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Clinical Comparison of Two At-home Bleaching Systems Having Different Peroxide Delivery

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Objective: The aim of the study was to evaluate the efficacy and safety of three modifications of an experimental paint-on bleaching film, containing 19% sodium percarbonate (equivalent to 5.3% hydrogen peroxide) versus a flexible polyethylene strip coated with a 6% hydrogen peroxide gel (Whitestrips). **Methods:** A total of 99 patients (aged 18-48) were randomised to one of 5 treatments in what was a parallel leg, partially blinded, placebo controlled, single centre study of 2 weeks duration. Prior to product assignment half the subjects in each leg received a dental prophylaxis. Bleaching agents were self-applied to the facial surfaces of the anterior teeth and left overnight (experimental bleaching film) or applied twice daily for 30 min (Whitestrips). Efficacy and safety measurements at baseline, 7 and 14 days comprised of oral soft tissue examinations and digital image analysis (DIA). Whitening efficacy was determined by evaluating changes from baseline in tooth yellowness (delta b*) and tooth brightness (delta L*). Statistical analysis was by ANCOVA. **Results:** Both the experimental bleaching films and positive control showed a significant reduction ($p < 0.001$) in tooth yellowness after 14 days usage giving a delta b* of -0.83 to -1.23 (depending on modification) and -1.90 respectively. Similarly the test products showed significant increase in levels of tooth brightness after 14 days usage, giving a delta L* range of 0.76-1.14 for patients using the three modifications of experimental bleaching film and 1.69 for patients using Whitestrips. The placebo group showed a significantly lower overall tooth colour change ($p < 0.001$) from baseline than all other groups (delta L*=0.13 and delta b* 0.13 at day 14). **Conclusions:** The research concluded that the experimental bleaching formulations provided a significant and measurable tooth whitening effect, lower than but comparable to that of Whitestrips. Supported by Procter & Gamble.

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SEM/CLSM Analysis of Surface Stains Treated with Whitening Formulations

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Tooth whitening can occur through stain removal or stain decolorization respectively. On enamel surfaces – both processes can take place in parallel. **Objective:** This study examined effects of bleaching gel both with and without dentifrice use on the rate of tooth whitening and observed disposition of surface stains *in vitro*. **Methods:** Human enamel crowns were sectioned and mounted in methacrylate blocks. Enamel was polished with prophylaxis paste and exposed to PCR standardized staining procedures. Following staining surface color was determined quantitatively in CIELAB color space L*, a*, b*. Following staining ½ of each stained surface was cleaned of extrinsic stains using prophylaxis paste and surface color of the still stained and now-prophylaxed sides were re-measured. Teeth were then cycled where continuous immersions in pooled human saliva at 37°C were interrupted by bleach applications daily. Treatments included Crest® Night Effects™ (CNE) bleaching gel (8 hour overnight treatment as paint on film) applied with and without Crest® Regular dentifrice toothbrushing (bid 40 seconds) and water brushed control. Color assessments on stained and prophylaxed sample sides were made at all treatment points, and CLSM/SEM were assessed on baseline, day 3, 14. **Results:** L* color was improved immediately on CNE treatment with stain portion of specimens showing L* color response of 33.1 ± 3.0 ; 64.5 ± 3.8 ; 69.7 ± 2.4 ; 74.4 ± 1.7 (baseline; day 1; 3; 14). Despite day 3 readings showing color response comparable to prophylaxed side, evidence was present in CLSM/SEM for sporadic retention of bleached film. Clean surfaces were derived for CNE treated through day 14 however. **Conclusions:** These microscopic analyses reveal the dual nature of bleach derived whitening from CNE peroxide bleaches – including both lightening of substrate through oxidative chemistry as well as macroscopic loosening and debridement of stain films.