

Original Article

## The Effect of Two Types of Denture Adhesive on the Satisfaction Parameters of Complete Denture Wearers

Farzin M.<sup>a</sup>; Golchin A.<sup>b</sup>; Badie A.<sup>b</sup>; Ghapanchi J.<sup>c</sup>; Zamani A.<sup>b</sup>; Rezazadeh F.<sup>c</sup>; Kalantari MH.<sup>a</sup>

<sup>a</sup> Department of Prosthodontics, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran.

<sup>b</sup> Undergraduate Student, Student Research Committee, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran.

<sup>c</sup> Department of Oral and Maxillofacial Medicine, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran.

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#### Corresponding Author:

Jannan Ghapanchi

Department of Oral and Maxillofacial Medicine, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran.

Email: [ghabanj@sums.ac.ir](mailto:ghabanj@sums.ac.ir)

Tel: +98-71-36263193-4

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### Abstract

**Statement of Problem:** Patient satisfaction is highly influenced by the retention of the denture. In some instances using denture adhesives may help the patient to achieve this goal.

**Objectives:** The purpose of this study was to evaluate the participants' opinion concerning the effectiveness of two types of denture adhesives having the same composition (Fixative-powder, Protefix-cream).

**Materials and Methods:** Forty healthy patients (25 Males and 15 Females) who visited the Department of Prosthodontics of Shiraz Dentistry School were selected. The oral cavity was examined and patients with oral ulcers, history of allergic reaction, severe xerostomia, red, white and/or red and white lesions were excluded. The subjects were instructed to receive a sequence of treatment protocols. All patients applied Fixative-powder on the dentures for seven days. The Participants were asked to fill a questionnaire to include their opinion regarding the strength, biocompatibility, convenience and masticatory ability of the adhesive. On the next seven days, the patients were asked not to use the adhesives and they completed the same questionnaire again. Finally, all participants were asked to apply Protefix-cream on their dentures for a week followed by no cream application for another 7 days. These patients answered the same questionnaire and data were collected and analyzed using paired-samples *t*-test and Chi-square test.

**Result:** Denture adhesives significantly improved the overall satisfaction level of the patients ( $p = 0.01$ ). When testing the fixative powder, the satisfaction score of the participants during the first week (powder application) and the 2<sup>nd</sup> week (no application) was  $19.95 \pm 3.76$  and  $26.2 \pm 2.82$ , respectively. The overall satisfaction rate of the patients using the Protefix adhesive was  $19.35 \pm 5.48$  in the third week (adhesive application) and  $25.85 \pm 4.35$  in the fourth week (no application).

**Conclusions:** The study clarified that applying denture adhesives (both types) markedly improved the satisfaction rate in complete denture wearers without any complications. Further studies on a larger group is suggested to determine which kind of denture adhesive is more effective and if there is any possible side effects that restrict the use of such substances.

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## **Introduction**

Large numbers of edentulous patients who are in need of treatment by complete denture live all over the world. Residual ridge resorption (RRR) is considered as a major oral disease which could occur in spite of careful prosthetic handling and compromised denture retention [1]. Denture retention has a key role in determining patient's satisfaction. Many factors influence the retention and stability of complete dentures in the oral cavity. These factors include atmospheric pressure, intimate adaptation of both hard and soft tissues beneath the denture base to the intaglio surface of the prosthesis, adequate peripheral extensions of the denture base and the presence of a thin film of saliva between the prosthesis and the tissues. Denture retention may be reduced if any of these factors is compromised [2]. In recent years, there have been significant advances in treatment with complete dentures. Implant-supported prostheses or retained by osseointegrated implants are treatment options for many edentulous patients, improving their satisfaction, function, comfort and quality of life. However, for most edentulous patients, the main treatment option involves conventional complete dentures, which are aesthetically acceptable and have a lower cost than other treatments [3-4]. It is known that not all complete denture wearers are able to adapt to their dentures, even if they are well-fitting and well-made. Many patients using these prostheses complain, especially about mandibular dentures, including problems of retention and instability, chewing difficulties, and low confidence, quality of life and satisfaction [5].

Denture adhesives (DA) had been long used to help in complete denture retention. Wilson and coworkers reported that 30% of the patients wearing dentures applied denture adhesives [6].

DA is commonly composed of three main components: 1) basic adhesive substance, 2) antimicrobial agent, and 3) preservatives, flavoring, wetting agents and plasticizers. Many studies reported the effect of DA on the improvement of mastication [2, 6-8].

DA is available in various formulations including powders, liquids, creams, or pads/ wafers. While the exact composition of commercially available denture adhesives may vary, they all contain the same generic materials that serve a specific function. An ideal den-

ture adhesive should be safe, cost effective, have adequate antibacterial and fungal properties. Moreover, it should improve the denture stability and function and should have acceptable smell and taste. An ideal denture adhesive is easy to access and use, does not alter or degrade the intaglio surface of the denture base; does not modify the occlusion of the dentures and finally maintains adhesive capabilities for 8-12 hours [2].

Kelsey *et al.* [9] designed a study in order to determine the effectiveness of five commonly used DA. The patients responded to questions about the effect of the pastes on the quality and duration of retention as well as on mastication. Subjects were also asked which product they considered to be the best. The study results showed that 72% of the subjects mentioned Secure (John O. Butler Co.) denture adhesive paste as the best.

Kulak and coworkers [10] evaluated the subjective responses of 30 denture wearers regarding the effectiveness of two denture adhesive pastes based on polymethylvinylether-maleic anhydride (PVM-MA) compounds or carboxymethyl cellulose (CC). The participants responded to questions related to retention, chewing ability, taste, durability of adhesives in the mouth, and removal. The results showed that the denture adhesive paste based on PVM-MA compound was rated higher (73% and 87%) than CC adhesive paste (60% and 37%) by experienced denture wearers in both maxilla and mandible with regard to chewing ability and durability in the mouth. On the other hand, there were no statistically significant differences between the two denture adhesive pastes on the retention of maxillary dentures, taste, and removal of the adhesives. They concluded that the retention of the dentures was either a little better or much better when using either of the adhesive pastes.

Many studies were performed about the effect of denture adhesives on the improvement of mastication but the overall satisfaction level is still not clear. The current study was conducted to compare two most commonly used DA (Fixative-powder and Protefix-cream) in order to estimate the satisfaction level of patients using denture adhesives

## **Materials and Methods**

The present study was approved by the Institutional E-

thics Committee.

In this cross sectional study, forty healthy and mentally receptive adult patients were recruited. The subjects (25 males and 15 females) were selected from the outpatient attending Prosthodontics Department at Shiraz Dentistry School, Shiraz, Iran during August 2015 to October 2015. All participants had been wearing dentures at least for four consecutive years. Patients with dysfunctions in the masticatory system and debilitating diseases were excluded. The oral cavity was examined and patients with oral ulcers, history of allergic reaction, severe xerostomia, red, white and / or red and white lesions also excluded from the study. The subjects were instructed to receive a sequence of treatment protocols. Application of the DA was trained by the researcher following the manufacturer's instructions. All patients applied Fixative-powder on the dentures for seven days. The Participants were asked to fill in a questionnaire about adhesive strength, biocompatibility, convenience and masticatory ability. On the next seven days, the patients asked not to use the adhesives and then they completed the same questionnaire, again. Finally, all participants applied Protefix-cream on their dentures for a week followed by no cream application for another 7 days. After that, these patients answered the same questionnaire including the following items:

- Are you satisfied with the retention of your denture while using denture adhesive?
- How did denture adhesive affect your maxillary denture retention?
- For how long did the denture adhesive have an effect on retention of your maxillary denture?
- Did the use of denture adhesive have an effect on your ability to chew?
- Did the use of denture adhesive have an effect when you were not chewing?
- Was it difficult to clean your denture after the denture adhesive had been applied?
- Was it difficult to clean your gums after the denture adhesive had been applied?
- Did the use of denture adhesive have an effect on condition of your mouth and show clinical symptoms or complaints?

#### **Denture Satisfaction**

Patient satisfaction was assessed using a denture satisfaction questionnaire, based on the criteria used by

Celebic and Knezovic-Zlataric [11], Souza *et al.* [12] and Paleari *et al.* [13]. The answers to each question and respective scores were as follows: (A) unsatisfactory ("0"); (B) regular ("1"); (C) good ("2"). The overall result for denture satisfaction was calculated by summing the scores of each question, with a range from 0 to 16 for each arch, which was the primary outcome variable of the present study. The questionnaire was applied by another researcher, who was unaware of all other procedures performed in this research.

#### **Statistical Analysis**

Statistical analysis was performed by another researcher, who was also unaware of all procedures performed in this research. The general score and the answers to each question about denture satisfaction were assessed separately.

Data were collected and analyzed using SPSS software, version 17 (SPSS Inc., Chicago, IL, USA) with the significance level set at  $p = 0.05$ . A comparison between the groups was performed using the Independent Samples *t*-test and Chi-square test.

#### **Results**

Forty- patients were recruited for the present study including 25 Males and 15 females aged between 53 to 78 years old (mean age  $64.93 \pm 6.19$ ). During the follow-up, no patient was lost from the study. Statistical analysis shows that the use of DA resulted in an increase in the total satisfaction of participants with their dentures  $p = 0.01$ . The satisfaction score when the participants using fixative powder during the first week was  $19.95 \pm 3.76$  and  $26.2 \pm 2.82$  in the next 7 days (without DA). The overall satisfaction rate of the patients when using Protefix adhesive was  $19.35 \pm 5.48$  in the third week and  $25.85 \pm 4.35$  in the fourth week (without DA). Statistical analysis did not reveal a significant relationship between each type of denture adhesives and patient consent ( $p = 0.649$ ), but applying the adhesive prominently increases the satisfaction rate ( $p = 0.01$ ). The results are presented in Table 1.

The statistical analysis did not show significant differences between the rate of satisfaction and both age and sex factors ( $p = 0.061$ ,  $p = 0.744$ ). The results

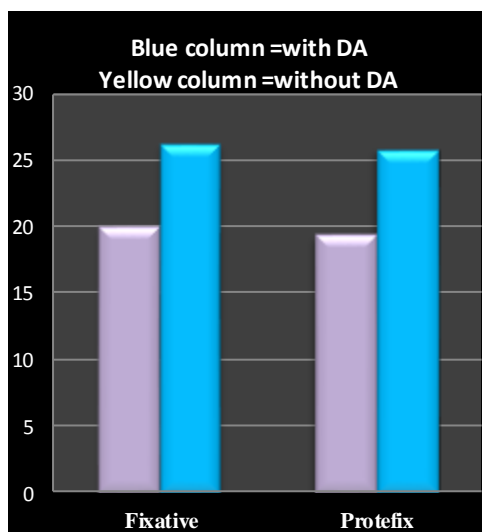
are shown in Table 2 and Figure 1 and 2.

**Table 1:** Comparison of satisfaction rates of both DA

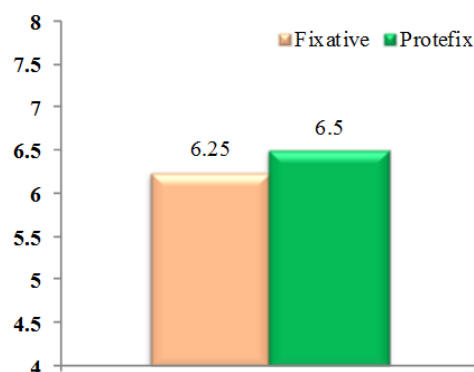
Group	Satisfaction score (Mean ± SD)		P*	Δ	P†
	no adhesive	with adhesive			
Fixative	19.95±3.76	26.2±2.82	<0.001	6.25±1.71	0.649
Protefix	19.35±5.48	25.85±4.35	<0.001	6.5±1.75	

**Table 2:** Comparison of satisfaction rates according to age and sex.

Variable	Group		P	
	Fixative	Protefix		
Age	66.77±6.22	63.1±5.73	0.061*	
Sex	Female	7 (35%)	8 (40%)	0.744†
	Male	13 (65%)	12 (60%)	



**Figure 1:** Comparison of overall satisfaction with and without adhesive



**Figure 2:** Comparison of the satisfaction rate after applying both DA

### Discussion

In the past, dentists used to think that the use of denture adhesives refers to poor dental skills as DA were

thought as a solution for ill-fitting denture. Nowadays, this viewpoint has changed. The use of denture adhesives is highly suggested for patients who seek extra retention demands that can't be achieved by the routine protocol of complete denture construction [14-15]. The aim of the present study was to ascertain if DA provided a better satisfaction level for the patients and it concentrated on the effect of adhesives on retention of complete dentures, adhesive strength, biocompatibility, patient convenience and masticatory ability that reported subjectively. According to Berg [16], 66% of patients were not satisfied with their dentures. He evaluates the influence of four denture adhesives 11 (Fittydent, Super Poligrip, Super Wernet's, and Tragacanth) on patients' opinions. The adhesives were applied on complete dentures of 32 patients. Subjective views of the patients indicated that one of the products significantly improved denture retention and had other favorable features. He also reported that 60%-70% of the patients had problems with retention and fitting of dentures. The results of the present study are consistent with those of Kelsey [9] who indicated a substantial improvement in chewing effects after using DA. Oczan and coworkers [17] conducted a study in order to establish the effect of a new denture adhesive on maximum bite force until denture dislodgement (BFDD) following adhesive application. He evaluated 15 denture-wearing patients (7 females, 8 males, mean age: 64 years). During one of the treatment sessions, the maximum BFDD with the pre-existing maxillary dentures using denture adhesive were measured. The measurements were also made at the baseline without adhesive and after the 1st, 2nd, 4th, and 6th hours following the application of the denture adhesive. The same procedure was applied to the new dentures about 2 weeks after the delivery of the dentures. This study showed a consistent improvement in BFDD when the adhesive was used. The current research finding is similar to Oczan's results in this regard. Zdzislaw *et al.* [18] measured the satisfaction rate of 60 patients with xerostomia regarding DA efficacy. In their study the retention of maxillary dentures was scored by modified Kapur index before application of DA. The participants were divided randomly into 6 groups regarding the use of the six DA during a six-month period. After this time, participants completed an HRQL

questionnaire. He reported that DA noticeably improved retention and stabilization of maxillary complete dentures. He also reported that DA in the glue form had the best retention effectiveness in patients with xerostomia. Zdzislaw also noticed that the amount of adhesive applied depends on the space between denture base and mucous membrane and the size of prosthetic foundation. The principle “the more, the better” is not suitable for these dental materials. The optimum effects of cream and powder are provided by the small amount of them (suggested layer is 1 mm thick). All dentists know that dry mouth is one of the most common oral symptoms in elderly patients but fortunately in this study nobody complains of severe xerostomia.

Pradis *et al.* [19] designed a study in order to compare the efficacy of two denture adhesives in edentulous patients wearing full dentures. His study confirmed the predicted and expected improvement in the stability and retention of well-fitting complete dentures with the adjunctive use of adhesives. Our study also showed the more effectiveness of DA in stabilizing the dentures of edentulous patients.

In some instances DA help the patients to overcome the denture complications but occasionally despite the physician experience it is difficult to meet the expectations. In these cases the use of dental implants is recommended [20].

The composition of DA is complex. There are components of plants and animals and synthetic compounds. Despite the local effect of the DA on oral mucosa, it may also affect the whole human organism. Therefore, nowadays just new generations of adhesives are used those without sensitization or cytotoxic effect on human body such as aldehyde derivatives are used. There are still observations showing discomfort or oral mucosal lesions caused by adhesives [18, 21]. Fortunately, in the current research none of the participants complained about irritation or discomfort. The study reveals that adhesives evidently improve the maintenance of dentures on prosthetic foundation and might be a solution when there are problems with achieving proper retention and stabilization of complete dentures. Contraindication for adhesives usage is damaged or broken prostheses. Applying DA demands proper hygiene of the prosthesis and oral cavity. Regu-

lar Check up are needed in order to check if the dentures are in the proper mechanical and hygienic condition and to educate patients.

## Conclusion

The study clarifies that applying either types of denture adhesives markedly improves the satisfaction rate in complete denture wearers without any complications. Further studies on a larger group by using different types of DA are necessary to determine which kind of denture adhesive is more effective and if there is any possible side effects that restrict the use of such substances.

**Conflict of Interest:** None declared.

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