

Effectiveness of a new denture adhesive paste containing natural ingredients (food grade) from a new point of view: the patient satisfaction

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Abstract

The effectiveness of denture adhesives has been controversial topic in literature although recently dental evidence suggests the important role of the adhesive paste for dentures in some particular local and/ or systemic and emotional medical cases. It is our belief supported from evidences, in fact, that patients' satisfaction is not only due to adhesiveness, but also to psychological factors and the pain caused by dental prostheses. The goal of this project was to test the effectiveness of a new denture adhesive paste containing natural ingredients (food grade) in particular pine resin considering a new point of view: patients' complacency through Quality of Life (HRQL) questionnaires. Data reported during the project suggest that the new denture adhesive product with natural ingredients, Food Grade and resin pine is compliant with the requested properties.

Keywords: Denture Adhesive; Food Grade; Natural Ingredients; Patient Satisfaction; Quality of Life (HRQL) Questionnaires; Denture Retention; Denture Stability; Complete Denture

Abbreviations: RRR: Residual Ridge Resorption; QOL: Quality Of Life; VAS: Visual Analogue Scale; HRQL: Health Related Quality of Life; MMSE: Mini Mental Status Exam

Introduction

Several factors and complex interactions affect the retention and stability of complete dentures in the oral cavity. These include atmospheric pressure, intimate adaptation between the denture impression surface and oral tissues, accurate peripheral extensions of the denture base that determined by physiological movements and presence of a thin film of acceptable viscosity saliva between the prosthesis and the tissues [1,2]. Residual ridge resorption (RRR) is a common, lifelong condition that plagues complete denture patients after exodontias and subsequent denture placement. RRR occurs rapidly within 3-12 months

after tooth removal, and continues throughout the patient's life. Alveolar ridge resorption compromises denture retention and stability that lead to unretentive and non-serviceable denture to the patient [3]. Furthermore, this will lead to unfavorable quality of life (QOL) to the patient. Van Waas MA has shown that the incidence of insufficient retention or instability of mandibular complete dentures increases with time. This is due to the influence of accelerated residual bone resorption. Majority of patients would complaint of inability to chew well, that related to unretentive and instability of the denture [4,5]. In addition to hard and soft tissue alterations over time, these patients can be affected by changes in saliva quality or quantity that are due to medications or age,

diminished bite force, and reduced neuromuscular control [6]. These biologic and physiologic changes compromise denture function. Therefore, new techniques have been introduced to enhance both the retention and fit of aging prostheses. These techniques include denture rebasing or relining, denture adhesives, and endo osseous dental implants. Literature reviews reported that Dentistry has never believed in adhesive paste to retain failure of prosthetic therapy [7,8]. Nowadays, dental literature stresses the important role of the adhesive paste for dentures in some particular local and/or systemic and emotional medical cases. In fact, patients' satisfaction is not only due to adhesiveness, but also to psychological factors and the pain caused by dental prostheses. The technical quality of dentures is certainly important, but medical and psychological factors are also considered to be contributory [9,10].

A recent review literature [11] has proposed 85 abstracts were reviewed, and 38 articles that met the inclusion criteria for this review were selected. The inclusion criteria included clinical trials and case series in which 10 or more patients were treated, as well as Cochrane Collaboration reviews and in vitro studies where clinical relevance could be determined. Of the original 85 articles, only 38 manuscripts met the inclusion criteria for this review: eight prospective controlled trials, eight cross-sectional cohort studies, seven in vitro studies, six multiple arm cross-over studies, five case series, three randomized controlled trials, and one retrospective study. Based on this detailed review of the relevant literature, when used as instructed, denture adhesives improve complete denture retention and stability as well as overall function, thus improving the edentulous patient's QOL. Denture adhesives should be used according to the manufacturer recommendations, following specific guidelines for application and removal to prevent potential misuse [11]. The goal of this project was to test the effectiveness of a new denture adhesive paste containing natural ingredients (food grade) in particular pine resin. The primary outcome was to report patient satisfaction through a Health Related Quality of Life (HRQL) questionnaire and through a Visual Analogue Scale (VAS) regarding the performance of the new adhesive. The secondary outcome was to record the masticatory efficacy and maximum bite forces until denture dislodgement of the denture of the new adhesive through the modified Kapur test [12] (Table 1).

3. MATERIALS AND METHODS

This multicentric controlled trial was carried out in 3 different private practices mainly voted at Prosthetic restoration. A total of 20 patients were selected, that comprised of 12 males and 8 females. The patients were wearers of 26 prostheses, 16 maxillary and 10 mandibular prostheses. The inclusion criteria foresaw patients who already were denture wearers, users or less of denture adhesive paste, which signaled discomfort in the use of the denture. The exclusion criteria were patients who cannot

answer the questionnaires for deteriorating general conditions. In doubtful cases, or in particularly elderly patients, patients were taken in to consideration their mental status through Mini Mental Status Exam (MMSE), a screening test to point out any degenerative mental process. The trial was conducted following this protocol: first visit in which the patient filled out a VAS on the discomfort produced by the prosthesis while the investigator collected consent for trial and filled a "first visit" questionnaire, a modified Kapur test, collected the images of the initial situation, instructed the patient on how to use the adhesive and the cleansing tablets. The re-evaluation was conducted after a standard period of seven days. During the re-evaluation, the investigator has monitored the absence of any reaction on the soft tissues, has filled a new modified Kapur test, a re-evaluation questionnaire, collected the images while the patient has filled a new VAS relative to the discomfort recorded after use of the new denture adhesive. The re-evaluation questionnaire contained trick questions to assess the reliability of the answers given by the patients.

4. RESULTS

All recruited patients have completed the test period of 7 days and have come at the re-evaluation appointment. During the clinical re-evaluation, the investigators did not detect any toxic reaction on the soft tissues; recruited patients reported no any particular inconvenience during the test period. A number of 3 patients (15%) reported burning gums after adhesive application with spontaneous resolution within 5 minutes after application. HQRL questionnaire has showed a general satisfaction of the patients. The tricky questions included in the re-evaluation questionnaire has considered reliable to all the answers obtained. VAS has registered satisfaction in 75% of maxillary denture wearers (Figure 1) and 80% of mandibular denture wearers (Figure 2). 80% of the patients showed enthusiasm in testing a natural product (Food Grade) and the taste of the new adhesive is on average pleasant. 20% of patients did not record taste during test period while 35% of patients recorded extremely pleasant taste with score of 5 (Figure 3). The adhesive seal in patients who had never previously used adhesive has had an average of 12 hours (Figure 4). The seal in patient's already adhesive users had an average of 8 hours in mandibular denture wearers (Figure 5) and an average of 12 hours in maxillary denture wearers (Figure 6). The modified Kapur test reported an increase in 93% of maxillary denture wearers (Figure 7) and 90% of the mandibular denture wearers (Figure 8).

5. DISCUSSION

The data collected although on a small sample confirm that masticatory activity improved with denture adhesive. Furthermore, with denture adhesive application, bite force until maxillary complete denture dislodgement increased significantly. Patients were satisfied with application of denture adhesive for

mastication, as it made chewing more comfortable [13]. Psillakis et al. and Ozcan et al. investigated the effect of a denture adhesive on maximum bite force until denture dislodgment after adhesive; they found a significant improvement in bite force until denture dislodgment when adhesive was used [14,15]. With the increased stability and retention provided by denture adhesives, denture wearers can apply more force during mastication, thus needing less chewing till deglutition. [16]. Denture adhesives can provide a softening effect; reduce the food particles collecting below the denture, thus inhibiting the growth of *Candida albicans* [17]. In addition, adhesives can serve to protect the mucosa [18]. As recorded during the trial, numerous publications describe the use of a range of sophisticated methods to test the retentive contribution of adhesives to denture stability [19]. The majority demonstrate significant improvements with maxillary dentures [19,20]. Since prosthodontic as well as surgical treatment can be performed to improve patient satisfaction, oral health-related QOL must be influenced by the quality of the prosthetic treatment [21,22]. In the management of complete denture patients, the psychological aspects of treatment are of paramount importance, and equally as important as the accurate technical construction of the prosthesis [23]. In this regard, as early as 1967, Kapur mentioned that denture wearers may find denture adhesive helps them to chew better, but his results did not demonstrate that masticatory performance was improved [24]

6. CONCLUSION

A recent authoritative literature review has found the “Ideal characteristics” of denture adhesives are i/ non toxic to the systemic or oral health of the patient, ii/ incapable of promoting bacterial or fungal growth, iii/ improves the dentures’ retention and stability, iv/easy for the patient to apply and remove, v/ acceptable odor, taste, and consistency, vi/ maintains its capabilities for 8-12 hours, and vii/ it is cost-effective for the patient [11]. Data reported during the trial suggest that the new denture adhesive product with natural ingredients, Food Grade and resin pine is compliant with the requested properties.

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