

**ABSTRACT****THE EFFECTS OF DIFFERENT 650 NM LASER DIODE IRRADIATION TIMES ON THE VIABILITY AND PROLIFERATION OF HUMAN PERIODONTAL LIGAMENT FIBROBLST CELLS**

**Background:** Endo-perio lesions are clinical manifestations of inflammation in the periodontal and pulp tissue. Damage to the periodontal ligament can inhibit its ability to regenerate. Therefore, laser therapy use is expected to improve the prognosis with regard to healing lesions. Unfortunately, the duration of irradiation during laser diode therapy can influence the viability and proliferation of human periodontal ligament fibroblast (hPDLF) cells. **Purpose:** This study aims to determine the effects of different irradiation exposure times of the 650 nm laser diode of the pulsed mode type on the viability and proliferation of human periodontal ligament fibroblast cells. **Methods:** This study constituted a laboratory experiment on hPDLF cells using 650 nm laser diode irradiation. Six groups formed the research subjects in this study, namely; two control groups, two radiation groups respectively subjected to irradiation exposure of 15 seconds and 35 seconds duration followed by 24-hour incubation, and two radiation groups exposed to irradiation for 15 and 35 seconds respectively followed by 72-hour incubation period. The viability and proliferation of those cells were subsequently calculated by ELISA reader, while the data was analyzed by means of one-way ANOVA and Tukey tests. **Results:** The significance value of the viability scores between the 15-second irradiation group and the 35-second irradiation group was less than 0.05, indicating that there was a significant difference between these treatment groups. Similarly, the significance value of proliferation scores between the 15-second irradiation group and the 35-second irradiation group was less than 0.05, again indicating a significant difference between these treatment groups. **Conclusion:** Irradiation using a 650 nm laser diode 15 seconds and 35 seconds in duration can induce an increase in the viability and proliferation of hPDLF cells.

**Keywords :** cell proliferation; cell viability; human periodontal ligament fibroblast cells; laser diode