A Comparison of Red and Blue Light Therapy for Superficial Wound Healing
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Context: Athletic trainers routinely provide care for acute and chronic wounds. The risk of infection associated with this care presents a growing challenge requiring innovative approaches. The use of light emitting diode (LED) devices has become a novel treatment for wound healing in place of previously used laser therapy. While laser therapy studies have shown promise for promoting wound healing and tissue growth, the efficacy of LED therapy in wound healing is not yet clear. Objective: To examine and compare the effects visible red and blue light wavelengths on dermal abrasion healing. Design: Randomized sham-controlled trial. Setting: Athletic training research laboratory. Participants: Twelve healthy males and females (age=20.6 ±1.2 y, height=168.5 ±10.7 cm, mass=67.6 ±15.2 kg) who were not using immune suppressants or any medication that might affect blood viscosity, clotting or wound healing time volunteered. Potential subjects were excluded if they were tobacco users or suffered from any of the contraindications for light therapy. Interventions: A 1.5 cm diameter dermal abrasion was created in each subject’s non-dominant anterior forearm using a previously published procedure. Subjects were then randomly assigned to one of three treatment groups in a double blind fashion; 624-nm visible red light therapy (R), 464-nm blue light therapy (B) and sham therapy (S). The blue and red light treatments were administered using a Dynatron Solaris 709 Plus (Dyantronics Corporation, Salt Lake City Utah) at a power density of 6 J/cm² once each day for ten consecutive days beginning the day after wound creation. Similar procedures were followed for the S group, however no light was emitted. A bio-occlusive dressing without antibiotic or anti-inflammatory intervention was applied and maintained between treatments. Main Outcome Measures: Digital images (1600 x 1200 pixels jpeg format) of the wounds were recorded with a Nikon D5000 digital camera mounted 40-cm perpendicular to the subject’s forearm immediately after wound creation and on days 2, 4, 6, 8 and 10 post injury. All images were analyzed for wound area and chromatic red using image-measurement software (Professional Version; Bersoft Inc, Ottawa, ON, Canada). Results: Analysis of variance with repeated measures revealed a significant Time main effect for wound area (F_{6,54}=7.5, p=.001) as a progressive decrease was observed after Day 4. The treatment had no effect, as a significant Time x Treatment interaction (F_{10,45}=.550, p=.845) was not observed. A significant Time main effect was also observed for chromatic red (F_{5,45}=48.19, p=.001), as a progressive decrease in area was observed over the 10 days. The treatment had no effect, as a significant Time x Treatment interaction (F_{12,54}=.921, p=.533), was not observed. Conclusions: The results suggest that visible red light therapy and blue light therapy do not accelerate dermal abrasion healing over a period of ten days. Word Count: 448.