P-16 Effect of 830nm Laser Phototherapy on Osteoblasts Grown in Vitro on Biosilicate Scaffolds
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The purpose of this study was to develop a method for successfully seeding osteoblasts onto a glass-ceramic scaffold designed for use in clinical settings; and, determine whether the application of laser phototherapy at 830nm would result in osteoblast proliferation on the glass-ceramic scaffold. The use of bioscaffolds is considered a promising strategy in a number of clinical applications where tissue healing is sub-optimal. As in vitro osteoblast growth is a slow process, laser phototherapy could be used to stimulate osteoblast proliferation on bioscaffolds.
A methodology was developed to seed an osteoblastic (MC3T3) cell line on to a novel glass-ceramic scaffold. Seeded scaffolds were irradiated with a single exposure of 830nm laser at 10 J/cm² (at diode). Non-irradiated seeded scaffolds acted as negative controls. Cell proliferation was assessed 7 days after irradiation. Osteoblastic MC3T3 cells were successfully grown on discs composed of a glass-ceramic composite. Laser irradiation produced a 13% decrease in MC3T3 cell proliferation on glass-ceramic discs (mean±SD = 0.192 ± 0.002) compared to control (non-irradiated) discs (mean±SD = 0.22 ± 0.002).
Despite successful seeding of bioscaffolds with osteoblasts, laser phototherapy resulted in a reduction in cell growth compared to non-irradiated controls. Future research combining laser phototherapy and glass-ceramic scaffolds should take into account possible interactions of the laser with matrix compounds.