

## BACKGROUND

**Purpose:** The benefits of using Chlorhexidine Gluconate mouth rinse in helping treat gingivitis and to promote post-surgical healing have long been established due to its bactericidal and bacteriostatic properties. A well documented side effect of using the mouth rinse is extrinsic staining due to its di-cationic structure. Several studies have evaluated the degree of extrinsic staining on sound enamel but there seems to be a paucity of information on the effects of Chlorhexidine mouth rinse on demineralized enamel. The purpose of this study is to examine the staining effects of 0.12% Chlorhexidine Gluconate mouth rinse on sound enamel compared to demineralized enamel using a digital colorimeter.

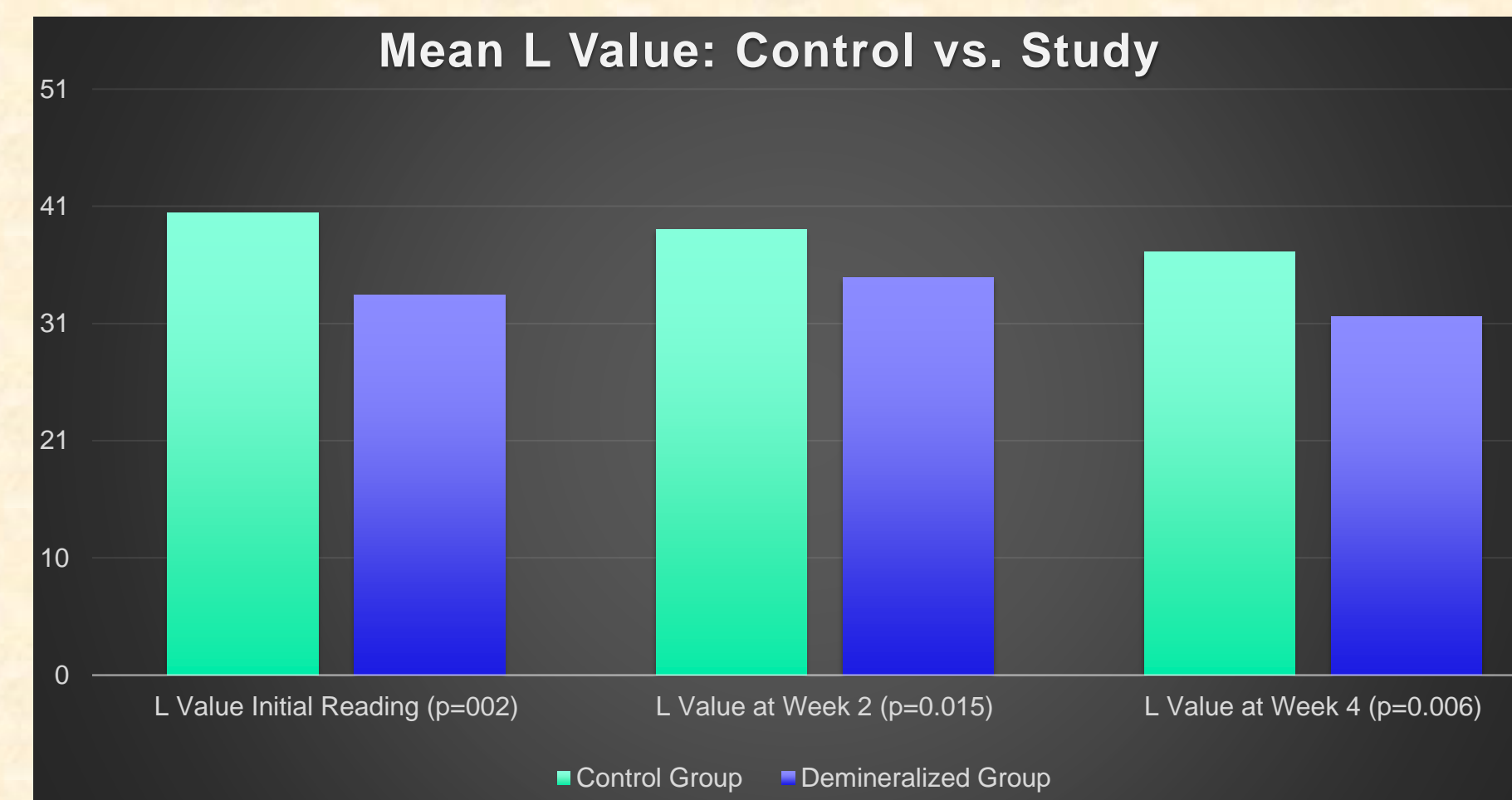
## MATERIALS and METHODS

Previously extracted permanent teeth consisting of incisors, canines, and premolars were randomly divided into two groups. All teeth were visually inspected for signs of demineralization. Any tooth that showed evidence of demineralization or signs of defective enamel were not used for the study. A total of thirty-two teeth were chosen for the study. Through the course of the study, six of the seventeen demineralized samples experienced “chipping” of the enamel surface and were removed from the study. At the end of the study, eleven demineralized enamel samples (Study Group) were compared to fifteen healthy enamel samples (Control Group). The demineralized group was subject to immersion in artificial caries challenge solution with a pH of 4.4 for 4 days to simulate artificial incipient enamel caries. The artificial caries solution consisted of 2.2 mM  $\text{Ca}^{+2}$ , 2.2 mM  $\text{PO}_4^{-3}$ , 50 mM acetic acid. The control group was not subject to artificial caries challenge solution.

## MATERIALS and METHODS cont.

The control group and the study group were subject to immersion in Chlorohexidine Gluconate 0.12% mouth rinse every day for thirty days to simulate twice a day rinsing with the mouth rinse (60 seconds daily). After immersion of the samples both groups were rinsed with artificial saliva and stored in separate artificial saliva mediums. The artificial saliva was exchanged with a fresh solution every three days. All samples were measured with a Konica Minolta LAB Colorimeter at baseline, on day 15, and on day 30. The values (L, A, and B) were recorded and analyzed using descriptive statistics.

## RESULTS



	Control Group	Demineralized Group
L Value Initial Reading (p=0.002)	40.431	33.253
L Value at Week 2 (p=0.015)	38.977	34.741
L Value at Week 4 (p=0.006)	37.016	31.369

At 15 days there was a difference in color change for both groups, but the difference was not statistically different ( $P < .05$ ). At 30 days there was a difference in color change for both groups. The control group showed a color change that was statistically different on day 30 compared to initial baseline values. The study group showed color change that was not statistically different at day 30 compared to initial baseline values.

## CONCLUSIONS

At 4 weeks of twice-daily use of Chlorhexidine Gluconate mouth rinse, there is a significantly higher degree of staining for non-demineralized enamel compared to demineralized enamel. The findings should help alleviate any consternation clinicians may be facing when prescribing Chlorhexidine Gluconate rinse for patients presenting with generalized enamel demineralization.

The etiology of Chlorhexidine staining has not been fully understood but a possible mechanism is that it is caused by an interaction or precipitation of dietary chromogens (plaque) with locally absorbed Chlorhexidine<sup>1</sup>. This study did not assess the degree of staining of sound enamel and demineralized enamel in the presence of plaque. Patients presenting with generalized demineralization are suspected of having higher levels of dietary chromogens present in the oral cavity.

In-vivo studies would be indicated to evaluate the effect that plaque has on the degree of staining.

## REFERENCES

1. Zanatta FB, Antoniazzi RP, Rösing CK. Staining and calculus formation after 0.12%chlorhexidine rinses in plaque-free and plaque covered surfaces: a randomized trial. J Appl Oral Sci. 2010 Sep-Oct; 18(5): 515–520.
2. James P, Worthington HV, Parnell C, Harding M, Lamont T, Cheung A, Whelton H, Riley P. Chlorhexidine mouthrinse as an adjunctive treatment for gingival health (Review). Cochrane Database of Systematic Reviews. 2017, Issue 3.
3. Kalantari MH, Ghorashian SA, Mohaghegh M. Evaluation of accuracy of shade selection using two spectrophotometer systems: Vita Easyshade and Degudent Shadepilot. Eur J Dent. 2017 Apr-Jun; 11(2): 196–200.