

In-office bleaching using violet LED with and without gel (6% H₂O₂): evaluation of pH levels and enamel microhardness

To reduce bleaching side effects and enamel surface alterations, recent protocols using violet LED light (LEDv), alone or associated with low concentrations of hydrogen peroxide (HP) have gained interest. Objective: this in vitro study evaluated the effect of three different in-office bleaching techniques on bovine enamel microhardness and the pH variation of peroxide agents during the protocols. Methodology: For Knoop microhardness (KHN) analyses, enamel fragments were divided into 3 groups (n=10): LEDv – hybrid violet LED/Laser light (Whitening Lase Premium, DMC) (10x2' LEDv + 10x30" light off, 2 cycles); HP6%LEDv – 6% HP gel (Nano White Flex, DMC) + LEDv/Laser (Whitening Lase Premium, DMC) (15x1' LEDv + 15x1' light off); HP35% - 35% HP gel (Nano White Flex, DMC) (1x45'). For pH measurements, all bovine teeth were divided into 2 groups (n=10): HP35% and HP6%LEDv. KHN was measured at baseline (T0), 24h after bleaching (T1) and after 7 days in artificial saliva (T7). Initial and final bleaching gels pHs were obtained utilizing a pH meter. KHN was evaluated by the Wald-type permutation statistic, aligned rank transformation statistical test, Wilcoxon and Mann-Whitney tests; pH levels were evaluated by the Welch-James and Wilcoxon tests (p<0.05). Results: HP35% and HP6%LEDv presented a decrease in KHN from T0 to T1 (p=0.0039; p=0.001, respectively), with no difference among them (p>0.05); baselines values were recovered at T7 (p=0.313 HP35%; p=0.557 HP6%LEDv). For LEDv, no significant difference was found between KHN at T1 and T0 (p=0.5286); at T7 KHN increased in comparison to T0 (p=0.029). HP6%LEDv and HP35% presented a reduction of pH values (p=0.0029; p=0.0284, respectively); HP6%LEDv showed greater reduction (p=0.0004). Conclusions: Bleaching with LEDv alone was the only treatment that didn't reduce enamel microhardness. HP6%LEDv led to a decrease in KHN values similar to the high concentrated gel. After seven days in artificial saliva, initial KHN was recovered. Although the pH of both gels decreased during the treatment, it remained above the critical value.