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Comparison between the effect of commercially available chemical teeth whitening paste and teeth whitening paste containing ingredients of herbal origin on human enamel

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**Summary of the article:**

Chacko Kalliath, Archana Mukunda, Meera Pynadath et al. conducted a study to compare the effects of chemical and herbal whitening toothpaste on enamel. The *in vitro* study was conducted over 14 days and it was published in An International Quarterly Journal of Research in Ayurveda on January 24, 2019 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6369603/>*).*

The study included, 20 samples of extracted premolars were separated into two groups of 10. The first group was treated with the chemical toothpaste and the other group of 10 was treated with toothpaste containing herbal ingredients. After the two weeks of cleansing, all of the premolars were examined under a stereo microscope to compare the surface morphology of each group. The premolars were examined using a Vita 3D shade guide to compare the shades of each group. Based on the tests results, the premolars with the chemical toothpaste demonstrated more surface irregularities compared to the herbal toothpaste. In addition, they had a whiter appearance due to the bleaching ingredients.

The authors concluded that the toothpaste containing herbal ingredients provides less surface irregularities and similar whitening effects of the toothpaste with the bleaching chemicals. Therefore, toothpaste with herbal ingredients has increased commercially.

**Article information:**

The title of the article is *Comparison between the effect of commercially available chemical teeth whitening paste and teeth whitening paste containing ingredients of herbal origin on human enamel*. Chacko Kalliath, Archana Mukunda, Meera Pynadath et al. are the authors of the study. It was published on January 24, 2019 in AYU, An International Quarterly Journal of Research in Ayurveda. The link to the article is <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6369603/> and the DOI link is <https://www.ayujournal.org/article.asp?issn=0974-8520;year=2018;volume=39;issue=2;spage=113;epage=117;aulast=Kalliath>. As stated in the article, there are no conflicts of interest present.

**Study analysis:**

1. **Type of study**

This article is a pre-clinical *in vitro* research study. It was non randomized and conducted over two weeks. The article does not mention where or when it was conducted.

1. **Study purpose**

The purpose of the study is to compare the shade and surface morphology of chemical and herbal whitening toothpaste on human enamel. Chemical whitening toothpaste contains bleaching agents that can remove stains and lightens the shade of the teeth. However, the article states that, “The chemical ingredients in whitening toothpaste cause undesired harmful effects not only on the enamel but also on the soft tissues, resulting in mucosal irritation, ulceration and circumoral dermatitis” (Kalliath et al., 2018). Therefore, it is recently noticed that the general population would prefer the toothpaste with herbal products to avoid the harmful side effects and sensitivity. This has resulted in various herbal origin toothpaste being more commercially available in the market (Kalliath et al., 2018).

1. **Experimental design**

The study was a non-randomized, *in vitro* study that was conducted over 14 days. Twenty premolars, which were extracted for orthodontic purposes, were grouped into two groups. All of the premolars were examined under a stereomicroscope to examine the surface morphology and checked with a Vita 3D shade guide. Once the results were recorded, one group was treated with Colgate Visible White Tooth Paste that contains chemical ingredients including hydrogen peroxide, silica, sorbitol, sodium fluoride, and sodium hydroxide. The other group was treated with Himalaya Sparkling white toothpaste that contains herbal ingredients including meswak, papaya, citrus fruits, and menthol. Throughout the study, the teeth were stored in distilled water and cleansed for 1 minute twice a day. Each premolar was cleansed under tap water with a soft bristled toothbrush containing the specific paste. After the two weeks, the shade and surface morphology of the premolars were evaluated analyzed statistically using a student’s unpaired *t*-test (Kalliath et al., 2018).

1. **Results**

After the two weeks, the changes in the shade of enamel and surface morphology were noted. The changes in both groups were noted as either ‘yes’ with a score of 1 if there was presence or ‘no’ with a score of 0 if there was an absence. These scores were entered electronically into excel sheets using student *t*-test SPSS package 18 for statistical analysis (Kalliath et al., 2018). As seen from the results, the group with the chemical ingredients (Group A) showed more changes in the surface morphology than the one with herbal ingredients (Group B). From the 10 premolars from each group, four had surface morphology present from Group A and two had it present from Group B. Additionally, an unpaired *t*-test performed with a P value of 0.354 for the surface morphology. The results from this test were not statistically significant. When comparing the shades of each tooth with a Vita 3D shade guide, 6 of the teeth from Group A and four of the teeth in Group B showed lightening. The P value from the unpaired student *t*-was 0.1923, which is also not significantly statistical. As seen from the tests, the toothpaste with the chemical ingredients causes a whiter appearance of the surface enamel compared to the toothpaste with herbal ingredients (Kalliath et al., 2018).

1. **Conclusions**

The authors of the article concluded that the herbal and chemical toothpastes have similar whitening effects, however, the herbal ingredients provide less surface changes. This lead to the increase of herbal products in the market that are used to prevent and treat oral diseases while preventing the harmful effects of the bleaching chemicals. Although the premolars that were cleansed with the chemical toothpaste had a whiter appearance in this study, the results were not statistically significant. The authors stated, “In spite of surge in availability of numerous proprietary herbal whitening toothpaste, there is dearth of data regarding their efficacy hence it was not possible to further assess and correlate the findings of the study” (Kalliath et al., 2018). Further investigation can be made with a larger sample size and increase in duration of the study. The authors did not mention what should be studied next, however, they listed herbal products that offer whitening on the teeth. (Kalliath et al., 2018).

1. **My impression**

This study is important because many patients are concerned about the cosmetic appearance of their teeth. As a result, many patients are curious about the ingredients inside of their toothpaste and how it is affecting their health. As a future dental hygienist, it is of great importance to know the different ingredients inside of each tube of dentifrice in order to make the best recommendations to patients. Also, this article has taught me that toothpastes containing herbal ingredients have a similar whitening effect as the chemical ingredients and can create less surface changes. I can apply these findings when I am making recommendations for a whitening dentifrice. I would like to further educate my patients that herbal ingredients in whitening toothpaste can minimize sensitivity and harm to their enamel. This topic is very interesting to me because I use whitening toothpaste and suffer from sensitivity. Now that I have learned more about the benefits of herbal ingredients inside whitening toothpaste, I will look out for them the next time I select my own toothpaste at the supermarket.

After reading the article, I would question the authors on why they chose only 20 premolars to conduct the study on. I believe that they should have treated more premolars to get a more accurate result. Additionally, I would question the authors why they only chose two weeks to conduct the study. In my opinion, I feel the study should have been conducted over a longer period of time. I would question what the results would be if the herbal toothpaste contained fluoride. It was interesting to me to see the different ways herbal products can whiten teeth that are within my normal diet. I would like to learn more about the effects of fluoride on the herbal ingredient toothpaste.

Sources

Kalliath, Chacko, et al. “Comparison between the Effect of Commercially Available Chemical Teeth Whitening Paste and Teeth Whitening Paste Containing Ingredients of Herbal Origin on Human Enamel.” *Ayu*, Medknow Publications & Media Pvt Ltd, 2018, www.ncbi.nlm.nih.gov/pmc/articles/PMC6369603/.