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# Low-level laser therapy stimulates bone–implant interaction: an experimental study in rabbits

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**Abstract:**

The aim of the present study was to investigate the effect of low-level laser therapy (LLLT) with a gallium-aluminium-arsenide (GaAlAs) diode laser device on titanium implant healing and attachment in bone. This study was performed as an animal trial of 8 weeks duration with a blinded, placebo-controlled design. Two coin-shaped titanium implants with a diameter of 6.25 mm and a height of 1.95 mm were implanted into cortical bone in each proximal tibia of twelve New Zealand white female rabbits (*n*=48). The animals were randomly divided into irradiated and control groups. The LLLT was used immediately after surgery and carried out daily for 10 consecutive days. The animals were killed after 8 weeks of healing. The mechanical strength of the attachment between the bone and 44 titanium implants was evaluated using a tensile pullout test. Histomorphometrical analysis of the four implants left in place from four rabbits was then performed. Energy-dispersive X-ray microanalysis was applied for analyses of calcium and phosphorus on the implant test surface after the tensile test. The mean tensile forces, measured in Newton, of the irradiated implants and controls were 14.35 (SD±4.98) and 10.27 (SD±4.38), respectively, suggesting a gain in functional attachment at 8 weeks following LLLT (*P*=0.013). The histomorphometrical evaluation suggested that the irradiated group had more bone-to-implant contact than the controls. The weight percentages of calcium and phosphorus were significantly higher in the irradiated group when compared to the controls (*P*=0.037) and (*P*=0.034), respectively, suggesting that bone maturation processed faster in irradiated bone. These findings suggest that LLLT might have a favourable effect on healing and attachment of titanium implants.