Effect of a Diode Laser on Wound Healing by Using Diabetic and Nondiabetic Mice

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The purpose of this study was to evaluate a 980-nm gallium-aluminum-arsenide diode laser for wound healing. Using genetically diabetic and nondiabetic mice, two 6-mm wounds were created on the back of each mouse by using a punch biopsy. The mice were assigned to 1 of 4 subgroups for laser treatment at different fluence and frequency of treatment: 5W(18 J/cm2) every 2 days, 5W(18 J/cm2) every 4 days, 10 W (36 J/cm2) every 2 days, and 10 W (36 J/cm2) every 4 days. In addition, control mice were used and the wounds were allowed to heal naturally. Wound healing was evaluated on days 5, 12, and 19 by percentage of wounds healed and percent wound closure. A maximum of 5 mice per subgroup were killed at days 7, 14, and 21, and histology was conducted on the wound sites. For diabetic mice receiving 5 W every 2 days, the percentage of wounds healed after 19 days was 100% versus 40% in the control group. Only 20% of wounds in the 10-W diabetic subgroups achieved healing during the same period. For the subgroups whose wounds did not completely heal, all but the 10 W every 2 days subgroup had average closure of _90%. The 100% closure for the 5 W every 2 days subgroup was significantly greater than the other subgroups. For nondiabetic mice, 100% of the wounds in the 5Wevery 4 days and control subgroups were completely healed, whereas 90% of the wounds from the 5 W every 2 days and the 10 W every 4 days subgroups were completely healed. In the latter 2 subgroups, wound closure was 99.4% and 98.8%, respectively. These differences were not significant. The histologic results confirmed these findings.
In conclusion, treatment at 18 J/cm2 shows a beneficial effect on wound healing in diabetic mice and does not have a detrimental effect in nondiabetic mice. (The Journal of Foot & Ankle Surgery 43(4):214-220, 2004)