Full thickness cutaneous wounds are frequently encountered in veterinary medicine, especially following vehicular or other trauma. Immediately following injury, a cascade of wound healing events is initiated that produces an initial inflammatory period followed by a proliferative phase consisting of angiogenesis, fibroplasia, epithelialization and contraction. Many adjunctive therapies have been developed in an attempt to enhance wound healing and reduce healing times. Low level laser therapy is a recently developed therapy that relies on biomodulation of processes at a cellular level using lasers with less than 10 mW of power. These processes are primarily launched by cytochrome activity and energy (adenosine triphosphate) production in mitochondria, which lead to synthesis of proteins involved in cellular repair, as well as promoting cellular growth and differentiation, and prostaglandin synthesis. However, the outcomes of previous *in vitro* cell cultures and *in vivo* rodent models evaluating the effect of LLLT on wound healing have been conflicting. Methodological differences in the literature with respect to laser class (I-IV), wavelength, dosage, duration, and frequency of treatment have hindered efforts to determine which laser types and dosing protocols are most beneficial for wound healing. Despite this confusion and lack of evidence, the modality is emerging as a common adjunctive wound therapy in veterinary medicine. Therefore, our objective was to evaluate the effects of low level laser therapy (LLLT) on healing of acute, full-thickness wounds in dogs using a prospective, controlled, experimental study.

This study protocol was approved by the Michigan State University Institutional Animal Care and Use Committee. Ten adult male beagles (13 to 18 months old) were used in this study. Two 2 x 2 cm wounds were surgically created bilaterally on the trunk of each dog and each side was randomized to receive LLLT (LAS) or standard-of-care wound management (SYS). Wound planimetry was performed on the caudal wounds at 15 time points, from which total wound area, percent contraction and percent epithelialization were calculated. Histologic features including histologic acute inflammation scores (HAIS) and histologic repair scores (HRS) were evaluated at 7 time points from cranial wound biopsies. To detect any systemic effect of LLLT, the SYS wound data were compared to a historical control group (CON). All images were blinded and randomized prior to wound planimetry tracing. Dogs were adopted at study completion.

There was no difference between LAS and SYS wounds for all parameters including total wound area, percent contraction, percent epithelialization, HAIS, and HRS. CON wounds had significantly greater contraction (day 4 and days 9-16) and epithelialization (days 9 – 30) compared with SYS wounds. SYS wounds had significantly less inflammation than CON wounds early in wound healing (day 4), but inflammation was significantly greater by day 21. Fibroblast infiltration and collagen were significantly less in SYS wounds than CON wounds between days 4 – 14.

Overall, there is no beneficial effect of LLLT on acute wound healing in dogs at the parameters used in our study. There may be a negative effect of LLLT, both directly and systemically, compared with standard of care treatment. The LLLT protocol used in this study is not indicated to treat open wounds in dogs. Further investigations into the mechanisms of action of LLLT are warranted to determine effects on wound healing *in vivo.*