A thermal investigation of dental bleaching in vitro

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Photomed Laser Surg. 2008 Oct; 26(5):489-93.

OBJECTIVE: Our goal was to investigate the surface temperature variations in the cervical region via infrared thermography, as well as the temperature within the pulp chamber via thermocouples, of mandibular incisors when subjected to dental bleaching using two different 35% hydrogen peroxide gels, red (HP) and green (HPM), when activated by **halogen light** (HL) and **LED light**. BACKGROUND DATA: Temperatures increases of more than 5.5 degrees C are considered to be potentially threatening to pulp vitality, while those higher than 10 degrees C can result in periodontal injury. MATERIALS AND METHODS: Tooth samples were randomly divided into four groups (n = 10 each), according to the bleaching agent and catalyst light source used. RESULTS: Mean values and standard deviations of the temperature increases inside the pulp chamber in the HL groups were 4.4 degrees +/- 2.1 degrees C with HP, and 4.5 degrees +/- 1.2 degrees C with HPM; whereas in the groups using LED light, they were 1.4 degrees +/- 0.3 degrees C for HP, and 1.5 degrees +/- 0.2 degrees C for HPM. For the root surfaces, the maximum temperature increases in the groups irradiated with HL were 6.5 degrees +/- 1.5 degrees C for HP, and 7.5 degrees +/- 1.1 degrees C with HPM; whereas in the groups irradiated with LED light, they were 2.8 degrees +/- 0.7 degrees C with HP, and 3 degrees +/- 0.8 degrees C with HPM. There were no statistically significant differences in pulp and surface temperature increases between the groups using different gels, although the mean temperature increases were significantly higher for the groups irradiated with HL when compared with those irradiated with the LED light ($p < 0.05$ with Tukey's test). CONCLUSION: LED light may be safe for periodontal and pulp tissue when using this method, but HL should be used with care.