

Wound:

Effects of laser irradiation on the release of basic fibroblast growth factor (bFGF), insulin like growth factor-1 (IGF-1), and receptor of IGF-1 (IGFBP3) from gingival fibroblasts.

Abstract Various studies have shown biostimulation effects of laser irradiation by producing metabolic changes within the cells. Little is known about the biological effect of laser irradiation on the oral tissues. Among the many physiological effects, it is important to recognize that low-level laser therapy (LLLT) may affect release of growth factors from fibroblasts. Therefore, the aim of the present study was to determine whether the laser irradiation can enhance the release of basic fibroblast growth factor (bFGF), insulin-like growth factor-1 (IGF-1), and receptor of IGF-1 (IGFBP3) from human gingival fibroblasts (HGF). The number of all samples in the study were 30, and the samples were randomly divided into three equal groups; In the first group (single dose group), HGF were irradiated with laser energy of 685 nm, for 140 s, 2 J/cm² for one time, and in the second group, energy at the same dose was applied for two consecutive days (double dose group). The third group served as nonirradiated control group. Proliferation, viability, and bFGF, IGF-1, IGFBP3 analysis of control and irradiated cultures were compared with each other. Both of the irradiated groups revealed higher proliferation and viability in comparison to the control group. Comparison of the single-dose group with the control group revealed statistically significant increases in bFGF ($p < 0.01$) and IGF-1 ($p < 0.01$), but IGFBP3 increased insignificantly ($p > 0.05$). When the double dose group was compared with the control group, significant increases were determined in all of the parameters ($p < 0.01$). In the comparison of the differences between the two irradiated groups (one dose and two doses), none of the parameters displayed any statistically significant difference ($p > 0.05$). In both of the laser groups, LLLT increased the cell proliferation and cell viability. The results of this study showed that LLLT increased the proliferation of HGF cells and release of bFGF, IGF-1, and IGFBP3 from these cells. LLLT may play an important role in periodontal wound healing and regeneration by enhancing the production of the growth factors.