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A. Koniaris

Vasileios Margaritis
Walden University, vasileios.margaritis@waldenu.edu

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CHALLENGING THE EFFICACY OF DIFFERENT DENTAL BLEACHING PROTOCOLS. AN IN VITRO STUDY

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A. Koniaris*, V. Margaritis, M. Antoniadou and A. Kakaboura

OPERATIVE DENTISTRY DEPARTMENT, DENTAL SCHOOL, UNIVERSITY OF ATHENS, GREECE

PURPOSE. Investigation of the *in vitro* efficiency of four dental bleaching protocols on the color change of teeth, stained by a black tea solution.

MATERIALS AND METHODS. One hundred intact, extracted, human incisors were randomly divided (n=4x25/group) and underwent black tea staining {2gr black tea (M&S Fairtrade Earl Grey) at 100ml boiled distilled water}, for seven days in room temperature (Fig.1).

The bleaching protocols applied per group were[1-4]:

A. 14 days x 120 min/day 10% CP (Opalescence PF 10%, Ultradent) with trays (bleaching at home-BH),

B. 2 times x (3 appl/time x 15min) 40% HP, (Opalescence Boost 40%, Ultradent) (bleaching in office-BO1),

C. 3 times x (3 appl/time x 15min) 40% HP, (Opalescence Boost 40%, Ultradent) (bleaching in office-BO2) and,

D. 14 days x 120 min/day 10% CP with trays and 2 times x (3appl/time x 15 min) 40% HP (combined BH-BO1).

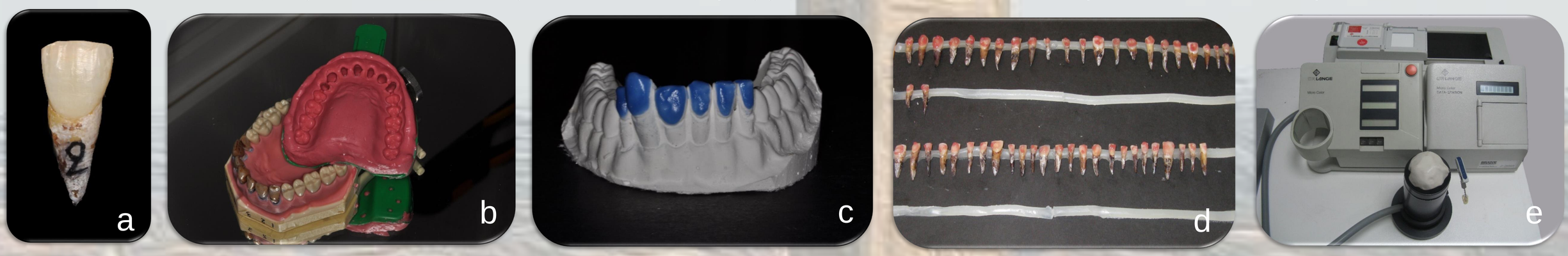

Fig. 1. Materials and methods of the study: a.Tooth numbering, b. Stained natural teeth fixed on frasaco and impression taking, c. Dental cast for splint preparation d. In–office whitening for groups B and C, e.Colorimeter.

The color measurements were conducted at baseline (t_0) and after staining (t_1), bleaching application (t_2), 90 (t_3) and 180 (t_4) days, with a colorimeter (Dr Lance Micro Colour, Braive Instruments) in CIEL*a*b* system. ΔE values were calculated relative to t_0 and analyzed by three-way ANOVA, Mann-Whitney U and Wilcoxon tests (a=0.01).

RESULTS. There were no group-depended differences for ΔE values and L* was significantly different at all times for all groups.

All groups presented augmenting L* values from t_1 to t_2 and diminishing from t_2 to t_4 (Fig.2). BH had significant differences in L* values at all-times. At t_3 and t_4 the lowest L* and the highest ΔE were reported for BH while the requested combination of a high L* and a low ΔE was reported to be best for BH-BO1 (Table 1).

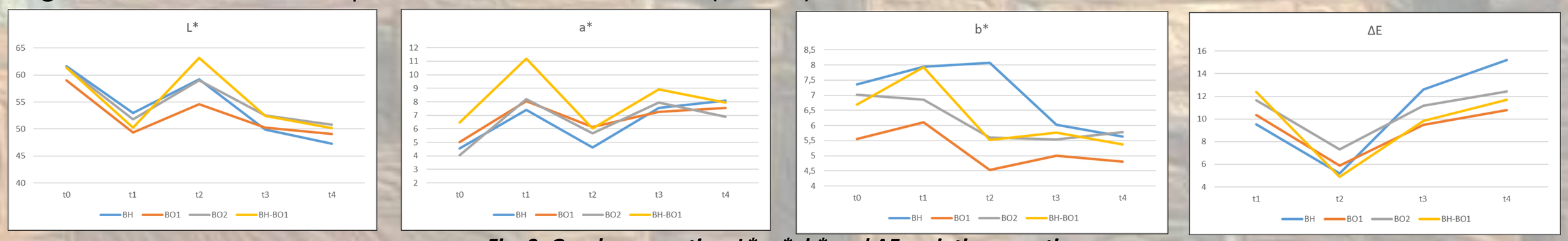

Fig. 2. Graphs presenting L*, a*, b* and ΔE variation over time

ΔE

Whitening protocols	t_1 (baseline)	t_2 (after staining)	t_3 (90 days)	t_4 (180 days)
Group 1 (BH)	9,53 (±5,61) [1,2,3]	5,20 (±4,05) [1,4,5]	12,59 (±6,43) [2,4,6]	15,22 (±6,47) [3,5,6]
Group 2 (BO1)	10,36 (±4,27) [1]	5,87 (±5,04) [1,2,3]	9,48 (±3,17) [2,4]	10,77 (±3,37) [3,4]
Group 3 (BO2)	11,67 (±5,93) [1]	7,31 (±4,66) [1,2,3]	11,19 (±6,63) [2]	12,43 (±5,94) [3]
Group 4 (BH-BO1)	12,41 (±5,31) [1,2]	4,88 (±2,89) [1,3,4]	9,84 (±4,55) [2,3,5]	11,71 (±4,61) [4,5]

Table 1. Mean ΔE values for all groups at all times. Same numbers within the rows for each parameter (L*, a*, b*) indicate statistically significant differences between time points for each group/row, Friedman test and post-hoc Wilcoxon Signed Ranks test, p<0.01.

CONCLUSIONS. In-office, at-home and combined bleaching protocols proved to be equally efficient although several differences were detected concerning color coordinates. All protocols tested provided significant color change in stained teeth just after bleaching within the same group. BH had the highest relapse, while BH-BO1 reported better bleaching efficiency at 6 months.

Literature

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