**Objectives:** Patients with xerostomia manifest various clinical signs of oral dryness, which has an impact on oral functions and wearing of dental prostheses, but the evidence of xerostomia-related changes in denture performance is unsatisfactorily documented. The purpose of this systematic review was to evaluate whether the available literature can answer the focused question “Is there an association between xerostomia and decreased denture performance among patients wearing removable dentures?” **Data sources:** Indexed databases were explored without time or language restrictions up to and including March 2019. All levels of available evidence including experimental studies, case reports, and case series were searched using different combinations of the following keywords: saliva, xerostomia, dentures, personal satisfaction, quality of life, oral dryness, and oral complaints. Nine studies were included for qualitative synthesis. Overall, five studies had a cross-sectional design and four studies were case-control studies. In these studies, the number of participants ranged between 35 patients and 493 patients with mean ages from 56 to 82 years; 66% of the patients were completely and 34% were partially edentulous. **Conclusion:** All studies included patient satisfaction with dentures and recorded the presence of oral dryness. Six out of nine studies demonstrated that xerostomia is significantly associated with the decreased performance of removable dentures. Although the available evidence lacks feedback from randomized, controlled clinical studies, it implies a negative impact of oral dryness on specific denture functions such as speaking, chewing, and retention, which affects both complete and partial denture wearers. (Quintessence Int 2021;52:46–55; doi: 10.3290/j.qi.a45427)

**Key words:** performance, removable dentures, saliva, satisfaction, xerostomia

Saliva, secreted by the salivary glands, is a biologic fluid with essential functions that benefit oral and general health, including supporting the function of dental prosthetics. The continuous flow of saliva into the oral cavity maintains the integrity of oral mucosa in a moist condition as it is less susceptible to denture abrasion. Saliva flow also removes microorganisms, desquamated epithelial cells, leucocytes, and food debris, and eventually eliminates those particles by swallowing. Generally, dental providers comprehend intraoral hydration as helpful for the wear of removable prostheses, as a layer of saliva lays between the dentures and oral mucosa, and protects from soreness and ulceration, as well as helping to gain retention for dentures. Therefore, the condition of dry mouth might render discomfort, pain, ulceration, and instability from wearing a removable prosthesis.

Changes in saliva properties and decreased saliva secretion can result in subjective or objective oral dryness, referred to as xerostomia or dry mouth (lowered quantity of saliva or hyposalivation), respectively. Xerostomia is the complaint of perceived oral dryness and often, but not necessarily always, combined with hyposalivation. It can affect patients of any age for various reasons; however, xerostomia is most frequently reported among the geriatric population. Xerostomia is a sensation that can be assessed by questioning the affected individual directly. In contrast, the objective sign of dry mouth is the result of salivary gland hypofunction, which is determined by salivary flow measurements (sialometry). While associations between the detrimental consequences of dry mouth such as increased rate of dental caries, tooth loss, aggressive bacterial colonization, and infections, are scientifi-
cally proven, very little attention has been paid to the effect of oral dryness or xerostomia on denture functions and patients’ satisfaction with their prostheses. Few reports are available that compare denture performance and function between patients with and without dry mouth. Some others assessed denture stability according to changes in saliva flow rates or measured changes in oral functions such as chewing, esthetics, and phonetics. Studies also investigated changes in various aspects of oral health before and after denture fabrication. While the generally accepted notion that saliva is essential for satisfactory denture performance and contributes to intraoral comfort in denture wearers has been postulated in these investigations, their design and study approach was rather diverse.

As a recent study by Hahnel et al indicated, the lack of sufficient scientific evidence and clinical studies hampers the clinical decision of whether removable dentures should be recommended for patients with dry mouth complaints. The present literature review was conducted to determine whether sufficient and consistent evidence can be derived from the relevant literature referring to the empirically established and presumably negative impact of oral dryness on denture performance among removable denture wearing patients.

Method and materials

Focused question

The present study was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The Participants, Intervention, Comparison, Outcome (PICO) format was used to formulate the focused question: “Is there an association between xerostomia and decreased denture performance among patients wearing removable dentures?”

Eligibility criteria

The inclusion criteria were as follows:

- original observational studies (cohort, cross-sectional, or case-control) that evaluated the association between xerostomia and oral functions in adult patients (18 years or older) wearing partial or complete removable dentures
- studies in which clinical oral dryness was assessed using validated methods
- studies in which denture performance or satisfaction level was reported, including oral functions such as aesthetics, chewing ability, phonetics, taste, retention, and/or comfort.

The exclusion criteria were:

- qualitative and/or quantitative reviews
- case-reports/case-series
- commentaries
- letters to the editor
- interviews and updates.

Literature search protocol

In order to identify studies relevant to the focused question, a systematic and structured literature search without language or time restrictions was conducted by two authors (SA, SVK) using PubMed (National Library of Medicine), Scopus, EMBASE, and Web of Science databases. The databases were searched up to and including March 2019 using different combinations of the following Medical Subject Headings (MeSH) terms (concepts): (1) saliva; (2) xerostomia; (3) dentures; and (4) patient satisfaction. Other MeSH terms (synonyms) were used in the search strategy to detect articles discussing the association between xerostomia and denture satisfaction. These included: (5) oral dryness; (6) dry mouth; (7) salivary flow; (8) retention; (9) performance; (10) quality of life; and (11) oral complaints. These keywords were used with Boolean operators (OR, AND) to combine the synonyms with OR and combine concepts with AND then the final search was formulated by a table of concepts.

Data extraction

To minimize the potential for reviewer bias, titles and abstracts of studies identified using the above-described protocol were independently screened by three investigators and checked for agreement. Full texts of studies judged by title and abstract to be relevant were read and independently evaluated for the stated eligibility criteria. After an initial electronic search, references of the identified studies were hand-searched to identify further potentially relevant studies. Any disagreements in the study selection were resolved via discussion and consensus between the authors. Cohen kappa value (κ) was used to determine interreviewer reliability. Data were extracted using standardized evaluation forms: first author’s last name, country of study, year of publication, study design, population size, age (range and mean), gender, dentures characteristics, methods to assess xerostomia, methods to assess satisfaction level, exclusion criteria, variables adjusted, and main outcomes. The investigators crosschecked all extracted data. Any disagreement was resolved by discussion until consensus was reached.
Quality assessment

The Newcastle-Ottawa Scale (NOS) was used to grade the methodologic quality of the studies included in the present review. In summary, the NOS scale uses a systematic approach based on three specific criteria: Selection (S), Comparability (C), and Exposure (E), which are subdivided into eight criteria:

- S1) Adequate case definition
- S2) Representativeness of the cases
- S3) Selection of control
- S4) Definition of control
- C1) Comparability of cases
- E1) Ascertainment of exposure
- E2) the same method of ascertainment for cases and controls
- E3) Nonresponse rate.

Each criterion was given a response of either “Yes,” “No,” or “Cannot tell.” Each study could have a maximum score of 8. Quality assessment of all studies included was conducted independently by two authors (SA, SVK) using the above-described tools and checked for disagreement via discussion among the authors.

Results

Through the initial search on four databases, 1,946 publications were identified. Figure 1 shows the study identification flowchart according to PRISMA guidelines with the reasons for the exclusion of articles after full-text reading. After screening of titles and abstracts, 1,658 publications were excluded, because those citations did not answer the PICO question formulated for this review or were duplicates. A total of 30 manuscripts were selected for full-text manuscript reading (including manuscripts written in English, Japanese, and Hungarian) with the kappa score of 0.76 interreviewer agreement at full-text eligibility. In the second step of evaluation, 21 articles were excluded, based on the decision of three reviewers as the focused clinical question was not addressed entirely. After the final stage of selection, nine eligible studies were analyzed in the qualitative synthesis for this review.

The quality assessment of included studies is summarized in Table 1. The quality score of the studies ranged from 5 to 8. The quality assessment identified that in general, case and control definitions and nonresponse rates were adequately performed in these studies. A common shortcoming among the
Table 1  Quality of reporting of included studies using the Newcastle-Ottawa Assessment

<table>
<thead>
<tr>
<th>Newcastle-Ottawa Assessment criteria</th>
<th>Doppanapudi et al</th>
<th>Yen et al</th>
<th>Halme et al</th>
<th>Al-Dawalibi et al</th>
<th>Aslan et al</th>
<th>Kebbe et al</th>
<th>Martin et al</th>
<th>Wo # et al</th>
<th>Martin et al</th>
<th>Niedermaier et al</th>
<th>Dormonal et al</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection is the case definition adequate?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Representativeness of the cases</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Selection of controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Definition of controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Comparability of cohorts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Exposure Ascertainment of exposure</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Same method of ascertainment for cases and controls</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Nonresponse rate</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

studies was the inadequate representativeness of the cases. This contributed to the difficulty in determining whether the results were in accordance with the available evidence. Due to the high degree of heterogeneity and/or dearth of data among the included studies, both in terms of data presentation and scales adopted, conducting a meta-analysis and therefore reporting quantitative outcomes was rejected. Therefore, a narrative summary of the results was undertaken.

The association between oral dryness and denture performance was investigated in five cross-sectional studies, including one retrospective study, and four case-control studies (Table 2). All studies were conducted between 1998 and 2017 in the following countries: UK, Germany, Hungary, India, Israel, Japan, Switzerland, Taiwan, and Turkey. Tables 2 and 3 summarize the general characteristics of the studies included in the present review. All studies focused on middle age or older adult patients as the mean age of study populations ranged from 45 to 89 years (overall median age 66 years). Studies included study populations between 35 and 493 individuals (a total of 1,893 participants). The studies included 1,864 edentulous subjects wearing removable complete or partial dentures. Of all these patients, 1,224 subjects (65.7%) were completely edentulous and 640 (34.3%) subjects were partially edentulous.

The overall prevalence of sensation of oral dryness was between 11.2% and 55.0% among these studies. The prevalence of xerostomia was significantly higher in participants who had a pair of complete dentures (maxillary and mandibular) (32.5%) and maxillary complete dentures (35.2%) compared with participants with mandibular complete dentures (15.0%) (P < .05). All studies addressed denture performance as satisfaction with oral functions.

A negative, statistically significant (P < .05) correlation between patient satisfaction with dentures and oral dryness was observed in five studies (Table 3). Accordingly, the overall satisfaction with prosthesis was significantly lower (P < .05); odds ratio [OR] = 6.32) in patients with oral dryness compared to healthy patients. Specific questions regarding the perception of oral dryness while eating was used in three studies. The severity of oral dryness was strongly correlated with satisfaction scores for chewing ability and phonetics, but not for esthetics. The comparison between complete and partial denture wearers with xerostomia showed that patients with par-
with xerostomia complained of complete denture instability and soreness, respectively, compared with non-xerostomic participants (21% and 15%). A significant association between oral dryness and denture mobility (OR 2.5; patients with complete denture), as well as aching spots on denture-bearing tissues (OR 2.8; patients with partial denture) was also found.
Salivary flow measurements were completed in four studies \(^{15,25-27}\) to measure hyposalivation. Objective measurements of submandibular/sublingual salivary flow rates \(^{21}\) revealed a statistically significant negative correlation \((P < .05)\) with denture satisfaction parameters such as retention, comfort, chewing, and speech. The submandibular/sublingual salivary flow rates did not significantly affect the perception of denture esthetics. \(^{25}\) In another study, \(^{26}\) authors could not confirm the statistically significant correlation between resting saliva secretion and denture performance, although they associated complaints on poor retention of the maxillary dentures with low stimulated whole saliva flow (< 0.5 mL/minute). In the two remaining studies \(^{15,27}\) no association was established between denture retention and xerostomia as none of the subjects with dry mouth complained of unstable dentures.

**Discussion**

The present review indicates an association between low patient satisfaction with dentures and oral dryness; however, the results need to be interpreted with caution due to inconsistencies in reported evidence. Two main reasons for discrepancies were identified: study design and outcome measurements. Most studies used self-administered assessments of xerostomia, thus the diagnosis of oral dryness was established by self-reports and prone to recall bias (in three studies \(^{24,26,28}\) the questionnaires were administered by the interviewers during a face-to-face interview). Satisfaction with denture performance during various functions was evaluated by questionnaires.

Accordingly, all studies in this review addressed xerostomia, the sensation of oral dryness, \(^{13-16,24-28}\) but measurements of saliva levels were not supplemented with the clinical diagnosis of dry mouth for all patients. Xerostomia assessments were qualitative measures, by either a single-item questionnaire \(^{14,24,27,28}\) or a multi-item questionnaire (at least two questions about perceived oral dryness). \(^{13,15,16,26}\) Only one study \(^{13}\) used a standardized questionnaire containing two questions for xerostomia, as developed for the European classification criteria for Sjogren syndrome. In two studies \(^{16,26}\) the severity of oral dryness was assessed by semi-quantitative analysis of the Clinical Oral Dryness Score (COPS), which requires clinical and visual inspection of the patients. Affirmative clinical signs, based on a clinical examination that confirmed oral dryness in all patients who complained about dryness, were detected only in two studies. \(^{13,16}\) It should also be noted that the xerostomia inventory, which was the first scientifically validated questionnaire \(^{29}\) to estimate the degree of xerostomia, was not applied in the studies of this review.

Xerostomia per se was previously demonstrated to be strongly correlated with wearing removable dentures, \(^{7}\) but clinical experience suggests that “adequate” salivary flow rate \(^{10}\) is essential for denture tolerance and comfort. In the present review xerostomia was associated with the severity of hyposalivation \(^{11}\); however, saliva levels were not measured in all patients to supplement their subjective complaints. Since the sensation of oral dryness does not necessarily concur with the established cut off values that indicate hyposalivation, \(^{11}\) the specific volume of “adequate” saliva output for denture tolerance and comfort is yet to be determined. At present, no specific numeric values of saliva flow rates allow clinicians to predict alterations in denture performance in dry mouth patients. Specifically, the performance of removable dentures and the satisfaction with their retention and functional qualities greatly depend on the quantity and quality of saliva film; \(^{12}\) therefore future clinical studies including these measurements are essential to establish the correlation with dry mouth.

The evaluation method of denture performance was evaluated among the studies as a significant weakness, as it was performed mainly by questionnaires based on qualitative self-assessment of denture performance and overall satisfaction \(^{13-15,24,26,27}\) with dentures (including additional categories of satisfaction with chewing, \(^{13,14,24-26,28}\) speaking, \(^{13,14,24-26,28}\) tasting, \(^{13,14,24,26,28}\) denture instability, \(^{13,15,24-28}\) soreness, \(^{13,14,24}\) discomfort, \(^{14,24,25,28}\) and esthetics \(^{16,25}\). Quantification of denture satisfaction would improve comparative analysis between studies and an additional clinical exam for each patient could provide more reliable data as numeric scores were reported only in three studies: visual analog scale, \(^{16}\) denture satisfaction assessment, \(^{28}\) and clinical grading of oral condition and denture quality by an experienced clinician. \(^{25}\)

Overall, most of the studies confirmed the previously suggested \(^{31}\) negative impact of oral dryness on denture performance. Reduced salivary flow rates from the submandibular and sublingual glands (these two glands secrete mostly mucous saliva) played a direct role in denture satisfaction and influenced the functional aspects of denture wearing, \(^{25}\) and stimulated saliva secretion measurements from the three major salivary glands confirmed the impact of oral dryness on maxillary complete denture performance during chewing and eating. \(^{26}\) Participants with xerostomia were more dissatisfied with their dentures in comparison to participants without xerostomia.

A significant strength of the present review is that the methodologic quality of nine studies was assessed by a standardized scale, and overall the studies had been conducted with good methodologic quality. Another strength was that the data extraction was reviewed by three researchers. The
### Table 3  Outcomes of clinical studies reporting on xerostomia and denture performance associations

<table>
<thead>
<tr>
<th>Study (region)</th>
<th>Edentulism</th>
<th>Main outcome</th>
<th>Statistical analysis and strength of the association</th>
<th>Secondary outcomes</th>
<th>Cofounders identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doppelappludi et al12 (India)</td>
<td>Complete</td>
<td>Significant association of chewing and phonetics with oral dryness by Kendall tau-b</td>
<td>Chewing: τ = -0.634; Phonetics: τ = -0.512 (P = .001) NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Yen et al14 (Taiwan)</td>
<td>Complete and partial</td>
<td>No direct association was tested (dry mouth to GOHAI or DAS to GOHAI)</td>
<td>DAS is the strongest predictor OHRQoL</td>
<td>$R^2 = 0.45$ between DAS and GOHAI-T ($P &lt; .05$). Patients who with perceived dry mouth GOHAI-T score was lower ($P &lt; .05$)</td>
<td>Sociodemographics, dental care service usage, factors related to denture wearing, remaining natural teeth, oral ulcerative lesions</td>
</tr>
<tr>
<td>Al-Dwairi et al16 (UK)</td>
<td>Complete</td>
<td>Dissatisfaction with denture in dry mouth patients (subjects without dry mouth were found to be mostly fairly satisfied)</td>
<td>$P &lt; .05$ by chi-square test</td>
<td>Significant association between subjective xerostomia and instability of complete dentures, feeling soreness while talking and eating</td>
<td>Smoking, type 2 diabetes, gender</td>
</tr>
<tr>
<td>Arslan et al18 (Turkey)</td>
<td>Complete and partial</td>
<td>Overall satisfaction of prosthesis is associated with oral dryness</td>
<td>$P &lt; .02$ by chi-square test of independence</td>
<td>Participants with dry mouth reported soreness of denture-bearing tissues in complete and partial denture wearers</td>
<td>Gender, education, tooth loss</td>
</tr>
<tr>
<td>Ikebe et al17 (Japan)</td>
<td>Complete and partial</td>
<td>Significant association between dry mouth and dissatisfaction with complete denture $P = .004$, OR = 6.3</td>
<td>Multiple logistic regression</td>
<td>Significant relationship between dry mouth and denture instability or soreness in denture-bearing tissue</td>
<td>Dental status, BMI, self-assessed general health, drug intake</td>
</tr>
<tr>
<td>Marton et al19 (Hungary)</td>
<td>Complete</td>
<td>Statistical analysis was not done, because no patient with xerostomia complained about denture instability and none of the control patients had xerostomia</td>
<td>Chi-square</td>
<td>Hyposalivation (measured in unstimulated whole and parotid flow rates) showed differences between case and control groups</td>
<td>No</td>
</tr>
<tr>
<td>Wolff et al20 (Israel)</td>
<td>Complete</td>
<td>Salivary flow impacted significantly on abilities of chewing, speech, and comfort ($P &lt; .05$) as well as retention ($P &lt; .01$)</td>
<td>Pearson chi-square test</td>
<td>Ridge shape, resilience, musculature, denture quality</td>
<td>Medical history, medications</td>
</tr>
<tr>
<td>Marton et al21 (Hungary)</td>
<td>Complete</td>
<td>Xerostomia was not associated with denture instability in the control or Sjogren group</td>
<td>Mann-Whitney probe</td>
<td>Secretion of UWS, palatal, and upper labial salivary glands did not change after fabricating new denture in control group. Subjects with Sjogren had lower UWS after denture fabrication.</td>
<td>No</td>
</tr>
<tr>
<td>Dormenvaul et al22 (Switzerland)</td>
<td>Complete and partial</td>
<td>Complete maxillary denture wearers with reduced stimulated salivary flow rate ($&lt; 0.5$ mL) indicated not satisfactory denture retention compared with those with a flow $&gt; 0.5$ mL ($P = .02$)</td>
<td>Pearson and chi-square test, Student t test, Mann-Whitney procedure</td>
<td>Association between complaints of oral dryness and reduced saliva flow rates (unstimulated and stimulated). Recent loss of appetite associated with dry mouth. Complaints of poor retention of the maxillary denture associated with decreased stimulated salivary flow rates.</td>
<td>BMI, nutritional status, loss of appetite</td>
</tr>
</tbody>
</table>

BMI, body mass index; GOHAI, Geriatric Oral Health Assessment Index; GOHAI-T, GOHAI Taiwanese; UWS, whole unstimulated saliva.

The present review identified that the consequences of dry mouth were more critical for complete dentures, particularly for the maxillary dentures, which is supported by the theory that the physical attributes of saliva are essential to facilitate cohesion, adhesion, and surface tension of the maxillary plate to maxillary complete dentures. Additionally, the palatal minor salivary glands, which are mucous salivary glands, may promote the stability of maxillary dentures and are less affected by...
decreased saliva secretion in patients complaining about oral dryness. Similar observations were discussed in a review paper by Turner et al., regarding the treatment effects of hyposalivation in complete denture retention, although the authors found only a low level of evidence for establishing clinical guidelines on that topic. In the present review, investigators in one study registered more dissatisfaction with the functions of partial dentures among denture wearers. Their possible explanation for this was that frequent construction faults of the mandibular dentures are related to dislodgement, which induces soreness and complaints in the absence of lubricating saliva film on the denture-bearing mucosal surface. The authors speculated that partial denture wearers have less experience in wearing their dentures, thus have less adapted functioning compared to completely edentulous patients.

With the extensive systematic literature search, the identified studies did not include information about various types of design, material, anatomical differences, history of previous prosthetics, and denture wearing habits. Importantly, analyses were not adjusted for confounding factors such as comorbidity, medications, and patient's age. Aging was found to be a contributing factor to oral dryness in one study, but most results considering age and gender differences were inconsistent. Generally, studies in this review addressed dental patients above the age of 45 years in a very diverse sample with respect to gender, general health, and dental status including the mean number of teeth. Besides oral dryness, which was found to negatively impact oral health, denture satisfaction was identified as the strongest predictor of oral health-related quality of life in older adult patients wearing removable dentures. This finding is supported by a recent study which described that xerostomia decreases the quality of life in older adults. Increasing age is frequently correlated with polypharmacy, and the consumption of prescription medications is associated with hyposalivation. As previously established by other investigations, medication-induced xerostomia adversely affects intraoral health, causing detrimental changes in teeth and oral mucosa supporting the removable dentures. Information about medications taken, underlying medical conditions, smoking, and body mass index, which are common risk factors or predictors of perceived oral dryness, were reported in only one study, thus further research about the relationship between polypharmacy-induced dry mouth and denture performance is needed.

There are potential limitations of the present review due to the high heterogeneity of study hypotheses, study designs, and approaches. No longitudinal, prospective studies or registered clinical trials were found to answer the PICO question. As studies were not consistent in their exclusion criteria (e.g., excluding dentures with retention problems and mucosal pain), evaluation of denture satisfaction regarding denture-caused sensitivity was not comparable among all studies. Denture-wearing history was also distributed among wide ranges, including studies with new dentures or studies that required at least 6 months of denture-wearing experience. While most studies in the present review did not provide data on denture-wearing history, this could be valuable information since new dentures stimulate saliva secretion within the first week after denture delivery. Other aspects of intraoral conditions that were often not reported, such as the status of the denture bearing tissues, intraoral inflammation, and dental carries due to the absence of protective saliva, possibly modified the recorded values of denture performance.

Conclusion

The present review, based on the currently available literature, affirmed the conventionally accepted negative impact of oral dryness on denture performance with variable statistical strength. Speaking and chewing abilities, as well as denture stability, were decreased in patients with dry mouth complaints compared to patients without dry mouth. Xerostomia was also associated with the severity of hyposalivation, measured by the secretion of major salivary glands. In a minority of denture wearers, stimulated salivary flow rates were found to affect denture comfort. Since both xerostomia and denture performance were based on the subjective opinion of the participants in the majority of studies and data were mostly collected among elderly patients by convenient sampling, generalized conclusions for various age groups in the general population warrant future investigations, including saliva measurements for all subjects. A quantitative meta-analysis could not be conducted because of the limited number of studies, the wide array of clinical outcomes, and missing information on potential confounders. Accordingly, available data and the strength of the relationship between xerostomia and denture performance varied among the publications included in the present analysis, providing an incomplete assessment of this topic.

Declaration

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
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