

OPTICAL COHERENCE TOMOGRAPHY (OCT) EVALUATING LOW INTENSITY LASER EFFECTS ON WOUND HEALING

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Low intensity laser therapy (LILT) has been studied for several years and it presents beneficial effects in several clinical conditions including wound healing. The purpose of this study is to assess via a noninvasive method, the optical coherence tomography (OCT), the effect of LILT on wound healing.

The experimental design used 15 male Swiss mice that were imaged using OCT before injury, immediately after injury and at days 2, 5 and 7 post-wound. The injury was created at the back of the animals using a cylindrical punch (4mm). The animals were alienated in two groups: a control group (CG) and an experimental group (EG) that received a single laser irradiation at day one, 30 minutes after injury. The irradiation was performed with a diode laser ($\lambda=660\text{nm}$, $P=40\text{mW}$), spot size of 4mm^2 , during 100s with radiant exposure of $4\text{J}/\text{cm}^2$ and irradiance of $1.0\text{W}/\text{cm}^2$. A qualitative imaging-based scoring system was used to evaluate the OCT images by five calibrated blind analyzers. The degree of inter-rater reliability was verified by Fleiss's kappa statistics.

The overall observations showed that 48h after injury both groups presented a thin bright layer covering the wound area, without evident signs of contraction or epithelial migration, and without differences between groups. At day 5, differences were noted between groups recognized through a more expressive tissue contraction with epithelial migration in the EG. The statistical analyses showed that at this point the groups were considered different with a Fleiss's kappa value of 1 indicating almost perfect agreement. At day 7, the differences between groups persisted and the overall velocity of wound contraction was greater in the EG. These preliminary findings suggest that LILT accelerates the wound healing even with a single application in the initial inflammatory phase and that OCT would be a helpful tool to investigate LILT dosimetry-related questions.