

In vitro response of Human Pre-osteoclasts to low intensity Laser irradiation

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ABSTRACT:

In vitro and in vivo studies have demonstrated that low intensity laser irradiation stimulates growth and cell differentiation of precursor cells, promoting dental movement and alveolar bone remodeling. But the information about the effect of laser irradiation on human pre-osteoclasts is limited.

Objective: To evaluate the effects on the viability of the pre-osteoclasts and cell proliferation in cultures of human pre-osteoclasts, after irradiation with low intensity laser.

Method: PoieticsTM Human Osteoclast Precursors Cat No. 2T-110 Cambrex-Lonza Inc. were irradiated with low intensity laser (As-Ga-Al) of 832.79 nm wavelength. A cytotoxicity test was performed using the Lactate dehydrogenase (LDH) technique, measuring absorbance, 6 and 24 h after the treatment, in the Stat Fax-2100 at a wavelength of 492 nm. The pre-osteoclast cell density was measured by the absorbance every 24 h for 6 days, using a microplate reader. (Cell proliferation with *Tetrazolium salts*: kit XTT, Roche).

Results: The average cytotoxicity at 24 h was twice the observed at 6 h (59% difference) in the experimental group treated with laser; Triton cytotoxicity in the positive control group was seven times higher at 24 h (86.3% difference). After 6 h the laser was 30 times less cytotoxic than Triton and after 24 h was 89 times less cytotoxic than Triton (96,6% difference for 6 h and 98.8% difference for 24 h). These time differences are statistically significant ($p < 0.001$). In the cell proliferation test the differences between groups were not statistically significant during the six days follow-up. Both cultures presented the same biological response, according to the cell cycle under study.

Conclusions: Low level laser irradiation does not have a cytotoxic effect that affect the cell viability in normal human Pre-osteoclasts cells cultured In vitro.

Keywords:

Pre-osteoclasts, Low energy laser, Cytotoxicity, Cell cycle, Orthodontic movement.