Concurrent Image Analysis Assessment of Gingivitis and Plaque Treatment Response
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ABSTRACT

Objective: A randomized controlled trial evaluated concurrent image analysis methods to assess gingivitis and plaque after oral hygiene.

Methods: After institutional review and consent, 59 healthy adults were enrolled in an experimental gingivitis clinical trial. Oral health was promoted via prophylaxes and daily supervised brushing over 14 days, hygiene was suspended to induce gingivitis over 21 days, and subjects were randomly assigned (1:1) to 7-days with an oral hygiene combination therapeutic rinse. Combination therapy used a 0.454% stannous fluoride dentifrice (Crest® ProHealth™ Clinical Gum Protection), a rotating-oscillating powered brush (Oral-B® ProfessionalCare® SmartSeries 5000 with SmartGuide), and an expanded polytetrafluoroethylene floss (Oral-B Glide® Pro-Health Professional Clinical Protection). The combination + rinse group additionally used a 0.07% cetylpyridinium chloride rinse (Crest ProHealth Multi-Protection). Use was supervised following label instructions. Gingivitis and plaque were measured using gingivitis image analysis (GIA) to assess ΔG, and fluorescein-disclosed digital plaque image analysis (DPIA) to assess area % coverage before and after brushing.

Results: Mean SD age was 24.3 6.5, and 58 of 59 subjects completed the study. Both GIA and DPIA showed significant (p<0.01) changes consistent with the natural history. After induction, mean SD prebrush plaque area % was 54.3 15.8. During the treatment phase, plaque levels declined quickly in both groups, with adjusted mean pre & postbrush area % of 4.7 & 1.6 for the combination versus 2.6 & 1.3 for the combination + rinse following 1 day of treatment. DPIA scores differed significantly from baseline throughout treatment reaching <1% area % coverage at Day 7 postbrushing. GIA results were similar, though delayed, as ΔG continued to decline the first treatment day. By Days 4 & 7, both groups showed significant (p<0.001) improvements ranging from 9.0 to 10.9 for ΔG.

Conclusions: In an induced gingivitis study, concurrent instrumental gingivitis and plaque digital image analysis methods showed the natural history response including treatment, progression, and resolution of established disease.

STUDY DESIGN & METHODS

Fifty-nine subjects were enrolled in this 3 phase study:
• Phase 1 (Hygiene phase): oral health of all 59 subjects was promoted via prophylaxes at days 0 and 7 and twice daily supervised brushing for 2 weeks
• Phase 2 (Induction phase): all subjects had all oral hygiene suspended for 21 days in order to induce gingivitis
• Phase 3 (Treatment phase): subjects were randomly assigned to one of two treatment groups: Combination or Combination + Rinse

Gingivitis and plaque were measured using gingivitis image analysis (GIA) to assess ΔG, and fluorescein-disclosed digital plaque image analysis (DPIA) to assess area % coverage before and after brushing.

RESULTS

Both DPIA and GIA showed statistically significant changes consistent with natural history.

Visualizations of Regions with the Largest Gum Color Changes

Intensity of blue color is proportional to mean ΔG. For the Combination treatment group. Similar changes were observed for the Combination + Rinse group. No adverse events were recorded or observed during the study.

CONCLUSIONS

In an induced gingivitis study, concurrent instrumental gingivitis and plaque digital image analysis methods showed the natural history response including treatment, progression, and resolution of established disease.