

# In Vitro Evaluation of Staino® iClean® For Stain Removal Potential

## Objective

The objective of this *in vitro* study was to evaluate the stain removal potential of Staino® iClean® compared to two commercially available prophylaxis angles.

## Methods

Sound enamel specimens were prepared and stained with a coffee, tea, mucin, FeCl<sub>3</sub> and *Sarcina lutea* solution to produce a pellicle stain on the surface of the enamel specimens. Colorimetric evaluation of the specimens was performed using the CIELAB color space scale at baseline and following treatment. The  $\Delta L^*$  value (change in whiteness/lightness) and  $\Delta E^*$  (overall color change) were determined for each treatment group. The prophylaxis angles tested were: (1) Staino® iClean® (2) Acclean Soft Webbed and (3) Young Soft Webbed. All treatments were performed for 6-seconds utilizing Nupro fine grit prophylaxis paste.

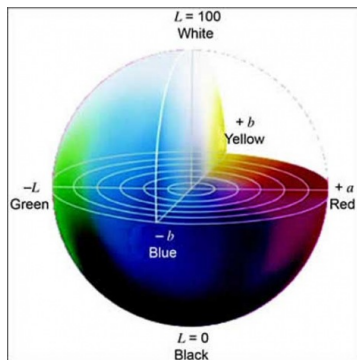


Figure 1: CIELAB Color Space

## Results

The stained enamel specimens treated with the Staino® iClean® exhibited a mean (N=16)  $\Delta L^*$  value of 20.31 and  $\Delta E^*$  value of 20.82 following treatment. Both values were numerically greater than that exhibited by the Acclean Soft Webbed ( $\Delta L^*$  = 14% less;  $\Delta E^*$  = 13% less) and Young Soft Webbed ( $\Delta L^*$  = 19% less;  $\Delta E^*$  = 19% less). The Staino® iClean® exhibited statistically greater ( $P \leq 0.050$ ) changes in both  $\Delta L^*$  and  $\Delta E^*$  values following treatment compared to the Young Soft Webbed treatment group.



Figure 2: Stained Enamel Specimens at Baseline

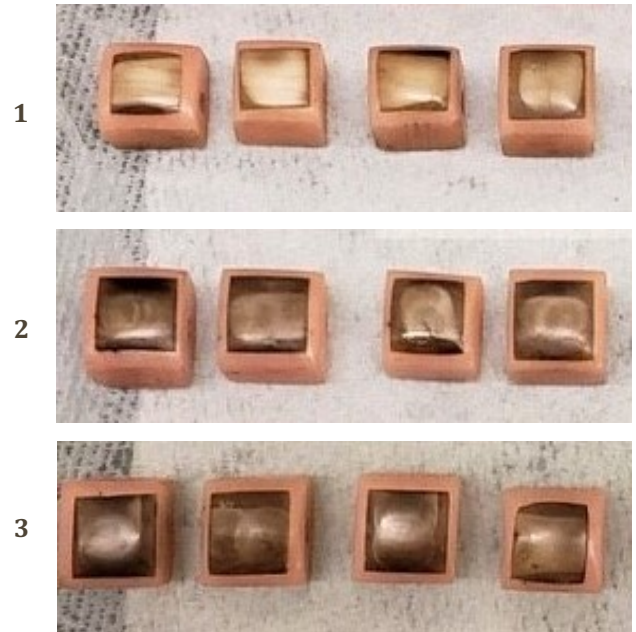


Figure 3: Post Treatment Enamel Specimens  
(1) Staino iClean® (2) Acclean (3) Young

## Conclusions

The Staino® iClean® was significantly more effective at removing pellicle stain from enamel specimens *in vitro* compared to the Young Soft Webbed prophylaxis angle and demonstrated numerically greater stained pellicle cleaning potential compared to the Acclean Soft Webbed prophylaxis angle. The Staino® iClean® exhibited significant stain removal potential as determined by colorimetric evaluation and was visually apparent as shown in the baseline and post treatment images.

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# In Vitro Evaluation of Staino® iClean® For Stain Removal and Enamel Abrasivity

## Objective

The objective of this *in vitro* study was to (a) evaluate the stain removal potential from pellicle stained enamel specimens and (b) determine the relative enamel abrasion (REA) provided by the Staino® iClean®.

## Methods

### Stained Pellicle Removal Study

Sound enamel specimens were prepared and stained with a coffee, tea, mucin, FeCl<sub>3</sub> and Sarcina lutea solution to produce a pellicle stain on the surface of the enamel specimens.<sup>1</sup> Colorimetric evaluation of the specimens was performed using the CIELAB color space scale at baseline and following treatment with the Staino® iClean®.

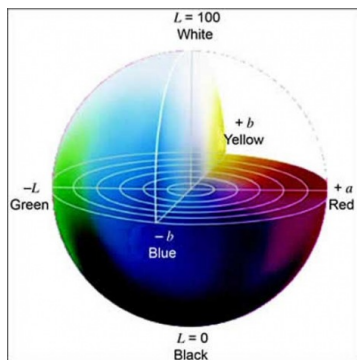


Figure 1: CIELAB Color Space

### Relative Enamel Abrasion Study

Determination of relative enamel abrasion (REA) was performed using the ANSI/ADA No. 62 procedure, which evaluates the quantity of radioactive <sup>32</sup>P abraded from activated human enamel specimens following treatment in comparison to a reference standard.<sup>2</sup>

#### References

1. Stookey G.K., Burkhard T.A., Schemehorn B.R. *In vitro Removal of Stain with Dentifrices.* J Dent Res 61(11): 1236-1239, Nov 1982.
2. ANSI/ADA Specification No. 62 (2010) – Dental Abrasive Pastes.
3. Mokrzycki, Wojciech & Tatol, Maciej. (2011). Color difference Delta E - A survey. Machine Graphics and Vision. 20. 383-411.

## Results

### Stained Pellicle Removal Study

The Staino® iClean® offered significant ( $P < 0.05$ ) reduction in stained pellicle present on the enamel specimens following treatment, as determined by  $\Delta L^*$ ,  $\Delta a^*$ ,  $\Delta b^*$  measurements. From these measurements the overall color change,  $\Delta E^*$ , was calculated. **The stained enamel specimens treated with the Staino® iClean® demonstrated a Mean  $\Delta E^*$  (N=16) of 26.47, which is indicative of an observer noticing two different colors.<sup>3</sup>**



Figure 2: Baseline Stained Enamel Specimens



Figure 3: Post Treatment with Staino® iClean®

### Relative Enamel Abrasion Study

The Staino® iClean® exhibited a Mean (N=8) REA value of 2.53. The reference standard is assigned a REA value of 10.0. **The Staino® iClean® was minimally abrasive to enamel and was approximately 4x less abrasive to enamel compared to the reference standard.**

## Conclusions

The Staino® iClean® was effective at removing pellicle stain while exhibiting minimal abrasion to enamel following treatment *in vitro*.

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