Research abstract

British Dental Journal 204, E15 (2008)
Published online: 11 April 2008 | doi:10.1038/sj.bdj.2008.291

Subject Category: Aesthetic dentistry

An *in vitro* comparison of tooth whitening techniques on natural tooth colour

A. Patel[1], C. Louca[2] & B. J. Millar[3]

- Supports the use of 10% carbamide peroxide for tooth whitening.
- This regime offers benefits over certain other whitening treatments and provides a similar benefit to power whitening with a halogen light.
- The whitening effect reduces over time after treatment is complete.
- There is a temperature rise within the tooth when using laser whitening.

Abstract

Objective Tooth whitening has become a popular treatment regime but there is little quantitative evidence to compare techniques and so confusion may exist for the clinician as to which regime to prescribe for greatest efficacy. The aim of this study was to compare immediate and longer-term colour change on natural tooth colour *in vitro*, using five current tooth whitening techniques with blind matched control groups.

Methods A total of 100 human teeth of matched size were cleaned, stored in sterile deionised water at 4°C then randomly allocated to one of the five active treatment groups or five matched control groups. The active treatments were: 10% carbamide peroxide (CP) ×60 min, 35% CP ×30 min or 35% hydrogen peroxide (HP) treatment ×30 min activated by one of three sources of energy (diode laser, halogen light, and plasma arc curing light). Tooth colour was analysed with a colorimeter before and after treatment: immediate, one week and nine months post-bleaching designed to generate tooth colour value (L^*) according to the L^*a^*b system. The change in colour was determined as ΔL (the difference in the value of the colour) for each tooth, then the mean differences were obtained for each group and compared. Tooth surface temperature was monitored.

Results Comparing active treatments with controls it was found that 10% CP, 35% CP, 35% HP with halogen provided significantly greater tooth whitening. Comparing the different treatments showed that 10% CP was significantly more effective ($P < 0.05$) than all other treatments except 35% HP with halogen activation. The effect of each treatment regime over time showed that the 10% CP gave a significant gain immediately and one week later ($P < 0.05$), however, all the whitening effects were lost over time following these single treatments. The temperature rise on the tooth surface was greatest when using laser activation during power whitening.

Conclusion This study suggests that 10% CP is an effective technique for tooth whitening and can offer significant benefits over alternative regimes.

---

1. Dental Student, King's College London
2. Senior Clinical Teaching Fellow, Eastman CPD, UCL Eastman Dental Institute, London
3. Director of Distance Learning, Senior Lecturer and Consultant in Restorative Dentistry, King's College London Dental Institute, London