

In vitro efficacy and risk for adverse effects of light-assisted tooth bleaching.

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Abstract

The use of optical radiation in the so-called light-assisted tooth bleaching procedures has been suggested to enhance the oxidizing effect of the bleaching agent, hydrogen peroxide. Documentation is scarce on the potential adverse effects of bleaching products and on optical exposure risks to eyes and skin.

The efficacy of seven bleaching products with or without simultaneous use of seven different bleaching lamps was investigated using extracted human teeth. The bleaching effect was determined immediately after treatment and one week later. Tooth surfaces were examined for adverse alterations after bleaching using a scanning electron microscope. Source characteristics of eight lamps intended for tooth bleaching were determined. International guidelines on optical radiation were used to assess eye and skin exposure hazards due to UV and visible light emission from the lamps.

Inspection of teeth one week after bleaching showed no difference in efficacy between teeth bleached with or without irradiation for any of the products. Scratches, probably from the cleaning procedure were frequently seen on bleached enamel irrespective of irradiation. Maximum permissible exposure time ($t(\max)$) and threshold limit values were exceeded for about half the bleaching lamps investigated. One lamp exceeded $t(\max)$ even for reflected blue light within the treatment time. This lamp also exceeded $t(\max)$ values for UV exposure.

The lamps were classified as "low risk" and as borderline to "moderate risk" according to a relevant lamp standard.

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