

Effects of Unfocused Extracorporeal Shock Wave Therapy (ESWT) for the Healing of Distal Limb Wounds

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Introduction:

Objective: To determine the effects of unfocused extracorporeal shock wave therapy (ESWT) on healing of distal limb wounds in horses.

Methods:

Sample population: Six healthy mature horses (5 Standardbred and 1 Thoroughbred). Five 6.25cm² superficial wounds were created over both 3rd metacarpi of six horses. Forelimbs were randomly assigned to treatment (ESWT and bandage) or control (bandage only) groups. In the treated limb, each wound was treated with 625 shockwave pulses from an unfocused electro-hydraulic shockwave generator. In the control limb, each wound received sham therapy. Wound appearance was recorded weekly as either inflamed or healthy, and scored based on the amount of protruding granulation tissue. Standardized digital photographs were then taken to determine the area of neopithelialization and absolute wound area. One biopsy was taken from one of the wounds on each limb every week for 6 weeks. The biopsy samples were used to evaluate epithelialization, fibroplasia, neovascularization and inflammation. Immunohistochemistry for alpha - smooth muscle actin was used to label myofibroblast.

Results:

The gross evaluation of the wounds showed that control wounds were 1.9 times more likely to appear inflamed when compared with treated wounds. Control wounds had significantly higher scores for exuberant granulation tissue than the treatment wounds. Measurements obtained from digital pictures revealed that ESWT affected neither the size of the wound area nor the area of neopithelialization. No significant difference was found for any of the histological or immunohistochemical parameters between the study groups.

Discussion:

Although we found a macroscopic effect of ESWT on equine wounds, none of the histological parameters showed a significant treatment effect. It is possible that the low number of samples available for histological evaluation limited the strength of the analysis. We decided to perform only one biopsy per wound to avoid further changes in wound size, however a higher number of specimens would have allowed for greater statistical power.

Conclusion:

In conclusion, in this study, treated wounds had less exuberant granulation formation and were less clinically inflamed than the control wounds, however, there was no difference on the overall healing time. Therefore, ESWT may be useful to prevent exuberant granulation tissue formation or treat chronic inflammation of equine distal limb wounds in horses, however further evaluation is necessary before recommendations can be made for its clinical application.