

Poster Presentations - Research Supported by P&G

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2439

External Bleaching Effects on Subsurface Enamel and Coronal Dentin

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A complete understanding of the type and location of oxidation which occurs with vital tooth bleaching may prove valuable in development of future safe and effective formulations. **Objectives:** This study examined empirical color variations in teeth bleached externally and compared these effects to those observed in teeth overbleached on cross-sections. **Methods:** Extracted human premolars were cleaned and analyzed for external CIELAB (L*a*b*) color with a Fuji-1000CCD and stratified into treatment groups including 0;6;24;48 hours (ABCD- periods) bleaching in bulk 6 % H₂O₂ gel 37°C. External tooth colors were recorded post-bleaching and teeth were hemi-sectioned along their vertical axis. Polishing of these flat faces revealed subsurface enamel, DEJ and dentin. Samples were analyzed for internal color with digital imaging to produce CIELAB line scans (DEJ + 300, 600, 900, 1200 mm (to dentin); -300, -600 mm to mid enamel - triplicate scans). Line scans were performed on a group of separate teeth which were analyzed before and after bleaching for 70 hours on sectioned faces - these serving as complete bleached internal-color controls. **Results:** External L*/b* measured 75-76/14.42-14.50 in A, with Δ showing a 6.61 Δ L*/4.93 Δ b* change. Internal color of hemi-sectioned tooth faces produced average L*/b* for non bleached enamel (and DEJ) 72-73 L*/9-11 b* units and for dentin 77-81L*/8.6-10.4b* units. Overbleached tooth faces revealed large L* changes in enamel only and large b* changes in enamel AND dentin. Together, L* and b* could thus be used to assess locations of tooth bleaching when applied externally. Bleaching externally produced time dependent large changes in L* and b* in enamel (+6 Δ L* and (-6 Δ b*) and more minor changes in dentin (+2 Δ L*/(-1 Δ b*). **Conclusion:** These results suggest that external tooth bleaching produces large effects on subsurface enamel and more minor effects in underlying dentin.

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Meta-Analysis of 6% Hydrogen Peroxide Whitening Strip Effectiveness and Safety

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Objective: This research evaluated the efficacy and safety of 6% hydrogen peroxide whitening strips using an extensive clinical trials database collected over a multi-year period at a single site. **Methods:** The inclusive meta-analysis used data from 7 different randomized clinical trials conducted at a single site. Each clinical study used 6% hydrogen peroxide whitening strips twice daily for 30 minutes over a 2-week period. Common efficacy (digital images) and safety (examination and interview) methods were used across studies. Pooled subject-level data were analyzed using a general linear mixed model to determine overall response, and the effect of treatment duration on whitening. **Results:** The 148 treated subjects ranged from 18-71 years of age, with b* (yellowness) ranging from 12-22, and L* (lightness) ranging from 69-80. After 1-week strip use, the adjusted mean (SE) for Δ b* was \bar{n} 1.6 (0.08), differing significantly from baseline ($p < 0.0001$). After 2-weeks, the adjusted mean (SE) for Δ b* was \bar{n} 2.3 (0.07), differing significantly from Week 1 ($p < 0.0001$). The estimated correlation between Weeks 1 & 2 for Δ b* was 0.74. Study-to-study variation, a random model effect, contributed less than 2% of all Δ b* variability. Results were similar for Δ L*, with Week 1 & Week 2 estimated means (SE) of 1.5 (0.13) and 2.0 (0.12). Tooth sensitivity (20%) and oral irritation (22%) was generally mild and transient. Other side effects were unremarkable, and only 1 subject (0.7%) discontinued treatment early due to an adverse event. **Conclusion:** The meta-analysis of multiple studies conducted at a single clinical site over a period of years establishes consistent, effective and safe vital bleaching with 6% hydrogen peroxide whitening strips.