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Bactericidal Effects of 2.94 μ m and 1.67 μ m Laser

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Abstract: The bactericidal effects of lasers with wavelengths of 1.67 and 2.94 μ m on cariogenic *Streptococcus mutans* were investigated. Temperature during irradiation was also measured to determine the mechanism underlying the bactericidal effects of the lasers. An aliquot of 2 μ l cell suspension of *S. mutans* JC-2 strain was placed on anhydrous quartz or dentin plate, covering an area of approximately 5.0 mm in diameter to a depth of approximately 0.1 mm. Cell suspension was then irradiated at a power of 0.8 W (3.1 J/cm²) at a rate of 40 pps for 30 sec. After irradiation, the plate was put into a bottle containing PBS and vigorously vortexed. Solution was serially diluted and inoculated on MS agar. After incubation anaerobically for 72 hr, colony forming units on the agar were counted. The experimental group, the number of bacteria decreased significantly compared to the control group under all conditions. No significant differences were observed in effect of wavelength or plate on bactericidal activity. In conclusion, laser irradiation at a wavelength of 1.67 μ m for 30 sec showed a bactericidal effect on *S. mutans*, suggesting that this wavelength is more useful than 2.94 μ m due to greater tissue penetration.

Key words: *Streptococcus mutans*, Er:YAG laser, Photochemical, Caries, Bactericidal

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