



Evaluation Of Surface Roughness Of Denture Base And Denture Teeth Subjected To Different Cleaning Procedures

Dental Science

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ABSTRACT

Acrylic resin is susceptible to change in surface properties when subjected to different mechanical and chemical denture cleansing methods, which may result in a rough surface that makes the prosthesis more susceptible to plaque accumulation.

Objective: To evaluate the effect of various denture cleansing methods on the surface roughness of denture teeth and denture base.

Method: 120 denture teeth and denture base specimens were divided into 4 groups (n=30): distilled water(control), alkaline hypochlorite, alkaline peroxide and toothbrush with soap and tap water. The samples were stored in their respective solutions for 8 hours, over a period of 6 months. Surface roughness of the samples was evaluated at varying intervals using a profilometer.

Results: Significant differences ($p < 0.05$) were found in surface roughness values of denture base and denture teeth after 6 months.

Conclusion: The time period and the type of denture cleansing method had a significant influence on the surface roughness of the specimens.

KEYWORDS:

Acrylic resins, denture cleansers, surface properties, peroxides, toothbrushing, surface roughness.

INTRODUCTION

Oral health of the completely edentulous patient significantly impacts their nutrition, social interaction, quality of life and thus, the overall well-being. The rapid population growth rate coupled with current economic conditions and greater life expectancy are suggestive of the fact that complete dentures will continue to be the mainstay of treatment for rehabilitation of function and aesthetics of the completely edentulous patient.

Generally, a complete denture provides useful service for approximately seven years, this term being dictated by the properties of acrylic resin, artificial teeth used and the patient's bone resorption pattern. In order to derive maximum clinical serviceability from the prosthesis, the patient needs to perform correct denture hygiene.

Considering that artificial teeth and denture bases undergo change in surface characteristics with the course of time, and this alteration may be related to cleaning methods; this study was conducted to evaluate the surface roughness of denture teeth and denture base subjected to different cleaning procedures.

MATERIALS AND METHOD:

The study was conducted on 120 artificial maxillary central incisor teeth and denture base specimens. The samples were randomly divided into four different groups and thereby subjected to different denture cleansing methods:

G1 - Distilled water (control)

G2 - 0.5% Sodium hypochlorite (VIClean)

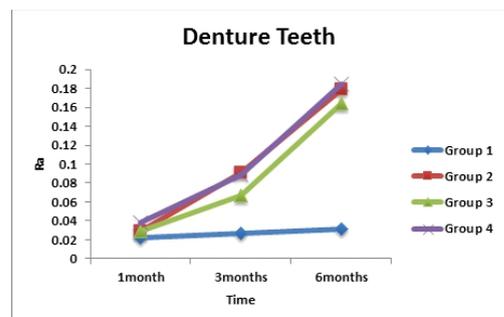
G3 - Alkaline peroxide (Clinsodent)

G4 - Mechanical brushing with a soft bristle toothbrush and soap solution, followed by immersion in tap water.

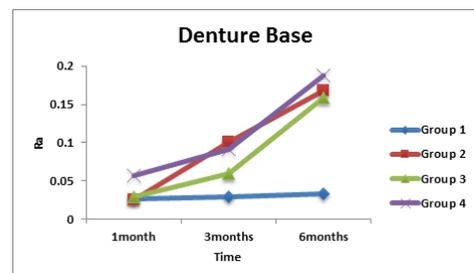
The specimens were stored in their respective solutions for 8 hours to simulate overnight immersion. This procedure was repeated everyday with fresh solutions of denture cleansers and was performed over a period of 6 months. The denture teeth and denture base were then evaluated for change in surface roughness at varying time intervals of 1 month, 3 months and 6 months, using a profilometer.

RESULTS:

Graph 1: shows the variation in Ra of denture teeth with time among the different study groups



Graph 2: depicts the change in Ra of denture base specimens among the different study groups at varying time intervals



DISCUSSION

complete denture prosthesis essentially aims to restore form, function and aesthetics for the edentulous patient, who must perform adequate denture hygiene to maximally benefit from this treatment. Various mechanical and chemical methods have been advocated to this end.

Ideally, any denture cleansing method should effectively remove all plaque and stains without adversely affecting the physical or chemical properties of the denture materials. Change in surface characteristics have been reported after various immersion procedures.

The surface roughness (Ra) of denture bases and denture teeth may be the most important factor in providing acceptable oral hygiene, promoting biofilm removal, influencing aesthetics and increasing the clinical serviceability of the prosthesis.

According to the results of the present study, an increase in surface roughness was seen with an increase in the duration for which any particular denture cleansing method was used. Samples exposed to tooth brushing (Ra = 0.104 μ) showed comparable roughness values with those specimens immersed in Alkaline hypochlorite (Ra = 0.1 μ) and lower values for alkaline peroxide (Ra = 0.086 μ).

The increase in surface roughness could be attributed to the concentration of oxidants present or the pH of the denture cleanser. The over enthusiastic and injudicious use of a toothbrush may result in abrasion of acrylic resin thereby causing an increase in surface roughness.

The findings of the present study revealed Ra values of all denture teeth and denture base specimens to be below the threshold value of 0.2microns, suggestive of the fact that the rougher specimen surface after prolonged use of various denture cleansing methods may not render the surface more prone to colonisation by microorganisms.

CONCLUSION

Within the limitations of the present study, the following conclusions can be derived:

- A significant increase in surface roughness results with increase in the time period of use of any particular denture hygiene regime.
- Tooth brushing with soap and tap water resulted in increased surface roughness values, comparable with those of 0.5% sodium hypochlorite. Alkaline peroxide showed significantly lower surface roughness values.
- Although a significant change in surface roughness was demonstrated, these values were less than the threshold limit for microbial colonization (Ra <0.2 μ)

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