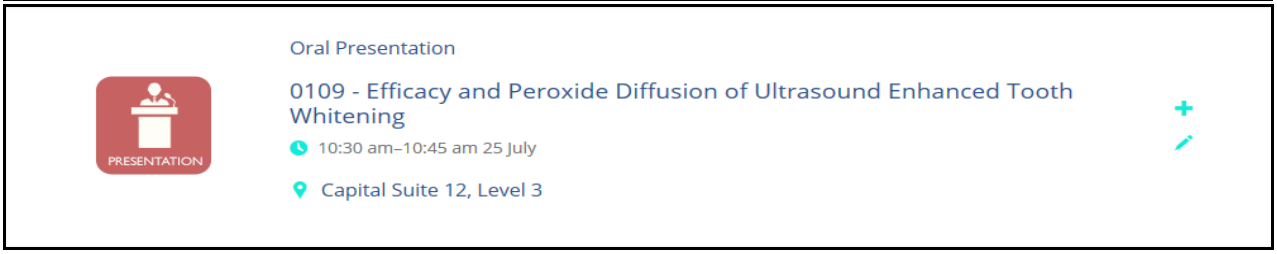

Description

Title: 0109 - Efficacy and Peroxide Diffusion of Ultrasound Enhanced Tooth Whitening

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Abstract:

Objectives: To assess the efficacy of a novel ultrasound enhanced tooth whitening technology and evaluate its effect on diffusion of hydrogen peroxide through dental enamel.

Methods: Fifty-four enamel disks 1.0mm in thickness were prepared from bovine incisors. Half of the enamel disks were immersed in coffee solution (55°C) for 24h, washed for 30s to create discolored enamel specimens, which were divided into 3 groups and subjected to whitening with 35%H_2O_2 gel alone (GEL), 35%H_2O_2+light (GEL/LT), and 35%H_2O_2+light+40KHz ultrasound (GEL/LT/US), respectively. Whitening efficacies were measured with a spectrophotometer at 5, 15, 30, 45 and 60 minutes. The remaining 27 specimens were divided into 3 groups and mounted on artificial pulp chambers placed in sterile cells containing 1.0ml acetate buffer. To assess peroxide diffusion, enamel surfaces were treated with GEL, GEL/LT and GEL/LT/US as above, and diffused peroxide concentration (μg/ml) was calculated at different treatment intervals using

a leucocrystal violet/horseradish peroxidase assay. CIE Lab color changes (ΔE) and peroxide diffusion were compared among the 3 groups.

Results: There were no significant differences in ΔE at 5 minutes among the three groups, but ΔE were statistically significant higher in GEL/LT and GEL/LT/US than in GEL at 15 minutes, and higher in GEL/LT/US than in GEL and GEL/LT at 30, 45 and 60 minutes. It took 30 minutes for ΔE to reach 17.5 in GEL/LT/US (an equivalent of 10 shades change from A4 to A2), as compared to 60 minutes in GEL/LT group (Table 1). Diffusion of peroxide through enamel was significantly higher in GEL/LT/US than in GEL and GEL/LT at 5 and 10 minutes. GEL/LT and GEL/LT/US showed significantly higher diffusion of peroxide than in GEL throughout experimental period (Table 2).

Conclusions: Ultrasound enhanced efficacy of light-assisted tooth whitening and accelerated diffusion of hydrogen peroxide through dental enamel *in vitro.*

Table(s):

Group**	5 min	15 min	30 min	45 min	60 min
GEL	3.8±3.1a	7.3±2.8b	9.3±3.2d	11.5±4.3e	13.2±4.0f
GEL/LT	4.7±1.6a	9.2±1.4c	11.6±2.3d	13.7±3.3e	17.5±4.5f
GEL/LT/US	4.4±2.7a	11.8±4.0c	17.6±6.5e	21.3±8.0f	23.5±8.7g

Group	5 min	10 min	15 min	30 min	45 min	60 min
GEL	0.3±0.1a	0.9±0.5b	1.2±0.5e	4.6±0.9g	6.6±0.9j	8.6±0.5m
GEL/LT	1.4±0.6b	2.2±1.2c	5.4±1.2f	6.8±0.9h	9.3±0.8k	10.2±0.7n
GEL/LT/US	3.2±0.6c	4.6±1.1d	5.5±1.0f	6.9±0.5h	9.4±0.6k	10.2±.0.6n

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The submitter must disclose the names of the organizations with which any author have a relationship, the nature of the relationship, and the clinical or research area involved. The following is submitted: **None**