



Effect of Experimental Office Whitening Gel on Human Enamel

0401

Y. LI, Z. LIN, W. ZHANG, S.S. LEE, O. ONYANGO, and J.S. KIM* • Loma Linda University, CA, USA

PURPOSE

To evaluate effects of experimental office tooth whitening gel on human enamel surface microhardness and morphology.

METHODS AND MATERIALS

- Human enamel specimen (Δ3 mm, surface polished with 0.05 μm Gamma Alumina) measured for Knoop Hardness Number (KHN, Leco Microhardness Tester, M-400-HI, St. Joseph, MI)
- Whitening gel treatment followed manufacturer's instructions

Experiment A

Group	N	Treatment	Duration/Replicates	No. of Replicates
Control	5	Saliva	20 minutes	3
Experimental	10	Experimental Gel	20 minutes	3

- Enamel surface covered with Experimental Gel (Discus Dental, Culver City, CA) at 1 to 2 mm thick
- Samples exposed to Zoom! Light at distance of 1-inch for 20 minutes
- Gel removed, sample rinsed with deionized water and briefly air-dried
- Treatment repeated for two more times
- Control samples treated with human saliva using the same procedures
- After the final gel treatment, enamel surface treated with FluorideX (Discus Dental) for 5 minutes

Experiment B

Group	N	Treatment	Duration/ Replicates	No. of Replicates
Control	5	Saliva	15 minutes	3
Experimental	10	Zoom2 Gel	15 minutes	3

- Zoom2 Gel (Discus Dental)
- Balancing Pre-Treatment Gel (Discus Dental) applied to enamel surface
- The enamel surface covered with Zoom2 Gel at 1 to 2 mm thick
- Samples exposed to Zoom2 Light at distance of 1-inch for 15 minutes
- Gel removed, sample rinsed with deionized water and briefly air-dried
- Treatment repeated for two more times
- Control samples treated with human saliva using the same procedures
- After the final gel treatment, enamel surface treated with Satin Finish Gel for 5 minutes

- Treatment specimens measured for KHN again and then prepared for SEM evaluation
- Data Analysis
 - KHN: within and between treatment effects analyzed by Student t-test
 - SEM: descriptive

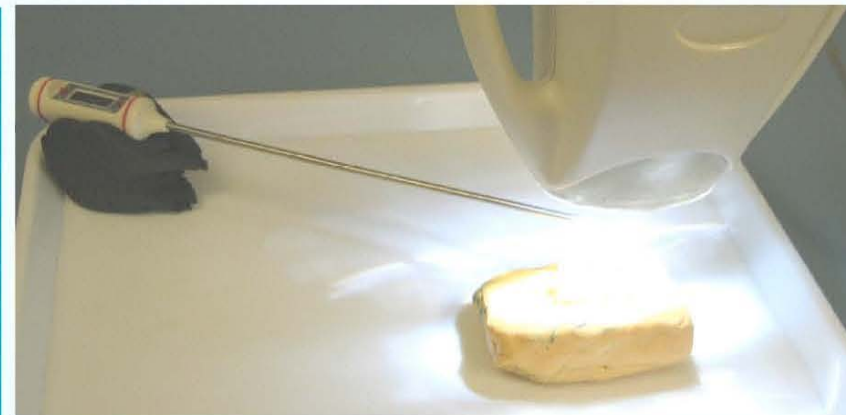
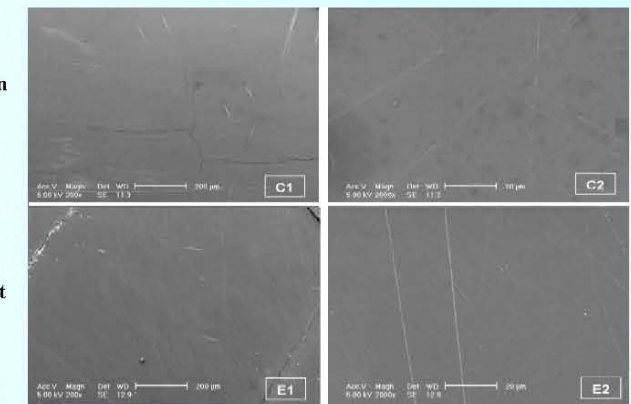


Fig. 1. SEM photomicrographs of human enamel surfaces treated with pooled human saliva (control) at 200x magnification (C1) and 2,000x magnification (C2) compared to those treated with Experimental Gel (three 25-minute sessions under Zoom! Light) followed with FluorideX Daily Defense treatment at 200x magnification (E1) and 2,000x magnification (E2).



RESULTS

Table 1. Effect of Experimental Gel Treatment Procedure on Knoop Microhardness of Human Enamel

Group	N	Knoop Hardness Number (Mean ± SD) ^a			
		Pre-treatment	Post-treatment	Change	p-value ^b
Control (saliva)	5	316.8 ± 13.6	304.9 ± 12.0	-11.8 ± 14.6	0.266
Experimental Gel	10	317.0 ± 17.6	303.2 ± 23.7	-13.8 ± 28.2	0.157
p-value		0.983	0.884	0.885	

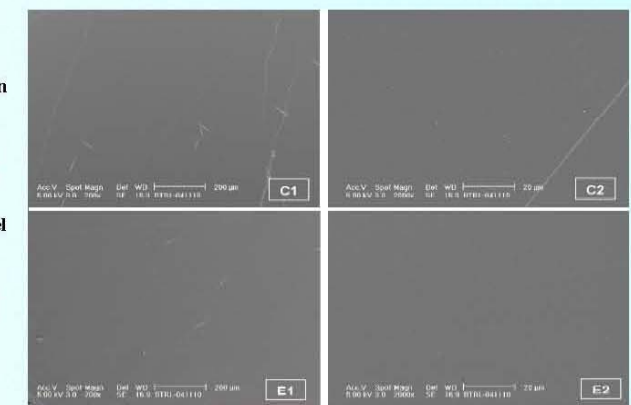
- a Values with brackets are not significantly different as determined using Student t-test.
 b Comparison between pre- and post-treatment values using the Student t-test.

Table 2. Effect of Zoom2 Gel Treatment Procedure on Knoop Microhardness of Human Enamel

Group	N	Knoop Hardness Number (Mean ± SD) ^a			
		Pre-treatment	Post-treatment	Change	p-value ^b
Control (saliva)	5	308.8 ± 26.8	303.7 ± 12.1	-5.1 ± 28.0	0.708
Discus Zoom2 Gel	10	309.2 ± 13.0	313.6 ± 9.7	4.4 ± 15.8	0.403
p-value		0.969	0.109	0.409	

- a Values with brackets are not significantly different as determined using Student t-test.
 b Comparison between pre- and post-treatment values using the Student t-test.

Fig. 2. SEM photomicrographs of human enamel surfaces treated with pooled human saliva (control) at 200x magnification (C1) and 2,000x magnification (C2) compared to those treated with Balancing Pre-Treatment Gel, Zoom2 Gel (three 15-minute sessions under Zoom2 Light) followed with Satin Finish Gel at 200x magnification (E1) and 2,000x magnification (E2).



CONCLUSION

Under conditions of the study, treatment with Discus Experimental Office Whitening Gel or Zoom2 Gel following manufacturer's instructions does not adversely affect the microhardness and surface morphology of human enamel.

ACKNOWLEDGMENT

The project was sponsored by Discus Dental, Culver City, CA.