

An In vivo Study to Compare the Effect of Different Denture Adhesives on the Retention of Maxillary Complete Denture.

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Abstract

The purpose of this study was to evaluate the retentive ability of maxillary complete denture with different denture adhesive materials. The study was conducted on 20 edentulous patients where the retention of denture was evaluated using two different adhesive materials. The sample size of 20 patients was divided into 3 groups. The retention was checked using Digital Force meter in the control group first and then using gel and powder. The data obtained in each group were sent for statistical analysis. The results obtained showed that retention in control group was lower than the retention force with powder and gel and the retention with powder was also as compared to denture gel and all these differences were highly statistically significant. The results clearly

indicated that gel had the best retentive ability than the rest.

Keywords: Denture Adhesives Gel And Powder, Digital Force meter, Retention

Introduction

Complete dentures are a preferred treatment option for edentulous patients. It aids in mastication, speech and aesthetics.¹Patients are satisfied when the complete denture closely fits the denture bearing areas. But some patients are not satisfied. It can be due to pain, pressure, looseness, poor function and appearance. Resorption of residual ridges with aging is one of the prime concern of dissatisfaction among old patients.²This is where role of denture adhesives comes into play. The use of denture adhesives prevents movements of denture while chewing,

improves bite efficiency and gives patients a lot of confidence while speech. Denture adhesives have active ingredients (water soluble polymers) and non active ingredients bas material.³It fills the gaps between the resorbed ridge and the denture.It does so by swelling up when it comes in contact with saliva and aids in retention by increasing the surface tension.

Materials and Method: The study was carried out among 20 individuals in the Department of Prosthodontics, Himachal Dental College, Sundernagar, Himachal Pradesh. The selected patients were completely edentulous and in good health.

Inclusion Criteria was as follows:

1. Severely resorbed edentulous ridges of severe grade
 2. Severely abused /hypertrophied tissue covering the ridges
 3. Patients having lack of neuromuscular control(e.g. stroke and Parkinsonism)
 4. Cases with Xerostomia
- Primary impression of the maxillary arch was made using impression compound material in a suitable sized stock tray and poured in dental plaster to obtain primary cast.
 - Custom trays were made using self-cure.
 - Custom tray was tried in the mouth and peripheries reduced so that they are 2 to 3 mm short of the tissue reflection.
 - Now the border molding was done using green stick compound and secondary impression was taken using zinc oxide eugenol.
 - The impressions were boxed, and the casts were poured. Denture base was fabricated on the obtained master cast.
 - Wax rims were fabricated on denture base through the master cast.

- Jaw relation was done and casts were mounted on the articulator.
- Based on the registered information,teeth setting were done.
- Try-in was done.
- Flasking was done of the cast with waxed up denture bases.
- Prefabricated stainless steel hooks was attached to anterior palatal region of the waxed up denture bases approximately corresponding to a line joining the distal surfaces of cuspids..
- The finished denture were inserted and checked i
- n the mouth
- For each patient the retention was checked by force meter without any application of adhesive material. For this 3 readings were taken and its mean was calculated.
- In the next step, for same patient adhesive powder was applied and similarly three reading were taken and its mean calculated.
- Denture was cleaned thoroughly and gel adhesive was used. Three readings were taken and its mean was calculated as in previous steps.

To Check the Retention Following Steps Was Be Done

The device was prepared to display the readings in kgf. The patient was made to stand upright with standardized head position, so that the maxilla was made parallel to the floor and a force was directed perpendicular to evaluate the retention. Force meter is a spring-loaded device that was engaged onto the hook attached to the denture and force was applied by pulling it downwards. Three readings were taken in each case and an average was calculated. The data thus obtained was subjected to statistical analysis.

Results

Table 1: Descriptive Statistics for Retention Force

	Control	Powder	Gel
Mean	0.649	2.99	4.14
Sd	0.38	0.37	0.54
Min	0.17	2.45	3.12
Max	1.54	3.55	4.98

Descriptive statistics for retention force is summarized in table 1. Max retention was obtained with Gel (mean 4.14 ± 0.54) and minimum retention was obtained in control group (mean 0.649 ± 0.38). Powder yielded intermediate values with a mean of 2.99 ± 0.37.

Bar diagram of the retention force obtained with three different treatments is represented in figure 1.

Figure 1: Representation of retention force

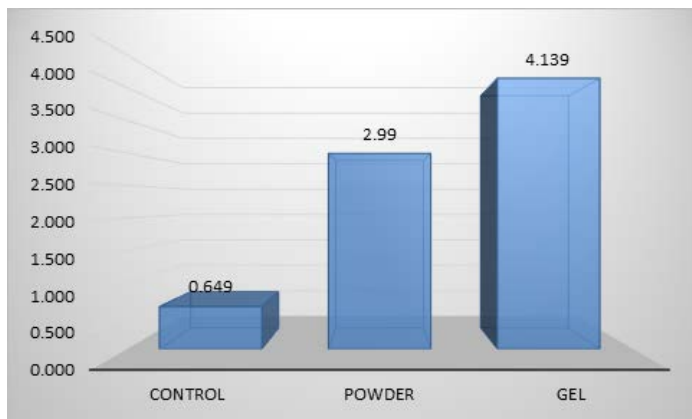


Table 2: Paired Comparison of Retention Force

Gr 1	Gr 2	T	P
Control	Powder	-24.75	0.00
Control	Gel	-26.01	0.00
Powder	Gel	-8.26	0.00

Results of Multiple group comparison of retention force in three treatments is presented table 2. It appeared that that retention in control group is lower than retention force with powder, and gel, and retention with powder is also lower than gel and all these differences are highly statistically significant (p < 0.000).

Discussion

The sample size of 20 patients was divided into 3 groups. Complete dentures were fabricated and delivered to all the patients. The retention of the maxillary dentures were checked using Digital Force meter and reading was taken. Later powder was applied to the denture and retention was checked and readings were taken. Similarly, gel was applied to the denture and retention was checked and reading was taken. The data was obtained for statistical analysis.

Denture adhesives are soaked in water while applying in the tissue surface of the denture to enhance retention. they become sticky and viscous when they come in contact with saliva and the denture polymer swells up by water sorption. However, high viscosity reduces the ease of manipulation. An ideal adhesive must be initially less viscous while manipulation and later when it imbibes water it must be more viscous in order to enhance retention between the denture and its supporting structures.³

The effectiveness of 3 types of denture adhesives (powder adhesives, adhesives pastes, and adhesive strips) on the incisal masticatory force of complete dentures was compared by Kalra et al.. They reported that the paste type of denture adhesives was the most effective in improving incisal force, followed by powder and strip adhesives. The strip and cream adhesives differ in that strips do not contain a long-acting synthetic polymer. According to a study by Berg, 25 among 4 different denture adhesives, patients expressed their preference for Fatty dent paste in terms of improved mastication.⁴

Role of denture adhesives were demonstrated by Tarbet and co workers in retention and stability by chewing denture dislodgements in patients eating standardized portions of food with and without denture adhesive which

later revealed in the reduction of chances of dislodgement⁶.

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