

“Biostimulation of bone marrow cells with a diode soft laser.”

In recent years, the use of low-intensity red light in regeneration of soft tissue has been increasingly pursued. As far as hard tissue is concerned, the biostimulating effect of laser has already been demonstrated successfully in more rapid healing of tibial bone fractures in mice at a dosage of 2.4 J. However, the effect of light of a low dose laser directly on osteoblasts has not been investigated yet. The aim of this study was to determine the effect of continuous wave diode laser irradiation on osteoblasts derived mesenchymal cells. Three groups of 10 cultures each were irradiated 3 times (days 3, 5, 7) with a pulsed diode soft laser with a wavelength of 690 nm for 60 s. Another 3 groups of 10 cultures each were used as control groups. A newly developed method employing the fluorescent antibiotic tetracycline was used to compare bone growth on these culture substrates after a period of 8, 12 and 16 days, respectively. It was found that all lased cultures demonstrated significantly more fluorescent bone deposits than the non-lased cultures. The difference was significant, as tested by the Tukey Test ($P < 0.0001$) in the cultures examined after 16 days. Hence it is concluded that irradiation with a pulsed diode soft laser has a biostimulating effect on osteoblasts in vitro, which might be used in osseointegration of dental implants.

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Clin Oral Implants Res. 2000 Dec; 11(6): 540-5.

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