

## Original Article

# Efficacy of sodium hypochlorite and sodium perborate in strains removal in acrylic resin

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### Abstract

**Background:** Most dentures nowadays are made with acrylic resin teeth and denture base material of polymethylmethacrylate type of resin. The present study was conducted to compare the efficacy of sodium hypochlorite and sodium perborate in strains removal in acrylic resin. **Materials & Methods:** The present study was conducted in the department of Prosthodontics. It comprised of 30 acrylic resin dentures. Group I included 15 dentures in which Clinsodent powder (Sodium perborate) was used and group II in which VI-clean denture cleanser (Sodium hypochlorite) was used. All dentures were suspended in aqueous staining agents of turmeric, tea and coffee for 10 days at  $37 \pm 1^\circ\text{C}$  in an incubator. All the stained specimens were then suspended in two freshly prepared denture cleansers for a period of 20 minutes and 8 hours correspondingly. **Results:** Mean average optical density value of turmeric ( $1.914 \pm 0.25$ ), tea ( $2.018 \pm 0.32$ ) and coffee ( $2.524 \pm 0.18$ ). The difference was significant ( $P < 0.05$ ). Mean optical density of turmeric after clinsodent was 1.19, on tea was 1.6 and on coffee was 2.46. The mean optical density of turmeric after VI- clean was 1.65, on tea was 1.52 and on coffee was 2.53. The difference was non- significant ( $P > 0.05$ ). Mean optical density of turmeric after clinsodent was 1.17, on tea was 1.5 and on coffee was 2.42. The mean optical density of turmeric after VI- clean was 1.68, on tea was 1.55 and on coffee was 2.56. The difference was non- significant ( $P > 0.05$ ). **Conclusion:** Both sodium perborate and sodium hypochlorite found to be equal in removing stains of turmeric, tea and coffee from acrylic resin dentures.

**Key words:** Sodium perborate, Sodium hypochlorite, Tea

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## INTRODUCTION

Most dentures nowadays are made with acrylic resin teeth and denture base material of polymethylmethacrylate type of resin. It is always better to use a cleaning method in which strong abrasive action is not present. These acrylic resin bases attract stains and odor producing organic and inorganic deposits. Such unclean dentures often produce a strong repulsive odor commonly called as denture breath. Sensing this requirement, many commercial denture cleansers are currently available and each one claims to be efficient.<sup>1</sup> Adequate cleaning of a well polished denture with hand soap and a properly designed denture brush is the current denture cleansing method recommended by the

American Dental Association. The use of chemical denture cleanser soaks is the second most popular method of denture cleansing and these are commercially available as alkaline peroxides, alkaline hypochlorite, dilute organic or inorganic acids, disinfectants and enzymes.<sup>2</sup>

Tea, coffee and turmeric stains along with bacterial plaque accumulates on the dentures in an average Indian patient despite attempts to produce a self cleaning design for dentures. The habit of daily intake of beverages like coffee, cocoa and oral rinses like chlorhexidine several times a day also tends to stain and discolor resin. Both the concentration and the period of exposure of the staining agents in beverages may affect

the pigmentation of resin.<sup>3</sup> The present study was conducted to compare the efficacy of sodium hypochlorite and sodium perborate in strains removal in acrylic resin.

**MATERIALS & METHODS**

The present study was conducted in the department of Prosthodontics. It comprised of 30 acrylic resin dentures. Group I included 15 dentures in which Clinsodent powder (Sodium perborate) was used and group II in which VI-clean denture cleanser (Sodium hypochlorite) was used.

All dentures were suspended in aqueous staining agents of turmeric, tea and coffee for 10 days at 37 ± 1°C in an incubator. The specimens were then washed and air-dried for two hours. At this point the optical density of the stained samples was measured. All the stained specimens were then suspended in two freshly prepared denture cleansers for a period of 20 minutes and 8 hours correspondingly. Results thus obtained were subjected to statistical analysis using chi- square test. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of Samples**

Total- 30	
Group I (15)	Group II (15)
Sodium perborate	Sodium hypochlorite

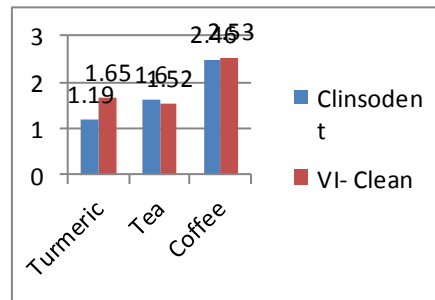
Table I shows that in group I samples, Sodium perborate cleanser was used and in group II, sodium hypochlorite was used.

**Table II Mean average optical density values of heat cured acrylic samples after staining with various staining agents**

Stains	Optimal density
Turmeric	1.914 ± 0.25
Tea	2.018 ± 0.32
Coffee	2.524 ± 0.18

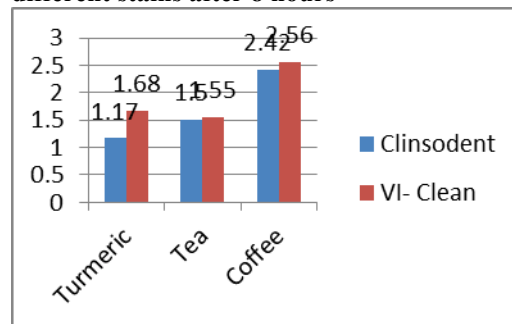
Table II shows Mean average optical density value of turmeric (1.914 ± 0.25), tea (2.018 ± 0.32) and coffee (2.524 ± 0.18). The difference was significant (P- 0.05).

**Graph I Comparison of mean optical density among different stains after 20 minutes**



Graph I shows that mean optical density of turmeric after clinsodent was 1.19, on tea was 1.6 and on coffee was 2.46. The mean optical density of turmeric after VI-clean was 1.65, on tea was 1.52 and on coffee was 2.53. The difference was non- significant (P> 0.05).

**Graph II Comparison of mean optical density among different stains after 8 hours**



Graph II shows that mean optical density of turmeric after clinsodent was 1.17, on tea was 1.5 and on coffee was 2.42. The mean optical density of turmeric after VI-clean was 1.68, on tea was 1.55 and on coffee was 2.56. The difference was non- significant (P> 0.05).

**DISCUSSION**

Despite the claims made by the manufacturers of these commercial denture cleansers, the efficacy of these cleansers remains questionable. Although a few studies have been cited in the literature comparing the antimicrobial activity of popular denture cleansing agents, the materials used were not Indian formulations. In the past, the function of denture cleansers has been to remove deposits and stains from dentures.<sup>4</sup> With the present knowledge of the role of microorganisms in the etiology of denture stomatitis, more emphasis is being placed on the ability of denture cleansers to sanitize dentures. An ideal denture cleanser should thus fulfill many requirements, including the ability to remove both organic and inorganic deposits together with any associated stain. A plethora of denture cleansers are available, with claims for their various efficacies, the composition of which remains a closely guarded secret in most cases.<sup>5</sup>

In present study, mean average optical density value of turmeric (1.914 ± 0.25), tea (2.018 ± 0.32) and coffee (2.524 ± 0.18). This is similar to Anthony et al.<sup>6</sup>

We found that mean optical density of turmeric after clinsodent was 1.19, on tea was 1.6 and on coffee was

2.46. The mean optical density of turmeric after VI-clean was 1.65, on tea was 1.52 and on coffee was 2.53. In a study by Raht et al<sup>7</sup>, 200 heat cured clear acrylic samples were prepared. The samples were divided into four groups and stored in tea, coffee, turmeric and paan at 37°C for 10 days. Stained samples were subjected to immersion in the commercially available denture cleansers sodium perborate (Clinsodent), sodium hypochlorite (VI-Clean) and distilled water (control). Optical density (OD) values were measured before and after 20 minutes and 8 hours of immersion in the cleansers. Both Clinsodent and VI-clean were found to be least effective in removal of coffee stains and best for removing turmeric stains.

Jagger et al<sup>8</sup> in their study used denture cleanser with sodium hypochlorite and was found to be a better cleanser than Boots Denture Cleaning Powder. For the control (distilled water) was found to cause small degree of stain removal which may be due to the increased temperature, causing increased water uptake by the materials and leaching out of few soluble components of the stains from the denture materials.

Gispin and Caputo<sup>9</sup> used tea, coffee and grape solution as the staining agents. They found grape solution to have a higher staining potential, owing to the increased pH. Yannikakis et al<sup>9</sup> studied the staining effect of coffee and tea on six brands of resins used in fabrication of provisional restoration. Coffee solution exhibited more staining than tea solution. Seven days of immersion resulted in perceptible color change in all brands of resin. The stains on the acrylic resin samples used in this study relate to the dental stains seen commonly in vivo and were therefore thought to be clinically relevant.

**Source of support:** Nil

**Conflict of interest:** None declared

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## CONCLUSION

Both sodium perborate and sodium hypochlorite found to be equal in removing stains of turmeric, tea and coffee from acrylic resin dentures.

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