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Assessment of dentists' knowledge in utilization of adhesives in complete dentures

Conhecimento dos cirurgiões-dentistas sobre a utilização de adesivos em próteses totais

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ABSTRACT

Objective: To assess dentists' knowledge regarding adhesive usage in complete dentures (CD). **Material and Methods:** Data collection was conducted through a questionnaire administered via the Google Forms platform. The study included dentists with active Regional Dentistry Council (CDR) registration, both general practitioners and prosthodontics specialists, practicing within Brazilian territory. **Results:** The findings revealed that, although adhesives positively impact denture stability, retention, masticatory performance, comfort, and patient satisfaction, there is still limited knowledge among professionals regarding their proper use. **Conclusion:** Results highlighted the professionals' lack of knowledge on the subject and the consequent importance of continuous professional development to ensure high-quality dental care.

KEYWORDS

Complete denture; Denture adhesives; Fixatives; Knowlegde; Practice.

RESUMO

Objetivo: Avaliar o conhecimento dos dentistas sobre o uso de adesivos em próteses totais (PT). **Material e Métodos:** A coleta de dados foi realizada por meio de questionário administrado pela plataforma Google Forms. O estudo envolveu cirurgiões-dentistas com registro ativo no Conselho Regional de Odontologia (CRO), tanto clínicos gerais quanto especialistas em prótese dentária, atuantes em território brasileiro. **Resultados:** Os achados evidenciaram que, embora os adesivos impactem positivamente na estabilidade, retenção, desempenho mastigatório, conforto e satisfação do paciente, ainda existe conhecimento limitado entre os profissionais quanto ao seu uso adequado. **Conclusão:** Os resultados destacaram a falta de conhecimento dos profissionais sobre o tema e a consequente importância da atualização profissional contínua para garantir a qualidade do cuidado odontológico.

PALAVRAS-CHAVE

Prótese total; Adesivos protéticos; Fixadores; Conhecimento; Prática.

INTRODUCTION

According to the Brazilian Institute of Geography and Statistics (IBGE), there were over 32 million people aged over 60 in Brazil in 2019. By 2060, the expectation is that this number will exceed 58 million people, constituting over 25% of the Brazilian population. With the increasingly aging population, there will inevitably be greater challenges in providing oral healthcare. Despite advances in dentistry, tooth loss associated with aging remains a reality. With this growing population of edentulous individuals,

there is likely to be a proportional increase in demand for total or partial dentures [1,2].

The progression of tooth loss is characterized by complete edentulism, an irreversible condition that continues to be a predominantly negative factor for both oral and general health, significantly impacting quality of life. Many edentulous patients face difficulty in performing fundamental functions such as chewing, eating, and producing phonemes. Moreover, over time, tooth loss can lead to atrophy of the supporting dental structures and loss of muscle tone, which can have unfavourable effects on facial aesthetics. The alterations caused by edentulism can be mitigated through dental prosthesis rehabilitation, the most economical and common treatment for restoring oral function in edentulous individuals [3,4].

This rehabilitation with CD has a significant impact on the functional and psychological aspects of individual well-being. Despite the success rate of implant-supported prostheses, conventional CD remain a common choice, including for patients with limited financial resources, severe bone resorption, or systemic diseases that preclude surgical procedures, and even for those satisfied with their prostheses who refuse other forms of treatment [5,6].

However, CDs can also cause stress to the individual when their fit, stability, and comfort are poor. Some of the main problems faced by CDs users involve retention, stability, and function; in fact, almost half of prosthesis users complain of discomfort during chewing, pain, and looseness, with loss of retention being the most frequently reported complication. These are important factors used, for example, to assess the chewing ability and oral health-related quality of life of these individuals. In order to improve these clinical aspects, products such as denture adhesives can be used [7,8].

Denture adhesives are characterized as compounds, primarily available in the market in the form of gel and powder, mainly composed of binding agents such as carboxymethylcellulose (CMC), which, upon contact with saliva, promotes adhesion between the prosthesis base surface and the individual's mucosa, filling the spaces between the two structures, providing strong cohesive bonds between them. This can result in improved prosthesis retention and stability, thereby enhancing chewing efficiency and capacity [9]. Such usage also aids in psychological satisfaction, as it increases user comfort and satisfaction, minimizing the accumulation and ingress of food particles between the prosthesis and oral mucosa, thus improving quality of life. Denture adhesives enhance the stability of well-fitted prostheses, chewing, patient satisfaction, mandibular movement during chewing, and bite force [10,11]. Additionally, an in vitro study conducted by Almeida [12] demonstrated that when incorporated with antimicrobial agents such as E. giganteum and P. granatum, denture adhesives were able to interfere with the biofilm development of *C. albicans*.

However, few studies have explored the attitudes, approaches, and viewpoints of dental professionals on this topic. A study by Polyzois et al. [13], which assessed the attitudes of Greek dentists towards denture adhesives, showed that 61.5% of general practitioners and 49% of prosthetic specialists recommend their use. Despite similar studies existing in other countries, there is no such research at the national level in Brazil.

Given the importance, as well as the lack of research on the subject, the main of this study was to evaluate, through a questionnaire, the knowledge of dentists regarding the use of adhesives in CD.

MATERIAL AND METHODS

The research project was submitted to the Research Ethics Committee (REC) of the Bauru School of Dentistry and approved (6.121.226), complying with Resolution No. 466/12 of the National Health Council (NHC). The Informed Consent Form (ICF) was previously signed by the participants, who, by agreeing to participate in the research, had their personal data safeguarded confidentially. Moreover, access to the results was ensured.

The entire research was conducted online, eliminating the necessity for participants and researchers to convene in person. The research team comprised five individuals who were responsible for crafting the questionnaire, conducting the literature review, organizing, and tabulating the data. Inclusion criteria encompassed generalist dentists or prosthetic specialists, while data obtained from dentists of

other specialties and dentists with inactive CDR were excluded.

The data collection was conducted using the Google Forms tool, where participants received the link via digital platforms (email and WhatsApp). The questionnaire consisted of 15 questions (Table I), both objective and subjective, related to the use of prosthetic adhesives in dental practice. Additionally, a question about the participants' level of specialty and area of specialization was included. The link was also sent to dental councils for questionnaire dissemination. Data were obtained through Google Forms and then organized and tabulated in Excel spreadsheets.

RESULTS AND DISCUSSION

A total of 95 responses were obtained, with approximately 41% of these recommending the use of adhesives in complete dentures when the upper prosthesis lacks adequate retention, as well as in lower prostheses. Among the reasons listed for these recommendations, 44.2% of participants highlighted improvement in retention as a crucial factor, while 14.7% of dentists indicated "resorbed ridge" as justification for recommending adhesive use. This response reflects an understanding of the physiological condition of alveolar ridges, which may experience volume loss over time, resulting in irregular ridges, thereby producing an unstable base for complete dentures, complicating conventional retention [14]. Another 12.6% mentioned ensuring greater comfort and security for the patient as reasons for recommendation.

Regarding the function of adhesive in CDs, 40.2% of professionals believe that the primary function of adhesive is to enhance denture retention, while 35.3% also agree that it contributes to stability. This may be related to the importance of retention and stability in dentures, characteristics that need to be achieved to increase mandibular movement, patient confidence, and comfort [15].

Interestingly, a smaller but still significant portion of professionals (1.6%) believe in the potential of preventing fungal infections with adhesive use. Although this number is lower compared to other perceptions, this observation suggests an understanding of the impact of denture adhesives on oral hygiene and oral environment of patients, as adhesives may exhibit antimicrobial activity for up to 12 hours [16].

About 38.9% of dentists recommend applying adhesive to complete dentures approximately twice a day, while 17.9% recommend applying adhesive only once a day, 11.6% suggested that their patients use adhesive three times a day, and only 1.1% of dentists recommend following the dosage of the denture adhesive brand. This may indicate that most dentists adapt their recommendations according to the clinical needs of the patient and their own experience.

It is notable that 89.5% of dentists recommend removing the used adhesive before reapplying it. This emphasizes the importance of the cleaning and hygiene process before each application, ensuring a clean base for effective adhesive bonding [17,18].

Table I - Questionnaire used for data collection

1. As a dentist, in which situation do you recommend the use of adhesives (e.g., Corega) in complete dentures?	2. If you recommend it, which form of adhesive presentation do you advise?
3. Describe the reason for your answer to the previous question.	4. Do you believe that when a complete denture is well-adapted, there is no need for adhesive indication? Explain your answer.
5. In your opinion, what is the function of an adhesive in a complete denture? You may select more than one option.	6. In your opinion, is the indication for adhesives linked to technical failures or procedures inherent to the fabrication of complete dentures?
7. How many times per day do you recommend the application of the adhesive?	8. According to the previous question, the indication for adhesives should be made because:
9. Do you advise patients to remove the previously used adhesive during the day before reapplying it?	10. If a new patient you treat is already using adhesive as a routine, what is your approach?
11. After how long do you suggest that the patient makes a new application of the adhesive?	12. Do you attribute the belief or disbelief regarding the use of adhesive to?
13. Do you think that the adhesive increases the risk of infections by increasing microbial contamination?	14. Do you use adhesive in your clinical practice when fabricating a complete denture? If so, at what stage?
15. What is the main complaint of patients who use adhesives?	

A significant number of dentists, 27.4%, do not know when to recommend reapplication of the adhesive. This may reflect a lack of consensus or the need for clearer information on this specific practice. Interestingly, 40% of the research participants recommend that patients reapply the adhesive every 6 hours.

When questioning about their beliefs regarding the risk of infections and microbial contamination associated with adhesive use in complete dentures, the results revealed a division of opinions. Approximately 66.3% of individuals believe that adhesive use increases the risk of infections. On the other hand, 33.7% of participants disagree with this belief. Being a widely studied topic in the literature, studies by Peralta et al. [16] demonstrate that the components of adhesives themselves exhibit antimicrobial activity. Other studies, such as the one by Sampaio-Maia et al. [19], indicate that depending on the brand of adhesive, it may even inhibit the growth of *Candida albicans*, the primary microorganism responsible for denture stomatitis.

Regarding the use of adhesives during clinical practice in CD fabrication, 42.9% of dental professionals reported not using denture adhesives in their clinical practice, which may reflect a confidence in the proper application of denture techniques principles. On the contrary, 32.5% of dentists indicated that they use adhesives in the registration and try-in phase of artificial teeth, suggesting that for this portion of professionals, adhesive use is considered during specific stages of the fabrication process, possibly to achieve temporary retention during these critical steps. Additionally, 20.8% of participants believe that there is no need to use adhesives when technical execution principles are achieved.

In this matter, it is important to emphasize that the proper fabrication of complete dentures remains the main determining factor for the clinical success of this type of rehabilitation, particularly in terms of retention, stability, and support. When dentures are fabricated with high technical quality, the need for denture adhesives for retention may be reduced. This association is supported by the study conducted by Tôrres et al. [20], which demonstrated that masticatory efficiency and the quality of life of edentulous patients are directly related to the technical quality of complete dentures.

Regarding preferences in presentation form, the results revealed that 58.5% of dentists recommend that their patients use cream adhesive, while 29.7% recommended the use of powder adhesive, which may indicate that some professionals believe that the powder form offers more effective adhesion or prefer its application. Which it is consistent according to a systematic review conducted by Figueredo et al. [21], which analysed nine randomized clinical trials (RCTs), concluded that the adhesive in cream form showed better masticatory function when compared to the powder and strips

When asking about the indication of adhesives in well-adapted CDs, there was a wide variety of responses from research participants. 49.4% believe that when a complete denture is well-adapted, there is no need to recommend adhesive use since it already provides retention and stability, while just. Although several studies had shown that denture adhesives play a crucial role in preventing the displacement of prostheses during use, which helps minimize the accumulation of food particles beneath the denture base and subsequently reduces the risk of compression ulcers and mucosal irritation [22]. Additionally, these adhesives enhance masticatory efficiency, occlusal force, and jaw movement, contributing to an improved quality of life related to oral health [23,24]. And only 10.5% believe that adhesives offer additional advantages beyond the already achieved retention and stability.

Regarding the indication of adhesives being linked to technical failures of complete dentures, research participants expressed their opinion, with 50.5% believing that technical failures in a complete denture should not be addressed through adhesive use. This suggests that, in the view of these participants, adhesives should not be used as a solution for technical problems or inadequacies in denture fabrication.

When questioning why the indication of adhesives should be made, 17.8% of dentists believe that the indication of adhesives should not be made, while 16.8% consider that the indication of adhesives should be made regardless of the presence of technical failures or the degree of retention achieved in the denture. Another 13.6% of dentists recommend adhesives only when there is neither retention nor stability in the complete denture, and 12.6% of participants

view adhesive as a rebase material, possibly using it to adjust the adaptation of the denture.

This particular result suggests that there is no consensus about its indication, even when several studies, such as the RCT conducted by Torres-Snachéz et al. [25], show how they greatly enhanced patient satisfaction due to improved retention, stability, and reduced accumulation of food particles between the denture and the mucosa.

When faced with a new patient who already uses adhesive in their denture, 49.4% of dentists reported that they reinforce with patients that when the CD already has adequate retention, adhesive use is dispensable. This approach highlights the importance of providing clear guidance to patients on the appropriate use of denture adhesive. 32.6% of participants indicated that they advise patients on the positive and negative aspects of adhesive use, and only 7.3% of dentists reported that they continue to recommend adhesive use for patients.

In a percentage of 3.1%, it was identified that some professionals assess the conditions of the CD and the patient before making any recommendation regarding adhesive use. This approach underscores the need to consider the individual circumstances of each patient. Another 4.2% of participants explain that they do not see the need for adhesive use and communicate this to patients.

A total of 43.1% of dentists attributed their knowledge of adhesives to what was taught during undergraduate studies. This perspective highlights the importance of academic education but also points to the need to deepen and update knowledge throughout one's career. Another 20% of participants attributed disbelief in adhesive use to social media influences. They noted that media may present the product in contexts where complete dentures are not used, which may raise doubts about its actual effectiveness. Additionally, 9.4% of participants reported not having sufficient knowledge on the topic. And another 4.2% disbelieve in adhesives based on their own clinical experiences, possibly due to unsatisfactory results or negative clinical observations.

When analysing patient complaints regarding adhesives, approximately 18.9% of dentists reported that patients use adhesives in their complete dentures without any professional guidance. This suggests that some patients may be resorting to adhesive use on their own, possibly due to information obtained from other sources or perceived necessity, although a group of researchers developed a complete denture cell phone application, as an auxiliary teaching tool that students, professionals and patients can use for complete denture knowledge [26].

Among patients, 15.8% complained of the unpleasant taste associated with adhesive use in their complete dentures. This perception of a bad taste can impact the patient's experience and adherence to adhesive use. Additionally, 11.6% of patients reported feeling nauseous when removing the complete denture. This discomfort may result from an interaction between the adhesive and the oral mucosa, highlighting the need to consider the compatibility and tolerance of the materials used [18,27]. Finally, it was noted that 48.4% of dentists do not have direct feedback from patients' complaints regarding adhesives. This may indicate a gap in communication between professionals and patients, emphasizing the importance of careful monitoring.

Among the dentists participating in this research, 43.2% were specialists in prosthodontics, and 12.6% were specialization students in prosthodontics. 26.3% of participants were specialists in other areas of dentistry, 11.6% were general practitioners, and 5.3% were specialization students in another area, indicating a diverse contribution of participants at different stages of their professional training.

It is worth noting that, to participate in the research, dentists needed to have an active CDR, which means they were in professional practice. Additionally, the research involved the participation of dentists from all five regions of Brazil, from more than 30 different cities. This demonstrates the geographical scope of the research and the representativeness of the responses at the national level.

CONCLUSION

This study offers an important insight into the current landscape regarding the knowledge and practice of dentists concerning denture adhesives in CDs. Understanding the gaps in knowledge and variations in recommendations can serve as a basis for educational interventions and the development of more precise clinical guidelines in this area. Additionally, the results highlight the lack of knowledge on the subject and the consequent

importance of continuous professional updating to ensure the provision of dental care.

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Author's Contributions

IFS: Investigation, Data Curation, Writing – Original Draft Preparation. CAC: Methodology; Writing – Review & Editing, Data Curation, Supervision. VCP: Conceptualization; Supervision, Writing – Review & Editing, Project Administration and Funding Acquisition.

Conflict of Interest

The authors have no conflicts of interest to declare.

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Regulatory Statement

The research project was submitted to the Research Ethics Committee (REC) of the Bauru School of Dentistry and approved (6.121.226), complying with Resolution No. 466/12 of the National Health Council (NHC).

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