managed clinically to promote healing by 2nd-intention [1,8,10]. As an adjunctive measure in the management of 2nd-intention wound healing in equine distal limb wounds, platelet-rich fibrin has gained prominence due to its ability to provide growth factors in a sustained manner, in addition to contributing to local tissue infection control, being easy to produce, and presenting low cost [3,4,11]. This case report aims to demonstrate the clinical applicability of platelet-rich fibrin for promoting 2nd-intention healing of a distal limb wound in a horse.

CASE

A 15-year-old mixed-breed mare was referred to the Veterinary Hospital of São Paulo State University (UNESP), Botucatu, São Paulo, Brazil, with a 60-day history of a wound on the left hind limb. According to the owner, the injury began as a laceration that subsequently developed exuberant granulation tissue. Fifteen days before referral, the mare had undergone surgical excision of the excessive granulation tissue performed by the attending veterinarian.

Upon hospital admission, the mare was alert and had a body condition score of 7/9 according to the Henneke scale. Physical examination revealed all parameters within the reference range for the species. On specific locomotor examination, a grade 1/5 lameness was observed according to the AAEP scale. The wound was located on the medial heel bulb of the left hind limb and presented exuberant granulation tissue, measuring 13.5 cm^2 in total area. In addition, necrotic tissue was identified at the base of the frog, and purulent exudate was noted originating from the frog and sole regions of the hoof.

As treatment, the wound was cleansed with tap water and a 2% chlorhexidine scrub[1]. Platelet-rich fibrin was applied every 7 days, followed by protective bandaging with sterile gauze, cotton padding, and an elastic bandage, which were changed twice weekly. For tetanus prophylaxis, a single subcutaneous dose of 10,000 IU of antitetanic serum[2] was administered. The patient was kept in a paddock, fed Coast Cross hay (*Cynodon dactylon*) and salt *ad libitum*, and hand-walked on a lead role for 30 min twice daily.

Platelet-rich fibrin was prepared using 60 mL of autologous whole blood collected into sterile, dry glass tubes without anticoagulant (10 mL per tube). The samples were centrifuged in a bench centrifuge[3] at 1,660 *g*) for 10 min at room temperature, following a modified protocol adapted from Dohan *et al.* [3]. Following centrifugation, the fibrin clots were aseptically removed using sterile anatomical forceps and placed between 2 Petri dishes, where they were gently compressed for 1 min to obtain fibrin membranes. Subsequently, the fibrin membranes were applied directly onto the wound (Figure 1) and covered with a sterile gauze compress and a protective bandage.

Wound progression and contraction rate were monitored through weekly photograph taken with a size reference included in each frame. Image analysis and wound area measurements were performed using ImageJ software (National Institutes of Health, USA), calibrated to a known metric scale (mm ruler).

At the end of the 1st week of treatment, the wound area had decreased from 13.5 cm^2 to 11.3 cm^2, a 16.3% reduction, with marked reduction of necrotic tissue, improved tissue homogeneity, and enhanced vascularization. By the 2nd week, the area had contracted to 8.4 cm^2, corresponding to a 37.8% reduction from baseline, and the wound bed appeared with reduced fibrinous material, early contraction of the wound borders, and no signs of active infection.

At the 3rd week, the wound measured 6.0 cm^2, a 55.6% reduction, and showed mature, well-vascularized

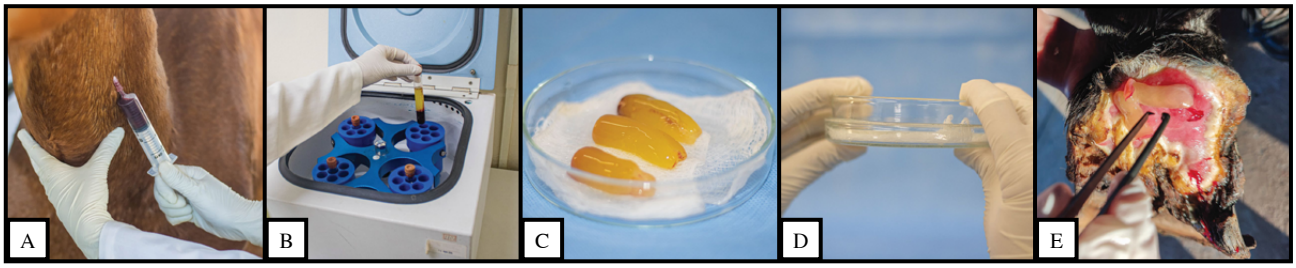


Figure 1. Sequential images illustrating the preparation and application of platelet-rich fibrin (PRF) on the wound. A- Whole blood collection. B- Centrifugation of the blood sample. C- 3 PRF clots obtained after centrifugation. D- PRF being compressed for application. E- Placement of the PRF membrane on the wound bed.

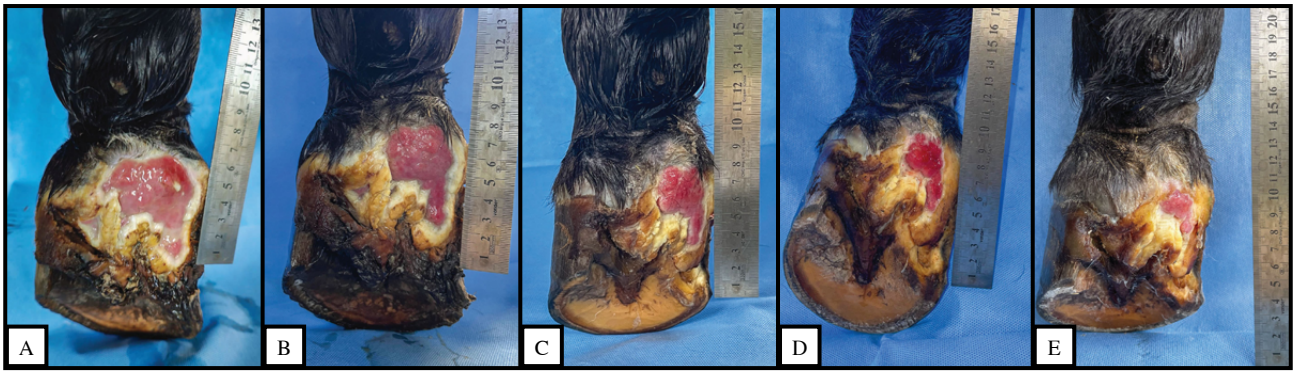


Figure 2. Sequential clinical photographs of the distal limb wound on the left hind limb of a mare during the healing process. A- Wound appearance at hospital admission prior to treatment. B- Seven days after initiation of treatment. C- Fourteen days after initiation of treatment. D- Twenty-one days after initiation of treatment. E- Twenty-eight days after initiation of treatment. [A ruler is included in each image to provide a reference for wound size].

granulation tissue with clean margins and progressive epithelialization. By the 4th week, the area had decreased to 2.8 cm^2, amounting to a 79.3% reduction, and the lesion presented as a shallow, well-epithelialized defect with no necrosis or exudate (Figure 2). At this point, complete functional healing had been achieved, and lameness was no longer observed. Consequently, the mare was discharged with instructions for the owner to continue daily cleansing using tap water and 2% chlorhexidine at the property.

DISCUSSION

This case demonstrates the healing potential of platelet-rich fibrine as an adjunctive therapy for 2nd-intention healing of a chronic distal limb wound in a horse. The progressive reduction in wound area, improvement in tissue quality, and achievement of functional closure without lameness in 4 weeks, highlight the regenerative potential of PRF in a region associated with delayed and complicated healing.

The distal limb wound described in this case evolved by 2nd-intention and showed a chronic course, with the development of an exuberant granulation tissue prior to referral. In horses, distal limb wound are injuries that tend to persist over time due to anatomical characteristics that increase susceptibility to contamination, mechanical tension and reduced tissue perfusion. These factors may sustain local inflammation and promote the formation of exuberant granulation tissue, thereby impairing normal epithelialization [7,13]. Accordingly, the pathological features observed in this case are consistent with the typical clinical course of chronic distal limb wounds in horses prior to specialized intervention.

The therapeutic approach applied in this case consisted of local wound cleansing followed by the application of platelet-rich fibrin. Conventional management of equine distal limb wounds is primarily focused on wound cleansing, infection control, and protection of the lesion through bandaging [13]. Although these measures are essential, they do not actively stimulate tissue regeneration and may be insufficient to restore organized healing in chronic wounds. For this reason, regenerative strategies such as PRF have been increasingly explored in equine wound management to enhance tissue repair rather than solely controlling infection.

Platelet-rich fibrin (PRF) is a 2nd-generation platelet concentrate and an autologous biomaterial

composed of a solid fibrin clot or membrane obtained through centrifugation of whole blood without anticoagulants. The fibrin matrix acts as a 3-dimensional scaffold that supports cell migration and allows the sustained release of biologically active mediators, including growth factors and cytokines involved in tissue repair [3,4,9,11]. In chronic wounds, this biological environment may help modulate persistent inflammation and promote angiogenesis, fibroblast regulation, and epithelialization, thereby favoring progression toward organized healing. In equine distal limb wounds, the regenerative properties of PRF have been associated with improved wound contraction and epithelialization [4], which is consistent with the favorable healing response observed in the present case.

This case illustrates the week-by-week healing progression of a chronic distal limb wound, with consistent improvement over a 4-week period characterized by progressive epithelialization, wound contraction, and controlled granulation tissue formation, ultimately resulting in functional recovery. The favorable healing trajectory observed after PRF application may be related to its regenerative properties and sustained biological activity within the wound environment. Distal limb wounds are common in equine clinical practice and, despite appropriate conventional management, frequently develop complications such as exuberant granulation tissue and prolonged healing times, increasing recovery periods and economic impact for owners [2,13]. In this context, the present case suggests that PRF may represent a feasible adjunctive option for the management of chronic distal limb wounds in horses.

As described, PRF preparation is based on materials commonly available in routine equine clinical practice, and the procedure is simple, involving blood collection and centrifugation. Its application to the wound does not require specialized equipment or trained manufacturing facilities and can be performed under field or laboratory conditions. The autologous nature of this biomaterial reduces the risk of immunological reactions and lowers associated costs, making PRF a simple and low-cost therapeutic option.

The main limitation of this case report is that PRF was applied in combination with standard wound cleansing and management, which prevents isolation of its specific contribution to the healing outcome. Additionally, as an individual case report, the findings are descriptive and cannot be directly compared or generalized. Finally, although the centrifugation protocol was modified, PRF clot formation was successfully achieved, and clinical outcomes were consistent with those reported in previous studies.

In conclusion, this case describes the management of a chronic distal limb wound using conventional wound care combined with adjunctive application of platelet-rich fibrin. The lesion showed progressive healing over a 4 week period, with epithelialization, absence of major complications, and restoration of limb function. Within the limitations of a single case, these findings suggest that PRF may represent a practical and feasible adjunctive option for the management of distal limb wounds in horses under field conditions.

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