

Original Research

Comparison of denture retention of three different forms of denture adhesives

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ABSTRACT:

Background: One of the most annoying problems posed by complete dentures is poor fit denture. The present study was conducted to compare three different forms of denture adhesives as regards to direct measurement of denture retention. **Materials & Methods:** 45 healthy completely edentulous patients of both genders were randomly classified into 3 groups as follows: group I, where the patient used type I powder denture adhesive, group II: where the patient used type II powder denture adhesive, and group III: where the patient used cushion denture adhesive. A digital force meter was used to objectively measure retention strength afforded in grams. **Results:** There were 8 males and 7 females in group I, 9 males and 6 females in group II and 5 males and 10 females in group III. The mean retention value in group I was 2542.8 grams, in group II was 3451.2 grams and in group III was 1426.7 grams. The difference was significant ($P < 0.05$). The mean retention value in group I was 1534.2 grams, in group II was 2142.6 grams and in group III was 762.4 grams. The difference was significant ($P < 0.05$). **Conclusion:** Maximum retention value was achieved with type II powder denture adhesive followed by type I powder denture adhesive and cushion denture adhesive.

Key words: Denture adhesive, retention value, edentulism

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INTRODUCTION

Rehabilitation of completely edentulous patients is one of the main challenges in dentistry. In spite of the increasing use of dental implants, the most common way to treat edentulousness is still by means of a conventional full denture. Unfortunately; edentulism and conventional complete denture treatment have been shown to have a negative impact on oral health quality of life (OHQoL).¹ One of the most annoying problems posed by complete dentures is poor fit denture. Although highly sophisticated prosthodontics techniques were suggested to overcome this problem, patients with compromised physiological and /or anatomical factors of retention still represent a challenge to conventional complete denture therapy.² The use of dental adhesives began in the XVIII century. These products were prepared by pharmacists who mixed plant gums to produce a material that could absorb the humidity of saliva and swell to form a mucilaginous layer adhering to the oral mucosa and dentures. Dental adhesives are used in prosthodontics to provide a binding layer on the surface of removable

complete dentures, thus allowing the latter to adhere to the supporting tissues of the edentulous patient.³ Dental adhesives are composed of three large groups of materials. A first group comprises the actual adhesives, including a broad range of classical products such as plant gums (karaya, tragacanth, acacia), and more recent components based on natural (methylcellulose, hydroxymethyl cellulose, carboxymethyl cellulose) and synthetic polymers (polyethylene oxide, acrylamides, polyvinyl acetate).⁴ A second group of materials comprises antimicrobial agents such as sodium borate, sodium tetraborate, hexachlorophene or propylhydroxybenzoate and ethanol.⁵ The present study was conducted to compare three different forms of denture adhesives as regards to direct measurement of denture retention.

MATERIALS & METHODS

The present study comprised of 45 healthy completely edentulous patients of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. All subjects received conventional maxillary and mandibular complete dentures with a standard thickness (0.01mm) tinfoil spacer adapted on the master casts before processing into heat cured acrylic resin. The patients were randomly classified into 3 groups as follows: group I, where the patient used type I powder denture adhesive, group II: where the

patient used type II powder denture adhesive, and group III: where the patient used cushion denture adhesive. The dentures were delivered in the patient mouth after necessary adjustments. A digital force meter was used to objectively measure retention strength afforded in grams. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II	Group III
Status	Type I powder denture adhesive	Type II powder denture adhesive	Cushion denture adhesive
M:F	8:7	9:6	5:10

Table I shows that there were 8 males and 7 females in group I, 9 males and 6 females in group II and 5 males and 10 females in group III.

Table II Retention values for maxillary dentures

Groups	Mean (g)	P value
Group I	2542.8	0.01
Group II	3451.2	
Group III	1426.7	

Table II, graph I shows that mean retention value in group I was 2542.8 grams, in group II was 3451.2 grams and in group III was 1426.7 grams. The difference was significant (P< 0.05).

Graph I Retention values for maxillary dentures

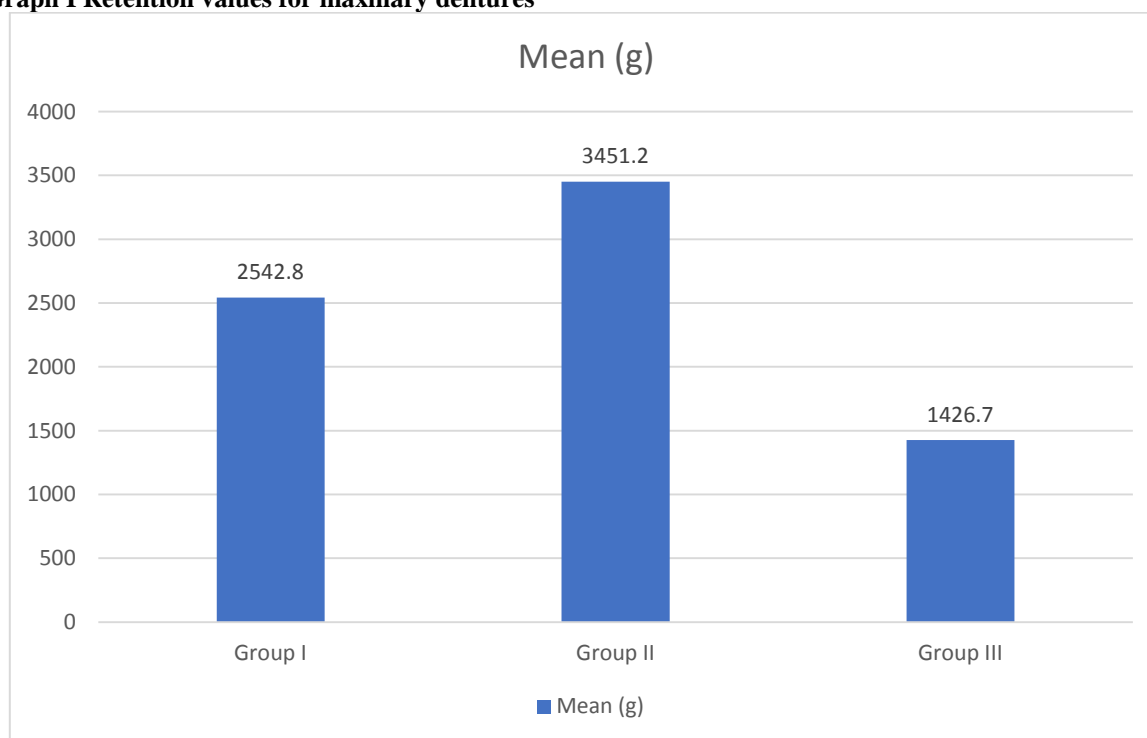
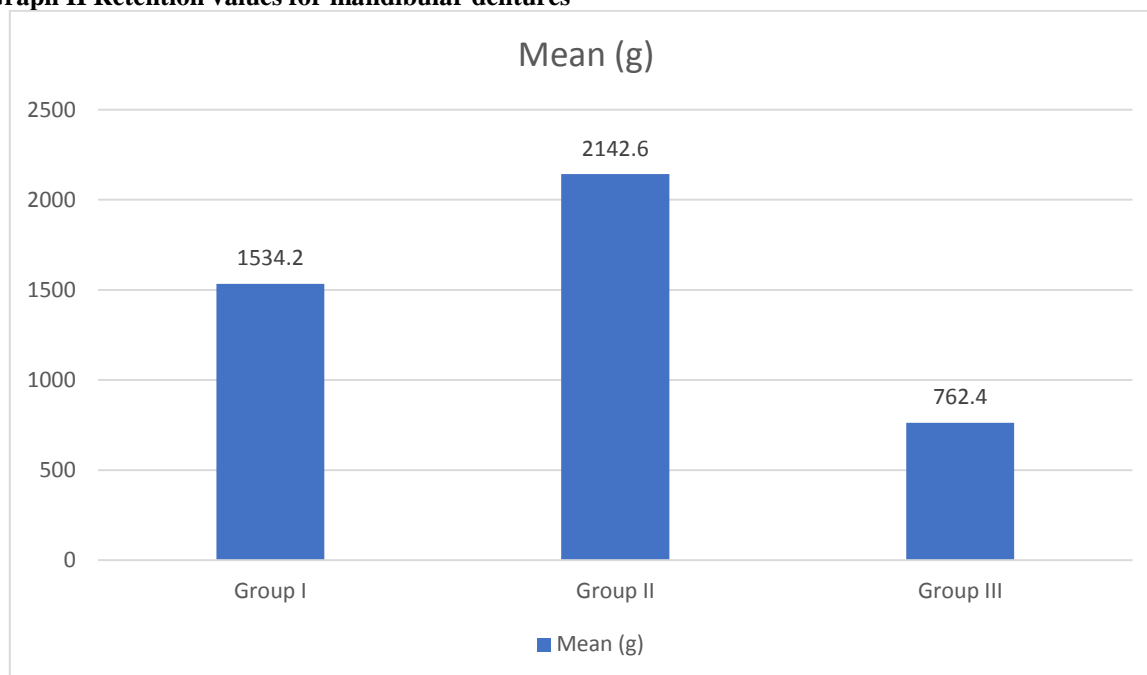


Table III Retention values for mandibular dentures

Groups	Mean (g)	P value
Group I	1534.2	0.01
Group II	2142.6	
Group III	762.4	

Table III, graph II shows that mean retention value in group I was 1534.2 grams, in group II was 2142.6 grams and in group III was 762.4 grams. The difference was significant (P< 0.05).

Graph II Retention values for mandibular dentures

DISCUSSION

One of the main problems posed by complete dentures is retention and stability of the mandibular dentures.⁶ In order to solve this problem, dentists and the dental industry for a long time have attempted to improve denture adhesion by developing a range of “glues” of highly varied composition and efficacy.⁷ The denture adhesives provide an interface between the oral mucosa and the denture fitting surface that allow retentive forces to be transmitted between the mucosa and denture via an intermediary film of saliva. Thus, it bonds the denture to the underlying oral tissues by physical and chemical actions.⁸ The major elements of adhesive products are ingredients which swell by absorbing water and become viscous and sticky. They are supplied into different forms including; powder, paste and cushions to fit a variety of patient demand.⁹ The present study was conducted to compare three different forms of denture adhesives as regards to direct measurement of denture retention.

We found that there were 8 males and 7 females in group I, 9 males and 6 females in group II and 5 males and 10 females in group III. Manes et al¹⁰ evaluated whether the adhesives used to improve complete denture retention are truly effective and able to increase denture adhesion to the mucosa covering the edentulous alveolar ridge of the mandibular dentures. An in vivo clinical study is made of 30 patients with complete mandibular dentures to evaluate the retention afforded by three commercial complete denture adhesives (Benfix®, Fittydent® and Supercorega®). A spring scale was used to measure retention strength (in grams). The purpose was to determine whether the use of complete denture adhesives is effective, and to establish which commercial brands offer the highest retention

strengths. The results obtained indicate that retention is enhanced by the use of such adhesives, and that Fittydent® offers the best retention performance, followed by Benfix® and Supercorega®.

We found that mean retention value in group I was 2542.8 grams, in group II was 3451.2 grams and in group III was 1426.7 grams. El N et al¹¹ conducted a study on fifty completely edentulous patients. Patient perceptions for five commercial complete denture adhesive types (Supercorega paste, Supercorega Powder, Protefix paste, Protefix Powder, Protefix Cushion) were assessed by a questionnaire on dentures (maxillary & mandibular) retention, chewing ability, taste, duration of adhesives in the mouth, and ease of removal for the denture adhesives from the oral mucosa after use. Patient satisfaction showed significant difference in dentures retention (maxillary & mandibular), duration of the adhesive in patient mouth, taste and, removal of the adhesive from the patient mouth. Improvement of the chewing ability was observed by the using of different adhesive types but there were insignificant difference between the different adhesives. The direct measurement of dentures retention showed that a significant improvement in dentures retention was observed when the paste type, powder type, or cushion type denture adhesive was used. And that Protefix paste and Protefix powder offers the best retention performance, followed by Supercorega paste and Supercorega powder, and finally Protefix cushion offers the lowest retention performance. While for the mandibular dentures the protefix paste and the supercorega paste offer the best retention.

We found that mean retention value in group I was 1534.2 grams, in group II was 2142.6 grams and in group III was 762.4 grams. Neill and Roberts¹²

reported that the use of denture adhesives provided significant improvement in mastication performance in subjects with poor- and fair-fitting dentures. This improvement of the chewing ability may be related to an increased sense of security and added comfort, even though an adhesive is not required for proper denture retention.

CONCLUSION

Authors found that maximum retention value was achieved with type II powder denture adhesive followed by type I powder denture adhesive and cushion denture adhesive.

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