

ABSTRACT

Efficacy of vital tooth bleaching with peroxide is well-established, especially where treatment is rendered under supervision after dental prophylaxis. Although common, few studies have critically evaluated the role of prophylaxis in bleaching. To examine these effects, 63 adults with tooth discoloration and extrinsic stain were enrolled in an 8-week clinical trial, and randomized to either a prophylaxis or no prophylaxis group. After cleaning (prophylaxis group only), subjects underwent a 2 week, 10% carbamide peroxide bleaching regimen using a custom tray. Anterior tooth color and extrinsic stain were measured by reflectance spectroscopy and visual grading at baseline, at weeks 1 & 2 during bleaching, and at weeks 4 & 8 after bleaching. A total of 60 subjects completed the study. While both groups were brighter (DL*) and less yellow (Db*) at 2 weeks (p<0.001), there were no significant between group differences in L*a*b* scores. At 8 weeks, adjusted DL* means were 3.23 and 2.37 for the prophylaxis and no prophylaxis groups respectively, with these groups differing in brightness (p=0.03). There were no between group differences in yellow, as the adjusted Db* mean after prophylaxis was -1.08 versus -1.38 without prophylaxis. Relative to baseline, the no prophylaxis group had significantly reduced (p<0.001) overall stain scores during treatment, but not thereafter. Although stain accumulated rapidly in the prophylaxis group, overall mean stain scores at 8 weeks were approximately one-half the no prophylaxis group mean. Tooth sensitivity was reported by 14 subjects (22% of the population), 7 in each group. **While vital bleaching was effective with or without prophylaxis, prior professional cleaning contributed to improved post-treatment outcomes.**

INTRODUCTION

Since its introduction in the late 1980's, at-home vital tooth bleaching with carbamide peroxide and custom trays has been shown to be an effective way to whiten discolored teeth, and has become increasingly popular and common. Current protocol before initiation of the regimen generally mandates the provision of a dental prophylaxis to remove all surface stains, however the criticality of a pre-bleaching prophylaxis for positive whitening outcomes has not been

established. This new research evaluated the impact of a pre-treatment prophylaxis on short- and longer-term tooth whitening and extrinsic stain results following a 2-week home bleaching regimen.

MATERIALS AND METHODS

This 8-week, parallel group, randomized, examiner-blind clinical trial assessed the impact of a pre-treatment prophylaxis on tooth whitening and stain removal in subjects undergoing a vital tooth bleaching program. At baseline subjects were randomized to either a prophylaxis or no prophylaxis group, then the prophy group received a dental cleaning and subjects in both groups initiated a 2-week home-use bleaching regimen with a commercial 10% carbamide peroxide gel (Opalescence®, Ultradent Products, Inc., South Jordan, UT USA) and custom trays. Generally healthy adults with anterior facial tooth discoloration (shade guide "A3" or darker) and measurable extrinsic stain were enrolled. Effectiveness measurements were performed at

Weeks 1 and 2 of active treatment, and at Weeks 4 and 8 post-baseline (Figure 1). Throughout, subjects brushed ad libitum with Crest® Regular dentifrice (The Procter & Gamble Co., Cincinnati, OH USA).

Effectiveness Measurements

OBJECTIVE Reflectance Spectroscopy

- **Digital Imaging** (Fuji HC1000 CCD, Fuji Photo Film Co., Tokyo, Japan) Numerical values were derived from tooth color changes within the parameters of L* (whiteness/brightness) and b* (yellowness). By visit, L* and b* scores were obtained for each subject by averaging values for teeth #8 and #9 (colorimeter) or for all incisors (imaging).

SUBJECTIVE Visual

- **Lobene Stain Index** (Lobene, JADA 1968). Stain intensity and area were scored on the gingival and body regions of all anterior teeth using a 4-point scale ranging from '0' (no stain) to '3' (intensity 'heavy' or area 'greater than 2/3 of region'). Averaging all graded tooth surface values per subject produced single intensity and area scores by visit.

RESULTS

The 57 evaluable subjects completing the trial had a mean age of 46.3 years and were predominately Caucasian (68%) and male (63%). Both groups had substantial, comparable baseline stain and discoloration (Table 1).

Table 1 Baseline Stain and Discoloration (Evaluable Subjects)

Mean	Prophy Group (N = 26)	No Prophy Group (N = 31)
Lobene Stain Intensity ¹	0.83	0.83
Lobene Stain ¹	0.71	0.71
Digital Imaging L*/b*	66.54†/23.70†	65.94/23.28

¹Combined body and gingival regions †Post-prophy

After bleaching, both groups realized significant (p 0.0001) increases in tooth brightness (DL) at every time point, with maximum brightness at Week 2. Significant (p 0.0044) decreases in yellowness relative to pre-treatment (Db*) were seen in both groups at all time points. Between-group comparisons revealed no significant differences in Db* scores, where adjusted means were -1.08 and -1.38 for the prophy and no prophy groups, respectively.

However, significant ($p = 0.03$) differences in increased whiteness favoring the prophy group occurred at Week 8, with adjusted DL* means of 3.23 for the prophy group and 2.37 for the no prophy group (Figure 2).

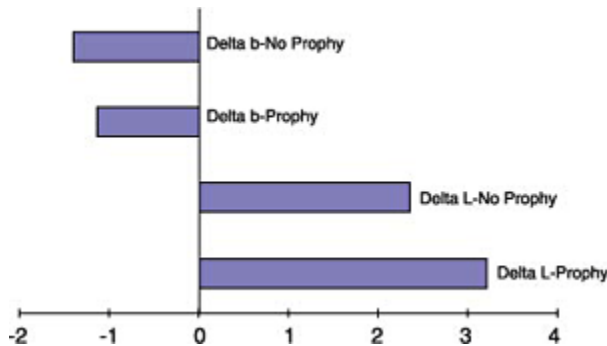
The no prophy group had significant ($p 0.0128$) Lobene stain reductions vs. baseline during active bleaching, peaking at Week 2. Stain then increased rapidly until approaching baseline levels by Week 8. While stain similarly increased in the prophy group after bleaching, mean Week 8 scores were approximately 1/2 to 2/3 the means of the no prophy group (Table 2).

Table 2. Lobene Stain ANCOVA Week 8 Results (Evaluable Subjects)

Adjusted Means ^a	
Body Area	Ging Area
0.35	0.40
0.68	0.60
Body Items	Ging Items
0.42	0.48
0.75	0.80

^a Means are adjusted with baseline score as the covariate

Figure 2 - Effect of Prophylaxis On Whitening Efficacy
8 weeks post treatment - 10% Carbamide Peroxide



Safety profiles for the groups were similar, with 7 subjects per group (22% of the population) reporting tooth sensitivity. No subject discontinued early due to an adverse event, and 97% of all events were mild in nature.

CONCLUSION

-Changes in tooth yellowness (b^*) and safety outcomes following bleaching with carbamide peroxide were similar whether or not subjects had a pre-bleaching prophylaxis.

-Pre-bleaching prophylaxis provided a significant increase in tooth whiteness (L^*) and less extrinsic stain at 6 weeks after cessation of bleaching, relative to no prophylaxis.