The Effect of Different Adhesive Materials on Retention of Maxillary Complete Dentures

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The aims of this study were to evaluate the retentive effect of different denture adhesives on maxillary complete dentures and examine the use of an intraoral transducer in assessing denture retention. The quantification of maxillary complete denture retention in 26 patients with five different adhesives was completed using vertical tensile tests and an intraoral resistance transducer. The means of the values obtained were analyzed statistically for comparative purposes. The experimental design revealed that all tested denture adhesives improved retention and that the intraoral transducer used proved to be appropriate for this evaluation. The intraoral transducer demonstrated that denture adhesives can improve retention of complete maxillary dentures. *Int J Prosthodont 2011;24:175–177.*

Improving denture retention and stability has always been a major challenge in prosthodontics.[1] Although the first prosthetic adhesive appeared in the 18th century, the first patent by the American Dental Association was not filed until 1913. The purpose of denture adhesives is to subjectively benefit the quality of life of denture wearers in terms of improved denture stability, retention, and comfort, in addition to improved incisal force, masticatory ability, and confidence.[2,3] Despite the negative attitude of dentists toward denture adhesives, a substantial proportion of denture wearers have tried denture adhesives in the past or are regular adhesive users.[2,4] Nevertheless, there is surprisingly little research available in this area.

Therefore, the main aims of this study were to evaluate the effect of different denture adhesives on the retention of complete maxillary dentures and to evaluate an intraoral transducer in the assessment of denture retention.

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Materials and Methods

The study group consisted of 26 patients from the Faculty of Dentistry, Porto University, Porto, Portugal, who wore complete maxillary and mandibular dentures. Patients were selected according to the following inclusion criteria: autonomous and cooperative adults of both sexes, completely edentulous, and without any type of maxillofacial surgery involving the evaluated area. All patients agreed to participate in the study and gave their informed consent. The study was approved by the ethical committee of the Faculty of Dentistry of Porto University.

Retention of only the maxillary complete denture was evaluated in vivo first without applying a denture adhesive and then with each of five different adhesives (Protefix cream, BMP Production; Corega cream, Stafford-Miller; Corega ultra powder, Stafford-Miller; Protefix powder, BMP Production; and Corega strips, Stafford-Miller). At the end of the tests, another evaluation was completed without adhesive.

The evaluation was carried out by quantifying the retention of the dentures when subjected to vertical tensile tests using an intraoral resistance transducer with four extensometers (120 Ω), forming a Wheatstone bridge to measure electric resistance. The center of the denture was determined from the center of a triangle defined by three anatomical landmarks (maxillary tuberosities and the interincisal papilla). A rivet was placed at this location to receive a screw from the transducer (Fig 1).

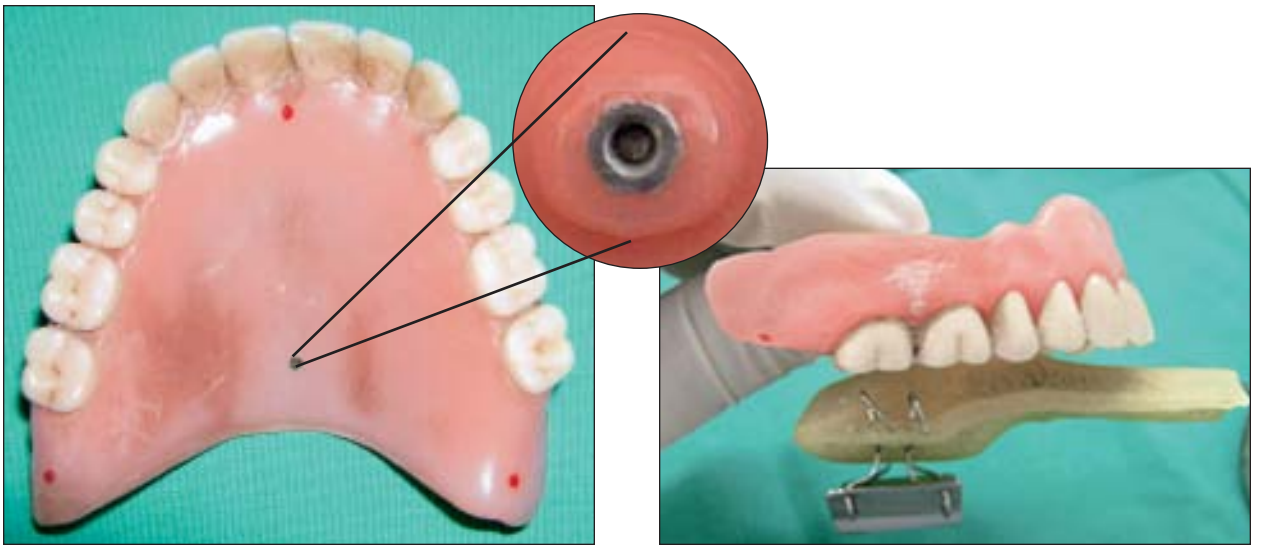

Fig 1 Determination of the denture connection to the intraoral transducer.

Fig 2 A data acquisition plaque was connected to a computer, and through use of software, mean retention values were able to be read.

Three measurements were obtained for each of the seven tests performed, and the mean of these measurements was calculated. A data acquisition plaque and LabView software (National Instruments) enabled the reading of values, which were subsequently analyzed using SPSS statistical software (IBM) (Fig 2).

Results

All denture adhesives, excluding the Corega strips, produced a statistically significant improvement in retention of complete maxillary dentures (P = .238). Corega cream, Corega powder, and Protefix powder showed similar retention values. The results obtained from the initial and final tests without adhesive were equivalent (Fig 3).

Discussion

Most of the denture adhesives studied (Corega cream, Corega powder, Protefix cream, and Protefix powder) produced a significant increase in retention; only the increase produced by the Corega strips had no statistical significance. The intraoral resistance transducer used was effective in studying retention to vertical forces. The transducer, however, is able to analyze only the retention of complete dentures against these forces and not against other forces of dislodgment for which other techniques may be indicated (eg, kinesiography, infrared, etc).[1,3,5] It is understood that retention and stability are difficult to dissociate in clinical tests, but with an intraoral resistance transducer such as the one used in this study, it is possible to analyze only retention. Although retention was only measured in a nonfunctional situation, it is believed that improving retention improves stability, and both improve the functional capacity of patients with complete dentures.

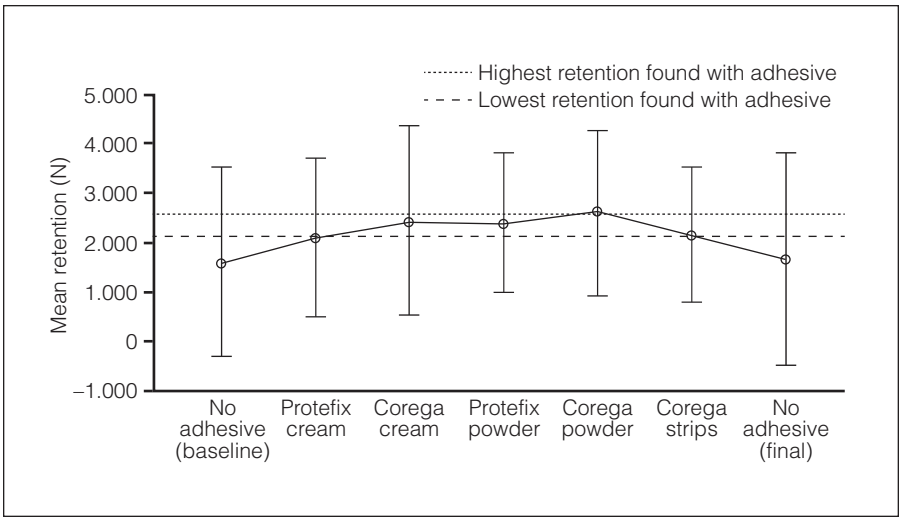

Fig 3 Distribution of mean values of retention.

Improvement in retention of maxillary dentures as a result of adhesive use is self-evident for countering vertical dislodging forces, but the method used in this study allowed the authors to compare the effect of different adhesives—an important contribution to the study of a clinical parameter that has been the target of patient complaints over the years.

The results show that although adhesives are often recommended unenthusiastically by oral care professionals, they can provide an advantage in retaining removable prostheses in general, and more particularly, maxillary complete dentures.[1,4] Since each patient has an individual morphology of the edentulous ridge and different soft tissue characteristics, patients were evaluated as their own controls. The increase in retention values for each particular individual was evaluated once. The initial retention values (without adhesive) varied immensely between patients.

One of the adhesives studied (Corega cream) was recently removed from the market because of its zinc content. At the time of the study, however, it was the best seller in Portugal.

The improvement seen with adhesives is less pronounced in mandibular dentures,[2] where overdentures and implants have a considerable advantage. Unfortunately, the intraoral transducer used was not adapted to evaluate the retention of mandibular prostheses; the authors are attempting to develop a new transducer to do so.

Conclusion

Within the narrow context of the experimental design of this study, it can be concluded that of the five adhesives tested, only Corega strips did not show a significant increase in denture retention. The highest retention values were obtained by Corega cream, Corega powder, and Protefix powder. The intraoral transducer was helpful to this adhesive evaluation.

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