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Challenging the efficacy of different dental bleaching protocols

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

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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 were1-4:
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).

The color measurements were conducted at baseline (t0) and after staining (t1), bleaching application (t2), 90 (t3) and 180 (t4) days, with a colorimeter (Dr Lance Micro Colour, Brave Instruments) in CIEL*a*b* system. ΔΕ values were calculated relative to t0 and analyzed by three-way ANOVA, Mann-Whitney U and Wilcoxon tests (α=0.01).

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

All groups presented augmenting L* values from t1 to t2 and diminishing from t3 to t4 (Fig.2). BH had significant differences in L* values at all-times. At t2 and t4 the lowest L* and the highest ΔΕ were reported for BH while the requested combination of a high L* and a low ΔΕ was reported to be best for BH-BO1 (Table 1).

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.

Table 1. Mean ΔΕ 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.

<table>
<thead>
<tr>
<th>Whitening protocols</th>
<th>t1 (baseline)</th>
<th>t2 (after staining)</th>
<th>t3 (90 days)</th>
<th>t4 (180 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (BH)</td>
<td>9.53 ±5.61</td>
<td>5.20 ±4.05</td>
<td>12.59 ±6.43</td>
<td>15.32 ±6.47</td>
</tr>
<tr>
<td>Group 2 (BO1)</td>
<td>10.36 ±4.27</td>
<td>5.87 ±5.04</td>
<td>9.48 ±3.17</td>
<td>10.77 ±3.37</td>
</tr>
<tr>
<td>Group 3 (BO2)</td>
<td>11.67 ±5.93</td>
<td>7.31 ±4.66</td>
<td>11.19 ±6.63</td>
<td>12.43 ±5.94</td>
</tr>
<tr>
<td>Group 4 (BH-BO1)</td>
<td>12.41 ±5.31</td>
<td>4.88 ±2.89</td>
<td>9.84 ±4.55</td>
<td>11.71 ±4.61</td>
</tr>
</tbody>
</table>

Literature