DOES THE USE OF AN ADHESIVE IMPROVE CONVENTIONAL COMPLETE DENTURES? -literature review

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ABSTRACT

Introduction. Denture adhesives, when used properly are safer and beneficial to the patient in improving retention and stability, incisive ability, comfort, function, and in providing psychological security. Although adhesives enhance denture performance and patient confidence, they should not be used to compensate denture deficiencies. The patients should use denture adhesives only on the advice of their dentists and the dentists too should instruct them about the proper use and caution against misuse of denture adhesives.

Key words: *complete denture, denture adhesive, denture stability, etc*

INTRODUCTION.

The huge prevalence of edentulism has resulted with an increase in the total number of patients requiring complete dentures [1]. Around one quarter of these patients complain about various degrees of looseness of their denture and reduced masticatory function which are related to poor retention [2,3]. Since a complete denture should have sufficient retention which is defined as a resistance of a denture to vertical dislodging forces [4], various treatment methods have been used to overcome this problem such as overdentures, implants and denture adhesives [5].

Among these, the denture adhesives have been considered as an alternative, useful adjunct to the denture treatment as they offer non-complicated and practical application [3,6].

Denture adhesives are known since the late eighteenth century, but they were mentioned in the literature and described by the American Dental Association in 1935 [7]. In the glossary of prosthodontic terms, it has been described as a material used to make a denture adhere to the oral mucosa with physical and chemical interactions [4]. This phenomenon occurs with two phases; ingredients of denture adhesive become swelling, getting viscous and sticky form by means of absorbing the water in the saliva and later, filling the gap between mucosa and denture [8]. As a result, the adaptation of the denture is improved by the denture adhesive that increases the surface contact area between the denture seating surface and the supporting tissues with the formation of retentive force.

LITERATURE REVIEW

Retention and stability can be affected by the extension of the denture borders, anatomic changes in the soft and hard tissues, reduction in salivary flow, or impaired neuromuscular control [7]. In such situations, denture adhesives may be indicated to improve retention and stability by improving prosthesis adaptation. Denture adhesives can also be used as a psychological measure to support patients

who have difficulty adapting to the treatment [9]. Denture adhesives typically consist of synthetic hydrophilic polymers in the form of powders, creams, or strips that swell when exposed to saliva and adhere to the glycoproteins present in the oral mucosa [8]. A viscous layer is formed that improves the adhesive and cohesive properties between the oral mucosa and the dentures, eliminating voids and food accumulation [12]. Denture adhesives can be used to improve the retention and stability of ill-fitting or well fitting dentures. However, in spite of the positive aspects, some dentists and patients are reluctant to recommend or use these products and believe that the need for their use is related to clinical negligence or incorrect laboratory procedures. The retention of conventional complete dentures (CD) in the oral cavity is achieved through the interaction of physical mechanisms, including adaptation to the supporting tissues in the thin layer of saliva between the CD and the mucosa, adequate peripheral edge extension, and atmospheric pressure. The lack of proper retention causes mucous membrane distortion, with consequent denture base displacement, which may result in bone resorption acceleration. 25 According to Lucena et al, factors such as esthetics, phonetics, retention, stability, and comfort are the main expectations of patients with new CDs. Berg reported that 66% of an edentulous population was dissatisfied with their CD, with 60% to 70% of these individuals having problems with comfort, retention, and poor adaptation.

Therefore, adequate retention is one of the essential points for the acceptance of conventional CDs. A consensus regarding the clinical advantages of the use of complete-denture adhesives in terms of retention and stability, patient-reported outcome measures (PROMs) by subjective parameters of satisfaction and quality of life, and masticatory performance is lacking.

The first-ever denture adhesive was atented in 1913. There is documentation of the use of denture adhesives from 1923 and 1930 [6].

According to S. Yankell [7], up until 1939, there are data that 15 million had been using denture adhesives. Of all, means of retention of complete dentures, adhesives are most widely spread and least detrimental to health [8]. The improvement of stability and retention of complete dentures with the help of some adhesive was proven in 1975. Other methods widely used today for the improvement of retention quality of complete dentures are implants or natural teeth that serve for the fitting of overdentures [1, 9].

Apart from the term “denture glue” used in Bulgaria by B. Atanasov, other widely adopted terms are also “denture adhesive” [10] and denture fixative [11]. Denture adhesives are available on a large scale, non-toxic, soluble products, that are applied between the denture and the mucosal surface for the purpose of improving the retention, stability and function of complete dentures [12].

If used correctly, the adhesives can provide reliable estimations of the ability of the dental doctor for exact application of means of retention [13] and they can also comprise a useful part of the dental care for the patient [14]. Adhesives establish a connection, albeit a temporary one, between a denture and underlying tissues [15]. According to À. Flynn Arlene [16] they turn into a necessity for the patient exactly because they enhance that connection.

Research by A. Coates in 2000 reached the conclusion that 52% of the patients do not feel any need of glue, 20.5% do not know what denture adhesive is and what it is used for at all, and 32.9% have tried using it, but only 6.9% continued using it[17].

Research by M. Ozcan in Istanbul reached the conclusion that somewhere between 7- 33% of the patients with complete dentures use adhesives, but people, in general, are not well acquainted with their existence, advantages and methods of implementation.

Research in Wales estimated that 12% of women and 10% of men use denture adhesives, but a large part of them start

avoiding their usage due to the high price and the insufficient duration 26 of action. There are certain requirements for the denture fixatives, and it is considered necessary for them to comply with those requirements [18]. The lack of natural teeth affects in different ways the function of the masticatory system and the psyche of the patient. Most strongly affected are chewing and biting off, less influenced is speech and the least is the embarrassment due to the patient's appearance.

According to G. Zarb, the most important role of complete dentures (CD) is the restoration of masticatory function. The relation that is most often looked after is the one of the qualities of the dentures, the anatomical-morphological specifics of the mouth cavity and the approval of the new dentures by the patient [29, 30]. However, in the USA, the cases of dissatisfied and affected patients with complete dentures are above 10%, and this share is growing. According to M. J. McEntee , it is no less than 60% of the dentures that are loose and unstable.

Elderly people have lesser requirements to dental procedures, but nevertheless, they suffer from dental dysfunctions and in particular, from ineffective complete dentures.

The same research works show that 71% of the people are satisfied with their complete dentures, but 29% experience certain dissatisfactions. When a patient with complete denture looks for dental help, his/her complaints are usually related to an uncomfortable or unstable denture.

Before the treatment, the completely toothless patients feel the need for complete dentures in order to improve their aesthetic appearance and masticatory function. After the dentures are made, those same patients increase their requirements to the dentures' retention and stability [31, 32].

Denture adhesives (DA) can be useful adjuncts to improving the retention, stability, and function of both ill-fitting and well-fitting CDs. According to Munoz et al, DA can be recommended to reduce the quantity of food particles that gathers under the CD and when even a well-made CD does not satisfy a patient's perceived retention and stability expectations. In addition, DA may be used when anatomic structures are compromised by a ridge shape or tissue resiliency that does not favor adequate stability and retention, and when medical circumstances, for example, stroke damaged neuromuscular control, adversely affect a patient's ability to develop the adaptive muscle behaviors required to control CD movement in function and at rest. Other general benefits are associated with the use of DA, such as a decrease in CD movement greater ability to chew and speak, and improved distribution of occlusal forces on the support tissues.

According to Koronis et al, 30% of CD wearers use DAs at some time, and the choice of which DA to use is subjective. Shay reported that this industry sector estimates the number of DA users around the world at between 15% and 33%. Often, people make indiscriminate use of these products.

When considering the use of DA as an adjunct to CD retention, masticatory performance analysis enables an assessment of the influence of these products on chewing effectiveness. The scientific literature contains a wide range of studies that report the use of DA to increase CD retention and stability. However, associations between the use of DA and masticatory performance are still relatively scarce.

Successful complete denture therapy involves both technical excellences during prosthesis fabrication and effective patient management once the dentures are placed. Satisfying the expectations of many patients for optimal denture retention and stability is often beyond the technical skills of even the most accomplished practitioners.

Discussing and implementing the judicious use of denture adhesives may satisfy patient's expectations and achieve the intended treatment goals. It is thought that dentist need to know more documented, well organized details about these adhesives in order to educate all denture patients about

the advantages, disadvantages and use of such products". In addition, to identify those patients for whom such products are advisable and or necessary for a satisfactory denture wearing experience.

Denture adhesives create an increased sense of security and satisfaction among patients, but they should use denture adhesives only on the advice of their dentist. Patients should also be instructed about the proper use and cautioned against misuse of denture adhesives, as a part of denture post delivery instructions.

It is mandatory that dentist educate denture patients about denture adhesives and their use, abuse, advantages, disadvantages and available choices. The major information resource for a patient should be the dentist and not magazines or television advertisements or the testimonials of relatives and acquaintances.

The choice between cream and powder is largely subjective, but certain facts may underscore a patient's selection". Powder formulations, as a rule, do not confer the same degree of "hold", nor do their effects last as long, in comparison to comparable cream formulations. However powders can be used in smaller quantities, are generally easy to clean out of denture and off tissues, and are not perceived as "messy" by patients. Furthermore, the initial "hold" for powders is achieved sooner than it is with cream formulations.

Obtaining the greatest advantage from the use of an adhesive product is dependent on its proper usage. For powder and cream products, the least amount of material that is effective should be used. This is approximately 0.5 to 1.5 gms per denture unit (more for larger alveolar ridges, less for smaller ones).

For powders, the clean prosthesis should be moistened and then a thin, even coating of the adhesive sprayed onto the tissue surface of the denture The excess is shaken off, and the prosthesis is inserted and seated firmly. If the patient suffers from inadequate or absent saliva, the sprayed denture should be moistened lightly with water before insertinq". For creams, two approaches are possible.

Most of the manufacturers recommend 1) placement of thin beads of the denture adhesive in the depth of the dried denture in the incisor and molar regions, and, in the maxillary unit, an anterio-posterior bead along mid palate.

However, even more distribution of the material can be achieved if small spots of cream placed at 5mm intervals throughout the fitting surface of the dried denture. Regardless of the pattern selected, the denture is then inserted and seated firmly". As with powders, use of denture adhesive cream by Xerostomia patient requires that the adhesive material be moistened with water prior to inserting the denture"

Denture adhesives, when used properly are safer and beneficial to the patient in improving retention and stability, incisive ability, comfort, function, and in providing psychological security. Although adhesives enhance denture performance and patient confidence, they should not be used to compensate denture deficiencies.

The patients should use denture adhesives only on the advice of their dentists and the dentists too should instruct them about the proper use and caution against misuse of denture adhesives.

The enhancement of retention and stability, which are major properties that determine the performance of a removable prosthesis, has always been a goal of prosthetic dentistry. Those who wear removable dentures, especially those with complete dentures, are often confronted with varying degrees of looseness of their prosthesis and complain of discomfort and/or reduced masticatory function or speech. Both functional disturbances and psychosocial problems have been reported to occur in edentulous patients treated with complete dentures.

The use of denture adhesives or denture fixatives has been considered a useful treatment adjunct for the improvement of denture retention and stability. According to Zarb et al, the term “denture adhesive” refers to a commercially

available, nontoxic, soluble material that is applied to the tissue surface of the denture to enhance retention, stability, and function. Although their first application was reported in 1913, followed by other patents in the 1920s and 1930s,4 it was not until 1935 that the American Dental Association Council on Dental Materials, Instruments, and Equipment characterized denture adhesives as nonmedical products.

Grasso suggested that denture adhesives be categorized into soluble and insoluble groups. The soluble category includes creams, powders, and pastes, while the insoluble group consists of wafers and pads. Furthermore, on the basis of their composition, denture adhesives can be divided into natural or synthetic denture adhesives.

CONCLUSIONS

Based on the findings of this systematic review, the following conclusions were drawn:

1. The use of denture adhesives in conventional complete dentures improved the overall performance of treatment, increasing the retention, stability, masticatory performance, and satisfaction of patients with complete edentulism.

2.Newly developed denture adhesives should be evaluated in future well-conducted clinical studies.

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