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Original Research

Comparison of NaOCl and sodium perborate in stains removal from acrylic resins

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***ABSTRACT*:**

Background: There are numerous products on the market with various claims for their efficacies in controlling or removing stain from the denture surface. **Aim of the study:** To compare NaOCl and sodium perborate in stains removal from acrylic resins.**Materials and methods:** The study was conducted in the Department of Prosthodontics of the dental institution. For the study, a set of 40 heat cured acrylic plates were formed. Each sample was then placed in reflectance spectrophotometer to record standard reflectance. Then, acrylic plates were stained with tea and turmeric by keeping them in tea and turmeric solutions for 30 minutes. The acrylic plates in Group 1 were cleaned with Sodium hypochlorite and plates in Group 2 were cleaned with Sodium Perborate. Then, the acrylic plates were placed in reflectance spectrometer to check the change in reflectance values. **Results:** We observed that mean change in reflectance in group 1 was 1.78 and in group 2 was 2.66. On comparing, the results were seen to be statistically non-significant. Visually, stain removal was more evident in Group 2 as compare to group 1. **Conclusion**: From the results of the present study, this can be concluded that Sodium Hypochlorite and Sodium perborate are highly efficacious as a stain removal from acrylic resins. However, on comparing both, Sodium perborate is more efficacious.

Key words: Sodium Hypochlorite, Sodium Perborate, acrylic resin.

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INTRODUCTION:

The maintenance of good denture hygiene not only satisfies aesthetic concerns but also plays an important role in the health of the patient and in the prevention of oral malodour.[1] Denture base materials and denture teeth attract and accumulate plaque, calculus and stains. There is similarity in the formation of the acquired pellicle on the enamel surface and any other restorative material.[2]Acrylic resin bases of removable dentures attract stains and odor-producing organic and inorganic deposits. Soft-food debris that clings to a denture can be removed easily by light brushing followed by rinsing. Hard deposits of calculus and stain are much more difficult to remove.[3] Furthermore, with ageing and impaired manual dexterity, it is more difficult to clean dentures by brushing efficiently.[4] The use of chemical denture cleanser soaks is the most popular method of denture cleansing.There are numerous products on the market with various claims for their efficacies in controlling or removing stain from the denture surface.[5, 6] Hence, the present study was planned to compare NaOCl and sodium perborate in stains removal from acrylic resins.

MATERIALS AND METHODS:

The study was conducted in the Department of Prosthodontics of the dental institution. The ethical clearance for study protocol was obtained from ethical committee of the institution. For the study, a set of 40 heat cured acrylic plates were formed. All acrylic plates were made of similar dimensions and made by same material and by following standard guidelines. Each sample was then placed in reflectance spectrophotometer to record standard reflectance. Then, acrylic plates were stained with tea and turmeric by keeping them in tea and turmeric solutions for 30 minutes. After this, the acrylic plates were grouped into

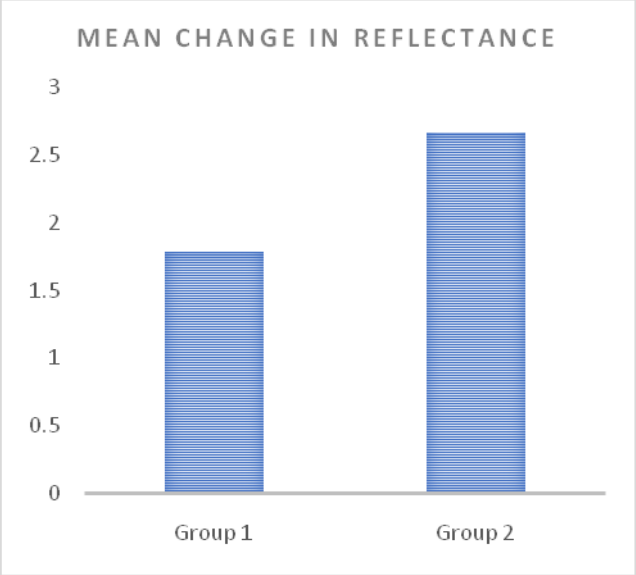
two groups, Group 1 and Group 2. The acrylic plates in Group 1 were cleaned with Sodium hypochlorite and plates in Group 2 were cleaned with Sodium Perborate. Then, the acrylic plates were placed in reflectance spectrometer to check the reflectance values.
The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

RESULTS:
Table 1 shows the mean change in reflectance after cleansing the acrylic plates in group 1 and 2. We observed that mean change in reflectance in group 1 was 1.78 and in group 2 was 2.66. On comparing, the results were seen to be statistically non-significant. Visually, stain removal was more evident in Group 2 as compare to group 1. Thus, Sodium perborate is more efficacious as compared to sodium hypochlorite with respect to being a denture cleanser. (Fig 1)

Table 1: Mean change in reflectance after cleansing the acrylic plates in group 1 and 2

Groups	Mean change in reflectance
Group 1	1.78
Group 2	2.66

Figure 1:



DISCUSSION:
In the present study, we observed that the mean change in reflectance was more with sodium perborate as compared to sodium hypochlorite indicating that sodium perborate is more efficacious as a stains removal from acrylic resins. The results were statistically non-significant and were compared with previous studies in the literature. Mathai JR et al compared the efficacy of two different denture cleansers--sodium perborate (Clinsodent) and sodium hypochlorite (VI-Clean)--in removing tea, coffee, turmeric and tobacco (paan) stains from heat-cured clear acrylic resins. Distilled water was used as a control. Both Clinsodent and VI-Clean were found to be the least effective in removing coffee stains and best for removing turmeric stain. They concluded that it is necessary that the dental professional be aware of these results to ensure that denture wearers know how to select the appropriate denture cleanser. Jagger DC et al evaluated seven denture cleansers for their mode of action of tea stain removal from Perspex acrylic resin material. Perspex acrylic resin specimens were stained using a combination of chlorhexidine and tea solution. The specimens were also treated with saliva to form an initial pellicle layer and facilitate the uptake of the stain. The capacity for stain removal was determined by measuring the optical density of the treated specimens by using a spectrophotometer. These were then exposed, for 5 minutes, to seven denture cleansers to demonstrate the percentage stain-removal ability of each cleanser. The same procedure was applied for roughened Perspex acrylic resin specimens. Water was used as a control in the two parts of the experiment. The products containing alkaline hypochlorite had the highest ability for removing stain from the acrylic resin material together with a bleaching effect. The results varied when the same denture cleansers were used on the roughened Perspex surface, and this was attributed to the presence of irregularities and porosities on the blocks. They concluded that denture cleansing agents containing hypochlorite and Boots Denture Cleaning Powder (constituents not stated by the manufacturer) exhibited the ability to remove stain from the denture base materials most effectively. Irregularities and porosities present on the denture surface played a major role in reducing the activity of denture cleaning agents and hence increased stain and plaque retention.[7, 8]
Al-Huraishi H et al determined the ability of eight denture cleansers to remove and inhibit tea-stain build-up on acrylic resin. In the stain removal study, Perspex(®) (cast heat polymerised resin) specimens previously soaked in saliva were stained using multiple exposures of chlorhexidine and tea solutions. Specimens were exposed for 1 min to one of the eight denture cleansers for five cycles, washed and dried and their optical density read on a uv/vis spectrophotometer at 295 nm. In the stain inhibition study, clear specimens were exposed to saliva followed by cleansers then tea solution, for five cycles. The build-up of stain at each cycle was measured, and differences in optical densities from baseline were calculated. All denture cleansers were significantly more effective than water in removing stain. There were significant differences in cleaning ability between cleansers, Dentural(®) and

Kleenite(®) were particularly effective. The stain inhibition experiment showed that most cleansers were significantly more effective than water in inhibiting stain. There were significant differences in inhibition ability between cleansers. Kleenite(®) and Equate were particularly effective. They concluded that all denture cleansers had a capacity to remove stain and most had an inhibitory effect on staining. Kleenite(®) was particularly effective in controlling stain formation. Makhija PP et al evaluated the efficacy of various denture cleansing materials in the removal of tea and turmeric stains and to compare the efficacy of those denture cleansers with each other in the removal of tea and turmeric stains. Heat-cured acrylic resin specimens were stained using tea and turmeric solutions. The spectrophotometer was used to determine the reflectance values of the samples and to evaluate the efficacy of various denture cleansing materials in removal of tea and turmeric stains. Three denture cleansers, namely, sodium hypochlorite, Safe plus, and Clinsodent were used in the study. Water was used as a control. ANOVA test and post hoc Tukey's test were used to determine the statistical difference between the groups. A statistically significant difference was found ($p \leq 0.05$) between the different denture cleansing materials used. Products containing sodium perborate along with trisodium phosphate had the highest stain removing capability. They concluded that it was found that all the denture cleansing materials used in the study were effective in removing tea and turmeric stains. Products containing sodium perborate along with trisodium phosphate had a comparatively greater stain removal capability than products containing sodium perborate along with sodium bicarbonate followed by products containing sodium hypochlorite followed by water (control).[9,10]

CONCLUSION: From the results of the present study, this can be concluded that Sodium Hypochlorite and Sodium perborate are highly efficacious as stain removals from acrylic resins. However, on comparing both, Sodium perborate is more efficacious.

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