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SYSTEMATIC REVIEW

# Does the use of an adhesive improve conventional complete dentures? A systematic review of randomized controlled trials

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## ABSTRACT

**Statement of problem.** A consensus on whether the use of a complete-denture adhesive provides a clinical benefit remains unclear.

**Purpose.** The purpose of this systematic review of randomized controlled trials was to evaluate the use of adhesive in complete dentures in terms of retention and stability, patient-reported outcomes measures, and masticatory performance.

**Material and methods.** A search was performed in PubMed, Web of Science, and Cochrane Library for articles up to October 2020. The Cochrane collaboration tool was used to analyze the risk of bias. The grading quality of evidence and strength of recommendations (GRADE) tool was used to assess the certainty of the evidence.

**Results.** Thirteen studies were included with a total of 516 participants with a mean age of 65.5 years. Most studies reported a significant improvement in the retention and stability, patient-reported outcomes measures, and masticatory performance of complete dentures with the use of denture adhesive compared with no-denture adhesive. Newly developed denture adhesives were reported to have promising results. Most studies presented a low risk of bias, but the certainty of the evidence was classified as low to moderate.

**Conclusions.** Participants had improved treatment outcomes when using denture adhesives because they significantly improve the retention and stability, patient-reported outcomes measures, and masticatory performance. However, further high-quality studies are needed to confirm these results with newly developed denture adhesives. (J Prosthet Dent 2022;128:150-7)

Conventional complete dentures remain a frequently provided treatment for most edentulous patients.[1,2] However, research into this treatment and the education for dentists and dental laboratory technicians could be increased.[3] Patients with complete dentures are typically satisfied with this option; however, some have great difficulty adapting to complete dentures, especially when retention and stability are compromised, and consequently, masticatory efficiency is reduced.[4,5] Complete dentures with poor retention and stability negatively impact patient satisfaction and quality of life.[6]

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[7] by improving prosthesis adaptation.[8] Denture adhesives can also be used as a psychological

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## Clinical Implications

Patients with conventional complete dentures should be educated about the use of denture adhesives, particularly those with difficulty adapting to the prosthesis because of limited retention and stability.

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[10,11] and food accumulation.[12] Denture adhesives can be used to improve the retention and stability of ill-fitting or well-fitting dentures.[7] 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.[9]

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. Therefore, the systematic review aimed to assess the influence of the use of adhesive on conventional complete dentures in randomized controlled trials (RCTs). The research hypotheses were that the use of denture adhesives would not affect complete denture retention and stability, that PROMs would not improve, and that denture adhesives would not improve masticatory performance.

## MATERIAL AND METHODS

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA).[13] Furthermore, the review protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO – CRD42020183857).

A question was formulated based on the population, intervention, comparison, outcomes, and study design (PICOS). The question was "Does the use of an adhesive in conventional complete dentures present similar retention, stability, PROM, and masticatory performance compared with complete dentures without the use of the adhesives?" The participants were rehabilitated by using conventional complete dentures without limitations on the average age. The intervention was the use of denture adhesives in comparison with no-denture adhesive. The primary outcome assessed was retention and stability, while secondary outcomes included PROMs and masticatory performance. Only the RCT study design was considered.

The inclusion criteria were direct comparative studies that evaluated the use of adhesive and no adhesive by using a cross-sectional or intervention design. Studies needed to have at least 10 participants in each group that evaluated at least 1 of the defined outcomes. Case series, case reports, in vitro studies, reviews, and those studies evaluating only intervention without a control group were excluded.

Literature searches of the MEDLINE/PubMed, Embase, Web of Science, and Cochrane Library databases were performed. Two independent reviewers (C.A.A.L., C.D.D.D.R.) searched for articles published until October 2020, without language or date restrictions. The following keywords were used: (Complete denture OR Complete dentures OR Overdenture) AND (Adhesive OR Adhesives OR Fixative OR Fixatives OR Adherent OR Adherents). The initial searches considered titles and abstracts for the selection and inclusion of articles. In addition, manual searches were performed by considering some periodicals, lists of references, and the non–peer-reviewed literature (http://www.opengrey.eu/). In cases of differences in choices between those who performed the primary review, a third author (E.P.P.) was consulted, and a consensus reached through discussion. The kappa statistic was used to assess interexaminer agreement with regard to the database search and selection process and the inclusion of relevant articles.

One of the authors (C.A.A.L.) was responsible for data extraction, while another reviewer (J.M.L.G.) verified the tabulated data to ensure the absence of transcription errors. Two independently reviewers (C.A.A.L., J.M.L.G.) used the Cochrane collaboration tool to assess the risk of bias for the RCT studies. This tool considers the selection bias, performance bias, detection bias, attrition bias, reporting bias, and other bias. The Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach based on study design, inconsistency, indirectness, imprecision, and publication bias was used to assess the certainty of evidence.[14]

## RESULTS

The literature search of all electronic databases yielded 3107 articles: MEDLINE/PubMed (n=2491), Embase (n=408), Web of Science (n=124), and Cochrane Library (n=84). After removing duplicates, 2523 articles remained, with no additional articles after hand searches.

After evaluation of the titles and abstracts, a total of 42 articles were considered for full reading, and 29 were excluded because they did not met the eligibility criteria (Supplemental Table 1, available online). Details of the search strategy are presented in the flowchart in Figure 1. A high level of agreement was observed (Cohen kappa=0.91).

A total of 13 studies[8-10,12,15-23] including 9 independent publications were considered because some studies reported the same patient group(s) in different publications and different outcomes.[9,10,16-18,20,21] Most of the included studies were crossover RCTs, except for 1 group that performed a multicenter RCT without a crossover design.[16-18] In total, 516 participants with a mean age of 65.54 years (range: 51.41 to 76.6) were evaluated, with a higher proportion of female participants. Most studies evaluated the use of adhesives in mandibular and maxillary prostheses, except for 3 studies [8,15,19] in which only maxillary prostheses were evaluated. Some studies performed the evaluation of new well-fitting complete dentures,[9,10,16-18,23] while other studies reported the inclusion of participants already with well-made and at least moderately well-fitting complete dentures at the screening visit after evaluation by an examiner using the Kapur criteria.[8,12,15,19-22]

A wide range of adhesives were evaluated. All studies evaluated cream-based adhesives; however, some studies also evaluated powder-based[9,10,16-18] or strip[12,21] adhesives. Different commercial brands were investigated, including Kukident (Proctor & Gamble), Kukident Pro (Proctor & Gamble), Super Poligrip (GlaxoSmithKline [GSK]), Poligrip (GSK), Corega (GSK), Ultra Corega (GSK), Protefix (Queisser Pharma GmbH & Co), and Fittydent (Fittydent International GmbH). In addition, 4 studies[8,12,15,19] evaluated different test adhesives. The authors compared tests with reference adhesives available on the market (positive controls) and the absence of adhesive (negative controls). Newly developed denture adhesives were reported to have promising results (Table 1).

The selected studies evaluated the retention and stability of complete dentures by using different methods, including incisal occlusal force (IOF)[8,15,19] and maximum occlusal force[16,22] measured by using a calibrated occlusal force transmitter until prosthesis dislodgement. The Kapur index scale was used to evaluate retention and stability with scores.[12,22] One study used a gnathometer and a dynamometer to evaluate the dislodgement of dentures.[23]

Regarding the parameters of retention and stability, most studies reported a significant improvement in retention and stability for complete dentures with the use of denture adhesives compared with no-denture adhesives, regardless of the type of adhesive.[8,12,19,22,23] Nishi et al[16] reported a significant increase in the retention force only for cream adhesive in participants with dry mouth. In contrast, 1 study[15] reported no difference in the dislodgement of maxillary complete dentures for any type of adhesive (test and reference) compared with the control group, Similarly, in another study,[19] 1 of the test adhesives demonstrated no difference in IOF for the displacement of the maxillary complete denture.

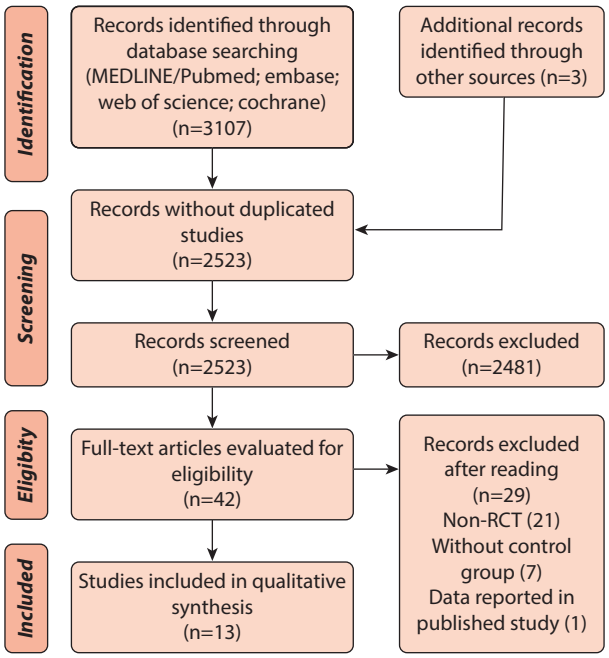


**Figure 1.** Flowchart of search strategy. RCT, randomized controlled trial.

Different instruments were used to assess the degree of satisfaction and quality of life by PROMs, including the Japanese version of the Oral Health Impact Profile for edentulous patients (OHIP-Edent-J), questionnaires, and the visual analog scale (VAS). Most of the studies reported a significant increase in domains of subjective parameters and satisfaction with the use of denture adhesive compared with no-denture adhesive for complete dentures.[10,12,19,21] Nishi et al[16] reported an increase in these parameters only for participants with dry mouth. Ohwada et al[17] reported no significant differences in general satisfaction and OHIP-Edent-J, but they observed that the use of adhesive increased the ability to masticate harder foods. In another publication of the same group, Ito et al[18] reported no significant difference among the adhesives and saline control group, but the cream adhesive improved OHIP-Edent-J in participants with a poor residual ridge.

Four studies[8,12,15,23] used the questionnaires to assess the different types of adhesives (tests and reference adhesives). These studies found no differences between the adhesives,[12,23] mainly in parameters related to taste, feel[15] or flavor/texture, denture fit, and

comfort[8] in comparison with tests with reference adhesives.

Only 3 studies evaluated masticatory efficiency.[9,16,21] Two studies performed the evaluation using the sieve method,[9,21] while another study used chewing gum.[16] Two studies found that the use of adhesive significantly increased masticatory performance compared with the use of adhesives,[9,21] while Nishi et al[16] reported that the use of the denture adhesive significantly increased performance only for participants with a dry mouth.

The assessment of the risk of bias revealed that a low risk of bias for selection bias of included studies, except 2 studies of the same group that evaluated different outcomes that were considered unclear.[20,21] Regarding performance bias, most of the studies were of high risk and unclear.[8,12,15,19,22] This could be explained because of the difficulty of blinding participants to the use of adhesive in the complete dentures. However, some studies were double-blind but did not show information about the blinding of participants.[10,20,21,23] The detection bias, attrition bias, and reporting bias were considered low for most included studies. Regarding another risk of bias, some studies were considered high risk [8,12,15,19,22] because they were funded by or some authors were employees of GSK Consumer Healthcare, which produced some of the evaluated denture adhesives (Fig. 2). The certainty of evidence was classified as low for retention/stability and moderate for PROM and masticatory performance. A downgraded level was associated with the heterogeneity between methods for the same outcome and the publication risk of bias (Supplemental Table 2, available online).

## DISCUSSION

The first null hypothesis—that the use of denture adhesives would not affect retention and stability—was rejected because a significant overall increase was observed with the use of denture adhesive as per the different measurement instruments. These results corroborate those of previous studies that reported that denture adhesive significantly improves retention and stability in complete dentures.[7,24,25]

These results can be explained by the fact that denture adhesive in contact with the surface of complete denture has a mechanism of action that increases the viscosity of saliva in contact with the base of the prosthesis, thus optimizing the adhesive and its cohesive properties, which in turn improve retention and stability.[9,11,21] Most of the selected studies reported a significant increase in retention and stability with the use of denture adhesive(s); however, 1 study[15] found no influence on the denture adhesive (test and reference) for increase(s) in IOF for displacement of the maxillary complete dentures. The authors suggested that the study was potentially underpowered to detect an effect size this small. Although not mentioned, another factor may have contributed. This study evaluated only the larger maxillary arch and maxillary complete denture, which tend to exhibit less resorption and muscle action compared with the mandibular arch.[10,26] Thus, this could contribute to better retention and stability even without denture adhesive in the small sample size.

Nishi et al[16] reported that the retention was significant only for the cream adhesive in participants with dry mouth. The authors reported that the powder adhesive did not improve retention in these participants because of the lack of moisture and given that powder adhesive generally removes oral humidity. These results were reported by Bogucki et al [27] in which an adhesive cream exhibited little leaching by saliva, providing strong and long-term effects. However, neither study[16,27] used a cross-sectional design to assess the effect of different types of adhesives in the same participant. Thus, further studies evaluating the effect of different types of adhesives (cream or powder) on patients with xerostomia are warranted.

A consensus is lacking regarding the duration of the retentive action of denture adhesives, which can vary from 3 hours to 12 hours depending on the adhesive type, and in some studies, this effectiveness did not exceed 10 hours.[24] Some of the included studies[8,12,15,19] that evaluated varying lengths of time observed that even after 12 hours, IOF values remained high, especially when compared with those measured immediately after adhesive insertion. All these studies only evaluated cream-based adhesives that were experimentally or commercially available; however, as previously mentioned, it is also important to assess the duration of the retentive action of powder-based adhesives. Furthermore, a period longer than 12 hours with the use of denture adhesive can be recommended to allow proprioceptive adaptation.[9]

The second null hypothesis regarding the effect of the denture adhesive in terms of PROM was also rejected because a positive influence of the use of denture adhesive was observed for conventional complete dentures. The satisfaction parameters of the different instruments were generally associated with retention, stability, ability to masticate and speak, ease of cleaning, comfort, esthetics, and accumulation of particles.[10,16,20] This may be correlated with the increase in retention and stability previously reported, which can act subjectively to enhance patient confidence in the use of conventional complete dentures[9] and, consequently, improved function that directly impacts treatment satisfaction.[20] However, 1 study[17] reported that the use of denture adhesive does not interfere with general satisfaction and quality of life. This can be explained by different factors, as the inclusion

**Table 1.** Extracted characteristics of included studies

| Author/ Year | Study Design | Patients, n | Mean Age, y | Arch Evaluated | Denture Adhesives Evaluated, (n, Participants*Drop) | Outcomes Evaluated | Outcomes Reported |
|---|---|---|---|---|---|---|---|
| Atassi et al[15] 2020 | RCT CO | 23 M: 5 F: 18 | 64.9 | Maxillary denture | Test Adhesive[a] (cream) (21) Test Adhesive[b] (cream) (22) Super Poligrip (cream) (21) Control (20) | Retention (IOF) Ooze, sensory, denture removal questionnaire | No statistically significant differences in mean incisal occlusal force (AOB 0-12h) until maxillary denture dislodgement between adhesives (tests and reference) and no adhesive ($P$>.05). Participants did not report any clear differences between test and reference adhesives in terms of taste or feel; however, dentures easier to remove with test adhesives vs reference. |
| [A]Nishi et al[16] 2020 [B]Ohwada et al[17] 2020 [C]Ito et al[18] 2020 | mRCT | 200 M: 95 F: 105 | 76.6 | Maxillary and mandibular dentures | [A,B]Poligrip (Powder) (61) Super Poligrip (cream) (60) Control (63) *16 dropout [C]Poligrip (powder) (46) Super Poligrip (cream) (50) Control (51) *16 dropout and 37 missing data | [A]Retentive force [A]Occlusal occlusal force [A]Masticatory performance (Chewing gum) [A]Satisfaction (VAS) [B]OHR-QoL (OHIP-EDENT-J) [B]Satisfaction (VAS) [C]OHR-QoL (OHIP-EDENT-J) | [A] Denture adhesives (cream and powder) significantly effective in dry mouth for denture satisfaction ratings of ability to masticate, stability, retention, and comfort of mandibular dentures ($P$<.05). Masticatory performance and retentive force of dry mouth denture adhesive using groups significantly improved after intervention ($P$<.05). [B] No significant differences observed between groups for general satisfaction or OHIP-EDENT-J ($P$>.05) and did not improve denture function. However, significant differences in satisfaction with various denture functions with cream- and powder adhesives, mainly in masticatory ability of hard foods ($P$<.05), affecting subjective evaluations and masticatory performance. [C]Use of dentures adhesives could improve OHR-QoL using OHIP-EDENT-J for complete denture wearers; however, no statistically significant difference among groups (adhesives, and saline group). Cream-type denture adhesive may expected to improve OHR-QoL in participants with poor residual ridge conditions. |
| Varghese et al[8] 2019 | RCT CO | 44 M: 17 F: 27 | 67.0 | Maxillary denture | Protefix Test[c] (cream) (43) Super Poligrip (cream) (43) Control (44) | Retention (IOF) Ooze, sensory, and denture removal questionnaire | Significant difference observed between adhesives vs control until denture dislodgement at all AOB (0-12h) time points ($P$<.05), but without difference between test and reference adhesive ($P$>.05). Questionnaires demonstrated no clear notable differences between adhesives (test and reference) in terms of flavor or texture, denture fit or comfort, although reference adhesive did rank slightly higher in most categories. |
| Atassi et al[12] 2019 | RCT CO | 83 M: 21 F 62 | 63.4 | Maxillary and mandibular dentures | Test Adhesive[d] (strip) (83) Super Poligrip (cream) (83) Control (83) | Retention and stability (Kapur Index) Questionnaires (confidence, comfort, satisfaction, and denture movement) | Both adhesives (test and reference) significantly higher retention and stability scores compared with no adhesive ($P$<.01). Participants reported significantly higher scores for denture comfort, confidence, satisfaction, and movement with both adhesives vs no adhesive (all $P$<.01). No differences in adhesive Ooze questionnaire reported between adhesives. |
| [A]Torres-Sánchez et al[20] 2018 [B]Torres-Sánchez et al[21] 2017 | RCT CO | 17 M: 6 F: 11 | 51.41 | Maxillary and Mandibular dentures | Fittydent (cream) (17) Corega (cream) (17) Control (17) | [A]Satisfaction (VAS) [B]Masticatory performance (sieve method) | [A]Denture adhesives improved satisfaction from better retention, stability, and less accumulation of food compared with non-use of adhesives ($P$<.01), but no significant differences between evaluated adhesives ($P$>.01). [B]Denture adhesives significantly increased masticatory efficacy in edentulous patients compared without adhesive ($P$<.05), with higher efficacy with use of Corega than Fittydent ($P$<.05). |
| Jose et al[19] 2018 | RCT CO | 48 M: 19 F: 29 | 71.9 | Maxillary denture | Test Adhesive[e] (cream) (47) Test Adhesive[e] (cream) (48) Super Poligrip (cream) (48) Control (47) | Retention (IOF) | Test adhesive[e] achieved significantly higher IOF until denture dislodgement AOB (0-12h) compared with no adhesive ($P$<.05). Not seen with test adhesive[e] ($P$>.05) Both test adhesives demonstrated significantly lower IOF compared with reference adhesive (Super Poligrip) ($P$<.05). |
| [A]de Oliveira Júnior et al[9] 2014 [B]Marin et al[10] 2014 | RCT CO | 40 M: 14 F: 26 | 66.05 | Maxillary and mandibular dentures | [A]Ultra Corega (powder) (40) [A,B]Ultra Corega (cream) (40) [A,B]Control (40) | [A]Masticatory Performance (sieve method) [B]Questionnaire (satisfaction) | [A]Significant increase in masticatory performance was noted with adhesives when compared with without adhesive group ($P$<.001). However, no significant difference found among adhesives ($P$>.05). [B]Denture adhesive significantly improved overall level of patient satisfaction ($P$<.001). |

(*continued on next page*)

**Table 1.** (*Continued*) Extracted characteristics of included studies

| Author/ Year | Study Design | Patients, n | Mean Age, y | Arch Evaluated | Denture Adhesives Evaluated, (n, Participants*Drop) | Outcomes Evaluated | Outcomes Reported |
|---|---|---|---|---|---|---|---|
| Munoz et al[22] 2012 | RCT CO | 37 M: 19 F: 18 | 70.65 | Maxillary and mandibular dentures | Super Poligrip (cream) (36) Super Poligrip (strips) (36) Unmarketed adhesive[f] (Cream) (37) Control (37) | Retention and stability (Kapur Index) BF and Denture Dislodgement | The increases associated with the cream ($P$<.0001) and strip ($P$<.001) adhesives were highly significantly when compared with no adhesive. Denture adhesive increased BF compared with no adhesive ($P$<.001). Participants experienced significantly ($P$<.05) fewer dislodgements while eating apple after adhesive was applied to dentures. |
| Pradies et al[23] 2010 | RCT CO | 24 M: NR F: NR | 58 | Maxillary and mandibular dentures | Kukident (Cream) (24) Kukident Pro (Cream) (24) Control (24) | Retention and stability (gnathometer and dynamometer) Questionnaire (Satisfaction) | Denture adhesives improved stability and retention (gnathometer and dynamometer) of complete dentures ($P$<.05), but did not demonstrate significant differences between 2 adhesives. Subjective evaluation favorable for both adhesives. |

CO, crossover; IOF, incisal occlusal force; mRCT, multicenter randomized controlled trial; OHIP, oral health impact profile; OHRQoL, oral health–related quality of life; RCT, randomized controlled trial; VAS, visual analog scale. [a]PVA (22.5%), PEG 200 (19.25%), sodium CMC, solvents, emulsifier, and silica. [b]PVA (20.0%), PEG 200 (16.75%), sodium CMC, solvents, emulsifier, and silica. [c]Crème Mint (Queisser Pharma; Germany marketplace). Ingredients: CMC, carbomer, paraffin, petroleum jelly, silica, wax, flavor, color, preservative. [d]Polyvinylmethyl ether/maleic acid, carboxymethylcellulose, petrolatum and mineral oil. [e]Ethyl cellulose, propylene glycol dicaprylate/dicaprate, medium-chain triglyceride, Carbopol, glyceryl caprylate/caprate, and glycerin in different proportions. [f]PVM/MA sodium magnesium-zinc mixed partial salt.

of participants who used old or new dentures, the short-term follow-up, a possible placebo effect of the saline solution, and the fact that this study included different participants for the groups evaluated without cross-section design differed from the other included studies. General satisfaction and quality of life was also observed by other researchers in the same group,[16] who reported no differences in satisfaction with the use of adhesives for patients with normal oral moisture. However, this study reported that participants with dry mouth exhibited a general increase in the parameters evaluated. In addition, another study in the same group[18] reported that the use of cream adhesive improved the quality of life in participants with a poor residual ridge. The cream is closer to a solid consistency than powder, which may result in greater sealing properties.[18] This is important to avoid the accumulation of particles under the denture base that cause discomfort during mastication and can cause pain and irritate the fibromucosa.[20] Therefore, these results should be considered from a clinical perspective.

A significant increase in masticatory performance was found after the use of a denture adhesive, leading to rejection of the third null hypothesis. The increase in masticatory efficiency may be related to an increase in the previously evaluated parameters. This fact was confirmed in the study by Nishi et al,[16] who reported greater masticatory performance only for participants with oral dryness, as observed for retention. Two studies compared 2 types of adhesive—powder versus cream—in terms of masticatory performance.[16,21] In both studies, the authors did not observe differences in masticatory performance between cream- and powder-based adhesives. However, Torres-Sánchez et al[21] compared different commercial brands of cream-based adhesives and observed a significant favorable difference for a specific type of adhesive. This difference may be related to the difference in composition of a copolymer of vinyl methyl ether and maleic anhydride compared with polyvinylacetate. As a consequence, more effective denture adhesives are being developed, with less harm to patients, as evidenced by the large number of experimental adhesives investigated in the studies included in the present systematic review.[8,12,15,19] Only 3 RCT studies considered the evaluation of masticatory performance, which represents limited data on the use of denture adhesives. Therefore, it is important to further investigate and develop newer dental adhesives to improve the parameters evaluated in the present systematic review.

Some concerns have been raised about the negative effects of denture adhesives. The use of denture adhesives cannot replace the need for a well-fitted complete denture, although some patients try to compensate for the misfit of the denture with adhesives. Patients must not mask clinical problems such as incorrect impressions during the making of dentures[24] or oral conditions such as stomatitis and candidiasis. However, RCTs evaluating the biocompatibility or microbiological parameters after the use of denture adhesives are lacking. Therefore, further clinical studies considering these parameters are encouraged. Participants of such studies need to follow the instructions provided by the manufacturer and should be monitored periodically by the professional to evaluate prosthetic maintenance requirements.

Although all RCTs were considered at low risk of bias, some limitations should be considered: the high heterogeneity because of the significant variability in

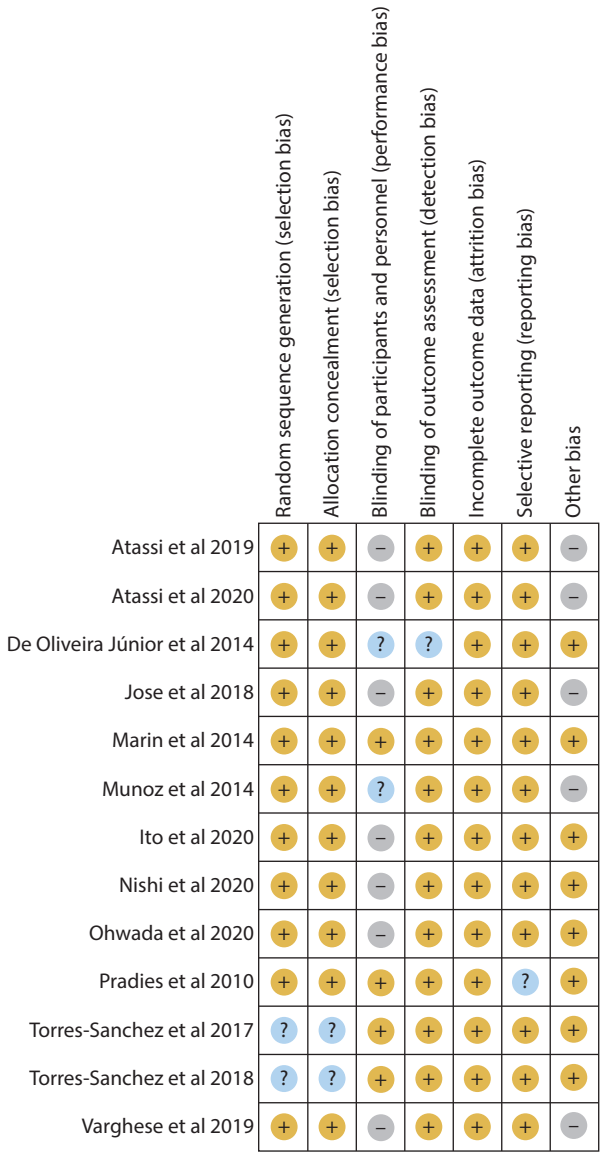


**Figure 2.** Risk of bias summary of included studies.

denture adhesives, types, and commercial brands, which made it difficult to standardize for effective direct comparison; and the different methods used to assess the outcomes contributed to the increasing heterogeneity. In addition, some studies evaluated the effect of dental adhesives over a short period (0 to 12 hours) in well-fitting complete dentures, while other studies considered days or weeks of evaluation; this difference should also be considered. Therefore, further studies that evaluate and attempt to standardize these different variables and consider different outcomes for denture adhesives for conventional complete dentures are encouraged.

## 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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## Noteworthy Abstracts of the Current Literature

### Magnetic resonance imaging for the planning, execution, and follow-up of implant-based oral rehabilitation: Systematic review

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**Purpose.** To undertake a systematic literature review of magnetic resonance imaging (MRI) employed in the three phases of implant-based oral rehabilitation: planning, execution, and follow-up.

**Material and methods.** MEDLINE (PubMed) and EMBASE bibliographic databases were searched up to January 2020 for studies assessing the use of MRI alone or in connection with CT and/or CBCT in the planning, execution, or follow-up of dental implant placement and/or bone grafting procedures in the maxilla or the mandible. Included studies were also assessed according to the diagnostic imaging efficacy scale presented by Fryback and Thornbury (F&T).

**Results.** The search strategy yielded 10 studies, which were included in the systematic review. Six studies focused on the implant planning phase, one on the immediate follow-up phase, and three on both planning and follow-up. No studies acquired signal from the bone. There was no consensus on the gold standard, MRI sequence, or field strength (T). One study reached F&T level 1, eight reached level 2, and one reached level 3.

**Conclusions.** The possible transition from radiography to ionizing-radiation-free imaging through MRI is still a novelty in dentistry and has yet to establish itself as a viable imaging modality suitable for replacing CT and CBCT. More studies are needed on the accuracy of the diverse MRI possibilities when applied for implant planning, execution, and follow-up before this diagnostic method can be considered as a reality for the clinician.