

SCOPING REVIEW OPEN ACCESS

# What Do Patients Prefer in Periodontal and Implant Therapy? A Scoping Review

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## ABSTRACT

**Aims:** Understanding and integrating patients' preferences into clinical practice can enhance personalized care, improve patient's adherence to treatment, and lead to better therapeutic outcomes. The aim of this scoping review was to map the existing literature investigating patients' preferences in periodontal and implant therapy while identifying key areas for future research and development.

**Methods:** Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR) guidelines, an electronic search was conducted in four databases (PubMed, Google Scholar, Cochrane Library, and ScienceDirect) in July 2024 to identify studies evaluating patients' preferences for periodontal and implant therapy.

**Results:** The literature search yielded 384 studies, of which eight articles met the inclusion criteria. These studies were conducted between 2003 and 2019 in Brazil, China, Austria, Italy, Germany, Canada, USA, Chile, France, Spain, and Portugal. A total of 1642 patients were included. Preferences were assessed using various quantitative and mixed methodologies. Results indicate a strong preference for treatments aimed at preserving teeth, favoring conservative approaches. When teeth cannot be restored, most patients prefer an implant-supported fixed partial denture to avoid damaging adjacent teeth with a conventional tooth-supported fixed partial denture. In this context, treatment predictability is ranked as the most important factor. While no sociodemographic factors appeared to be associated with preferences in periodontal treatments, several predictors were identified for dental implant therapy. Younger patients, women, individuals with higher education levels, and those with high perceived dental health showed a higher willingness to pay for dental implants.

**Conclusion:** The literature on patients' preferences in periodontal and implant therapies is scarce. Several trends are identified but further longitudinal studies are needed to explore patients' preferences over time and the role of sociodemographic and cultural segmentation criteria.

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## 1 | Introduction

There is a growing interest in the assessment of patients' preferences in medicine, driven by the recognition that healthcare outcomes are not solely defined by clinical parameters [1]. Indeed, understanding and measuring patients' preferences prior to treatment appear to be essential to achieve successful patient reported clinical outcomes (e.g., patient satisfaction from treatment). Moreover, this is a central component in the practice of Evidence-Based Dentistry (EBD) that requires patients to be actively engaged in the decision making with regard to their treatment (Figure S1).

Sometimes discrepancies arise between treatment choices made by patients and those recommended by healthcare providers [2]. Research suggests that aligning treatment with patient's preferences can improve compliance and adherence to treatment, especially in chronic conditions like noncommunicable diseases (NCDs) where patient engagement is crucial [3]. This approach has been investigated in diseases such as diabetes, rheumatoid arthritis, depressive disorders, and end-of-life care [4–7].

The US Food & Drug Administration (FDA) defines patient's preferences as “qualitative or quantitative assessments of the relative desirability or acceptability to patients of features that differ among alternative health interventions” [8]. These are different from patient-related outcomes (PROs), which the FDA defines as “reports of the status of a patient's health condition that come directly from the patient, without interpretation of the patient's response by a clinician or anyone else” [8]. Unlike patients' preferences, which can be expressed at any stage of the treatment process and reflect what the patient wants, PROs are posttreatment measurements used to assess how patients are feeling and whether the treatment has met their expectation (glossary).

Understanding patients' preferences involve identifying the aspects of care that are most important to the patient (the attributes), ranking these preferences based on their relative significance, and determining the trade-offs patients are willing to accept. When these have to be investigated in research, study design and method complexity increase as researchers move from assessing attributes to assessing trade-offs, progressing from qualitative to quantitative methods [8] (Figure S2). Qualitative methods involve in-depth exploration of patient attitudes, beliefs, and preferences through interviews, focus groups, or open-ended questionnaires, focusing on understanding the “why” behind patient choices rather than providing numerical data. In contrast, quantitative methods generate statistical data that can measure the strength of preferences and predict choices based on specific attributes. A mixed method approach combines both qualitative and quantitative techniques, balancing their strengths while addressing their limitations. For each methodology type, quantitative and qualitative, several tools have been described (Table S1 and Figure S3). However, regardless of the chosen methodology, a standardized approach needs to be implemented, from the definition of the problem, the decision model, and the experimental design, right through to data analysis (Figure S4).

In the field of periodontal and implant therapy, patients' preferences have not been sufficiently explored. However, it is clear that incorporating patients' preferences regarding various treatment options is crucial for adopting an EBD approach, meeting patient expectations, and achieving successful therapeutic outcomes. Particularly, patients suffering from periodontitis or requiring implant-supported rehabilitation due to missing teeth are usually engaged in long-lasting treatment plans, including supportive periodontal (SPC) and peri-implant care (SPIC) protocols, for which patient's compliance is the key factor to obtain successful outcomes and long-term effectiveness [9]. Thus, patients need to be aware of their condition and express their preferences for alternative treatments. Clinicians need to understand the factors that may influence patients' decisions and perceptions of care.

To our knowledge, no previous literature review has been conducted to investigate patients' preferences for periodontal and dental implant therapies. Thus, a scoping review was designed with the aim to provide a comprehensive overview of the existing literature on the topic while identifying key areas for future research and development.

## 2 | Methods

### 2.1 | Review Protocol

This review was conducted following a systematic approach, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR) guidelines [10]. The review protocol was not registered on PROSPERO because it does not accept scoping reviews.

A specific review question was formulated prior to initiating the literature search:

“What are the patient's preferences concerning periodontal and implant treatments?”

### 2.2 | Selection Criteria

The following eligibility criteria were applied during the study selection process:

P: Patients requiring or undergoing periodontal or implant therapy.

No restriction was applied for the type of periodontal diagnosis, the reason for missing teeth, or the protocol for implant therapy (e.g., dental implant type, surgical protocols, prosthetic rehabilitation).

I: Self-reported questionnaires or interviews assessing patients' preferences according to the methods described in the literature and summarized in Table S1.

C: Not applicable.

O: Patients' preferences for treatment.

S: Interventional and observational studies (including cohort, case-control, and cross-sectional studies), and systematic review with or without meta-analysis.

The literature search was limited to studies published in English or French.

The exclusion criteria were:

1. Studies focusing on PROs according to the FDA definition [8].
2. Studies addressing preferences in areas other than periodontal and implant treatments
3. Studies on practitioner's preferences
4. Abstracts and conference reports
5. Letters to the editor or commentaries
6. Case reports or case series.

### 2.3 | Information Sources and Search

An electronic search was conducted in Medline (via PubMed), Google Scholar, Cochrane Library databases, and Science Direct to retrieve manuscripts published up to July 2024. The search strategy and search results are outlined in Table S2. Furthermore, a manual search was performed to identify any additional studies in the references of the included articles. The included articles were compiled using a bibliographic software tool (Rayyan [11]).

### 2.4 | Selection Process

Two reviewers (S.G. and V.G.) independently screened the titles and abstracts according to the predefined eligibility criteria. If there was insufficient information in the abstract, the full text was reviewed. Any disagreements were resolved through discussion or by involving a third reviewer (M.C.C.) who acted as tiebreaker. The inter-reviewer agreement was very good (Cohen's Kappa value of 0.795 (95% CI=0.599–0.991), with an overall agreement 89%).

### 2.5 | Study Quality Appraisal

The objectivity and quality of studies examining patients' preferences were evaluated using a risk of bias assessment tool: the ROBVALU (Risk of Bias in studies of Values and Utilities) tool, as described by Karam et al. [12]. This is a standardized instrument developed to assess the risk of bias in studies evaluating people's values, utilities, or importance of health outcomes. The tool addresses potential bias through four key subdomains: selection of participants into the study, completeness of data, measurement instruments, and data analysis. It employs seven key signaling questions and utilizes a 4-point Likert-type scale (yes, probably yes, probably no, no) to evaluate individual items and formulate an overall risk of bias judgment, ensuring a structured and reliable assessment of methodological quality.

## 3 | Results

### 3.1 | Literature Search and Selection

The electronic and manual search yielded 384 studies (Figure 1). After screening titles and abstracts and removing duplicates, 16 studies were selected for full-text assessment, and eight records were excluded for various reasons (Table S3). Ultimately, eight studies were included in the review [13–21]. These were all original studies; no systematic review was found.

### 3.2 | Characteristics of the Included Studies

All included studies employed a cross-sectional design, involving a total of 1642 patients. These studies were conducted between 2003 and 2019 across diverse countries, including Brazil, China, Austria, Italy, Germany, Canada, USA, Chile, France, Spain, and Portugal (Table 1).

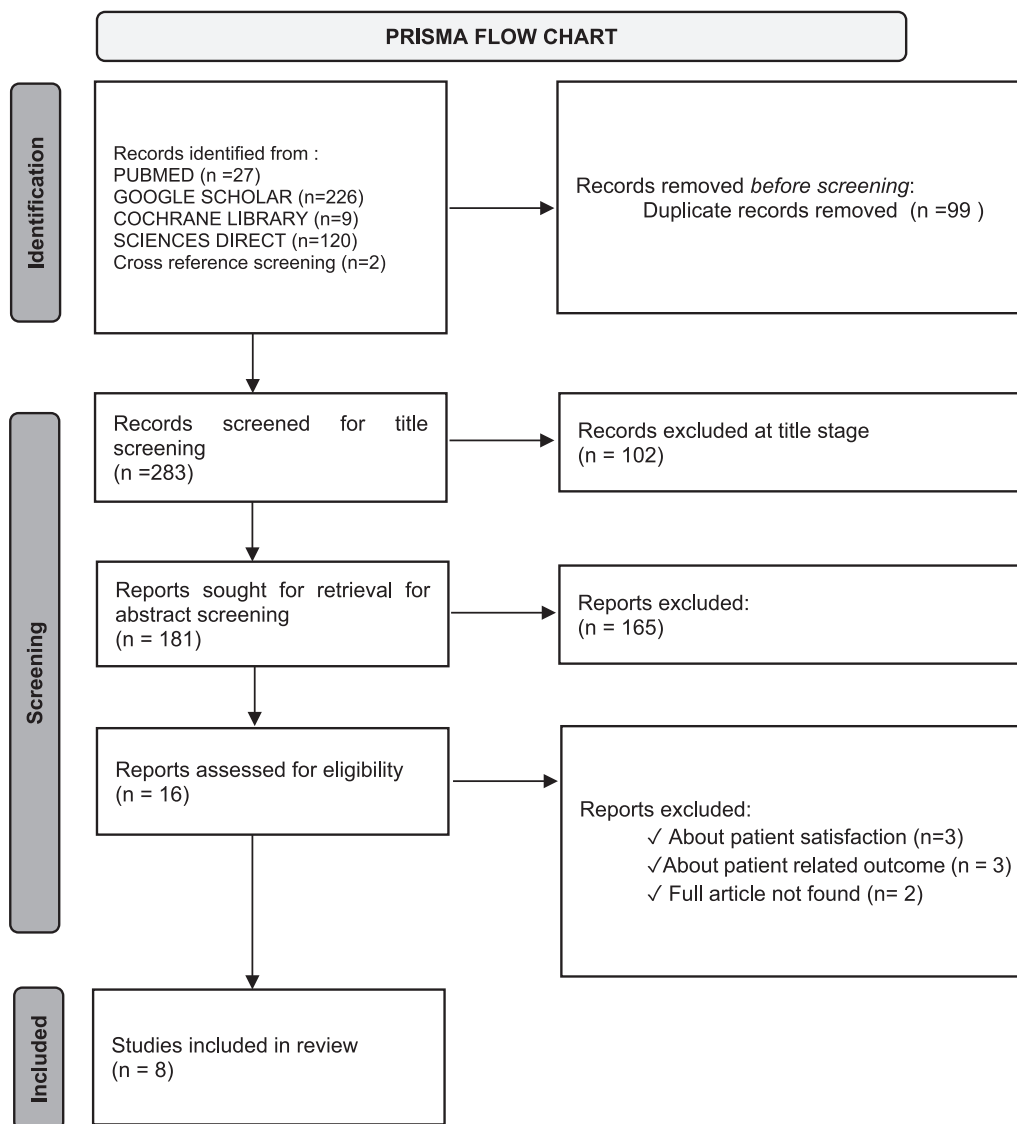
Among the eight selected studies, two focused on patients' preferences regarding periodontal disease therapy [14, 15], four examined preferences for implant therapy [16–19], including preferences for bone graft surgeries [18, 19], and the remaining two explored preferences for implant-supported prosthetic treatments [20, 21].

Half of the studies used self-administered questionnaires, whereas the other half relied on interview-based questionnaires. Only two studies [14, 20] applied a strictly quantitative methodology to assess patients' preferences (namely discrete choice experiment methods, raking methods and rating methods) whereas four studies [15–17, 19, 21] used a mixed-methods approach (both qualitative and quantitative). The most commonly used methodology was contingent valuation, which includes measures such as patients' willingness to pay as a quantitative method for evaluating preferences for treatment [16, 17, 21].

#### 3.2.1 | Patient's Preferences for Periodontal Treatments

Two studies were included, involving a total of 736 patients [14, 15] (Table 1).

Croft et al. [15] examined 469 patients with a history of periodontal disease, all of whom were under SPC. To assess patients' preferences, the authors used an anonymous, 13-item, self-administered questionnaire. The questionnaire assessed preferences for ultrasonic or hand instruments for SPC and explored the reasons for these preferences through multiple-choice questions. There was no mention of the questionnaire's development methodology or pretesting, nor whether steps were taken to ensure understandability by patients. The study showed that 74% of respondents preferred ultrasonic scaling, whereas 4.1% preferred hand scaling during SPC; 21.9% had no preference. The reasons for preferring ultrasonic instruments included more effective buildup removal, less pain, greater procedural efficiency, and a cleaner feeling. The main



**FIGURE 1** | PRISMA flowchart for study screening and selection.

concerns regarding ultrasonic scaling were noises, tooth sensitivity, and perceived messiness. No subgroup analysis was performed to determine whether gender or age had an impact on patients' preferences.

Vennedey et al. [14] examined 267 patients with a history of periodontal disease. To assess patient preferences related to periodontal disease and its treatment, the authors used a self-administered anonymous paper or online questionnaire in the form of a discrete choice experiment. Twelve choice tasks were presented, each with two options. Patients made choices by weighing the relative importance of different hypothetical scenarios. Then, a rating methodology, specifically a best-worst scaling (BWS) type 2, was used. Patients were asked to identify which attribute (tooth loss within 10 years, cost, complaints/symptoms, frequency of periodontist visits) had the greatest or least impact on their decision. The total completion time for the questionnaire was 10–15 min. The authors developed this questionnaire based on a literature review, interviews with three experts, and focus groups with 15 patients, during which participants stated their primary treatment objectives. The

questionnaire was pretested on three patients, leading to minor editorial changes.

The study showed that patients significantly disliked tooth loss, with the coefficient increasing as the number of lost teeth increased (one tooth loss =  $-1.97$ , two tooth losses =  $-5.0$ ). Patients preferred to pay less for their periodontal therapy ( $-0.0002$  per euro) and expressed a greater dislike for gum recession ( $-1.51$ ) compared to tooth sensitivity ( $-0.68$ ) and occasional gum bleeding ( $-0.05$ ). No significant preferences were found regarding the frequency of periodontist visits. The attribute “tooth loss within the next 10 years” was considered the most important factor for decision-making by the majority of patients (82%), followed by “cost,” which was deemed the most important by 8% of patients. Conversely, 71% regarded the “frequency of periodontist visits” as the least important factor. Most patients (65%) considered gum recession the worst symptom, whereas tooth sensitivity was regarded as the worst by only 28% of patients. Subgroup analyses did not reveal any significant differences in preferences related to age, gender, educational level, or history of periodontal treatment.

**TABLE 1** | Summary of cross-sectional studies included in the scoping review.

First author, Year	Country	Population (Sample size)	Sample characteristics	Method(s) to assess patients' preferences	Segmentation criteria	Clinical data	Settings	Main results
Studies dealing with periodontal therapy								
Croft et al., 2003 [15]	USA	Patients with history of periodontal disease in SPC (no mention about the disease classification used) ( <i>n</i> = 469)	Mean age: 59.4 (±10.4) years; 60% females; 40% males	Anonymous self-administered paper questionnaire, multiple-choice questions. The questionnaire assessed preferences for ultrasonic or hand instruments and explored the reasons for these preferences	Age, gender	All patients were undergoing SPC. No specific periodontal clinical parameter was described	Three different private practices	74% preferred ultrasonic scaling over hand scaling during SPC
Vennedey et al., 2018 [14]	Germany	Patients with history of periodontal disease (no mention about the disease classification used) ( <i>n</i> = 267)	Mean age: 54.5 (±13.2) years; 58% females; 42% males Smoking status: 23% current smokers, 40% former smokers, 24% never smokers. Education level: 51% University degree or equivalent, 27% vocational training, 12% lower secondary education level, 6% college diploma	Anonymous self-administered paper or online questionnaire, Discrete choice experiment: patients make choices by weighing the relative importance of different hypothetical scenarios. Then, rating methods (BWS type 2): patients were asked directly to state which of the attributes had the largest or smallest impact on their decision and to state the symptoms or complaints they wanted to prevent most	Age, gender, health insurance coverage, educational level, smoking status	Diagnosed for periodontal disease, already treated for periodontal disease, current and previous disease	Private practice ( <i>n</i> = 200) and hospital settings ( <i>n</i> = 67)	82% prioritized tooth loss in decision-making; 8% prioritized cost

(Continues)

TABLE 1 | (Continued)

First author, Year	Country	Population (Sample size)	Sample characteristics	Method(s) to assess patients' preferences	Segmentation criteria	Clinical data	Settings	Main results
Studies dealing with implant therapy								
Leung et al., 2010 [17]	China	Convenient sample of patients requiring dental implants ( <i>n</i> = 51)	Mean age: 39.4 (±16.3) years 68.6% females; 31.4% males Education level: 54.9% secondary education, 23.5% tertiary education, 21.6% primary or no education. Employment status: 54.9% full-time employed, 13.7% students, 13.7% homemakers, 7.8% retired	Structured individual questionnaire interview. Patients were asked to choose their preferred hypothetical treatment for an anterior or posterior missing tooth presented using visual aids. Then, using the contingent valuation (bidding method), patients were asked to determine the WTP	Age, gender, education attainment, employment status, personal income	Self-reported oral health status: missing teeth at the anterior or posterior region, experience in tooth replacement, perceived dental health, dental awareness. No data about the periodontal status	Hospital setting	94% preferred implant for missing anterior tooth, 84% for posterior over FPD/RPD. WTP was found to be associated with gender and education attainment but not with income level. Females and those with higher education level showed higher WTP
Hof et al., 2012 [18]	Austria	Consecutive patients seeking for dental implant ( <i>n</i> = 150)	Mean age: 45 (±12) years 56% females; 44% males Employment status: 16% self-employed, and executives, 9% pupils and students, 47% white-collar workers and civil servants 23% retired	Questionnaire interview based on a rating method (prioritization tool): patients were asked to rank the treatment objectives based on what they considered most important. Then, with a structured interview, patients' expectations of treatment success and longevity, willingness to accept bone graft surgery and second-opinion seeking behavior were assessed	Age, gender, socioprofessional categories, denture satisfaction	Self-reported initial prosthetic restorations. No data about the periodontal status	Hospital setting	59% prioritized treatment predictability; 30% avoidance of RPD 67% accept additional costs for guided implant placement to avoid bone graft surgery

(Continues)

TABLE 1 | (Continued)

First author, Year	Country	Population (Sample size)	Sample characteristics	Method(s) to assess patients' preferences	Segmentation criteria	Clinical data	Settings	Main results
Re et al. 2017 [16]	Italy	Consecutive patients ( $n = 103$ )	Mean age: 44.1 ( $\pm 9.5$ ) years; 50% females; 50% males Education level: 6% primary education, 35% secondary education, 59% tertiary education Employment status: 5% unemployed, 63% employed, 32% private practice	Structured interview: patients were asked what they would prefer between 2 treatment options: RCT and crown positioning, or tooth extraction and implant insertion. Then, contingent valuation (bidding method): patients were asked to determine WTP to receive their preferred treatment option	Age, gender, education level, employment status, personal income	Self-reported dental routine check-up/year, history of hopeless tooth. No data about the periodontal status	Private practice	76% preferred RCT and crown; 24% chose implant. 46% WTP additional €300 beyond €2000 base cost for their preferred treatment
Bucchi et al., 2019 [19]	Italy, Chile, France, Spain, Portugal	Adult patients consulting for a periodontal, surgical or implant treatment ( $N = 330$ )	Mean age: 47.6 ( $\pm 18.28$ ) years; 61.2% females; 38.8% males Education level: 57.9% higher education, 25.6% secondary education, 13.7% primary education	Self-administered questionnaire based on a mixed methodology: patients were asked about their level of acceptance for each type of bone graft through multiple-choice questions (repertory grid method), followed by open-ended questions (where patient spontaneous responses were recorded) and mixed questions to identify the reasons for refusal (if applicable)	Age, gender, education level, religious affiliation, country of origin	Self-reported. No data about the periodontal status	Hospital setting	Higher percentage of refusal for: Allograft (40.5%); Extraoral autologous bone graft; Xenograft; Autologous bone graft from an intraoral donor site; Alloplastic materials

(Continues)

TABLE 1 | (Continued)

First author, Year	Country	Population (Sample size)	Sample characteristics	Method(s) to assess patients' preferences	Segmentation criteria	Clinical data	Settings	Main results
Studies dealing with implant-supported rehabilitation								
Leles et al., 2009 [20]	Brazil	Convenience sample of consecutive partially edentulous patients (N = 165)	Mean age: 44.5 (±11.1) years; 69.1% females; 30.9% males	Self-administered questionnaire (ranking and rating method with a 5 points Likert scale); patients were asked to rank in order of preference four treatment approaches for partial edentulism: RPD, FPD, IPD and no treatment. Then, patients were asked to rate the importance of various reasons explaining the treatment ranking	Age, gender, marital status, education level, individual and household income	Position and location of edentulous spaces, previous prosthodontics treatment, age at first tooth loss. No data about the periodontal status	Hospital settings	RPD were preferred by older patients with greater oral health related quality of life, whereas ISC were preferred by patients with higher education levels. Financial cost had a great impact on refusing ISC
Augusti et al., 2013 [21]	Italy	Consecutive patients received at the first consultation (N = 107)	Mean age: 47.4 (±18.8) years; 55% females; 45% males	Questionnaire interview: quantitative and qualitative methodology (structured individual interview and contingent valuation). Patients were asked to imagine a hypothetical scenario involving the loss of a single dental element; Then, patients were asked to choose between FPD or ISC, and indicate their WTP for their preferred treatment	Age, gender, education level, occupation, income	Self-reported previous prosthodontic therapies, current needs, perceived dental health. No data about the periodontal status	Private practice	64% preferred ISC for single-tooth gap over FPDP Median WTP: €3000 (ant.), €2500 (post.) Patients were willing to pay more for ISC than for FPDP, with the lowest WTP for FPDP in the posterior region (€1500)

Abbreviations: BWC, best-worst choice; FPD, fixed partial denture; IPD, implant-supported partial denture; ISC, implant supported crown; NA, not applicable; RCT, root canal therapy; RPD, removable partial denture; SPC, supportive periodontal care; WTP: willingness to pay.

### 3.2.2 | Patients' Preferences for Implant Therapy and Implant-Supported Rehabilitation

Four studies investigated patients' preferences for implant therapy and two for implant-supported rehabilitations (Table 1). Of these, three studies used various methodologies [18–20], and three assessed the patients' willingness to pay (WTP) (described in the following section).

Leles et al. [20] published a study conducted to investigate the reasons for choosing or refusing implant-supported prostheses (IPD), fixed partial dentures (FPD), removable partial dentures (RPD), or opting for no treatment to replace missing teeth. The study included 165 consecutive partially edentulous patients and, to evaluate patient preferences, a self-administered questionnaire using ranking and rating methodologies with a Likert scale was used. Patients were asked to rank four treatment approaches for partial edentulism (RPD, FPD, IPD, and no treatment) using printed charts and acrylic resin replicas. They were then instructed to rate the importance of various potential reasons for their chosen option, assessing 32 items related to surgical requirements, treatment duration, relative cost, complexity of treatment, need for dental preparation, and removability. The questionnaire was pretested, and it was completed by the patients before the initiation of the treatment.

The results showed that there was no significant difference in treatment choice between the maxilla and mandible. When each arch was analyzed separately, the preference for RPDs was significantly higher in the mandible. Implant-supported partial dentures were the most frequently refused treatment option in both maxillae. Patients with a higher oral health related quality of life (measured on OHIP-14 score) and with advanced age preferred RPDs, whereas younger patients and those with higher educational levels were more likely to choose implant-supported restorations. Cost was the most influential factor in deciding for or against a particular treatment, while concerns about general health were considered the least important reason by patients.

Hof et al. [18] aimed to evaluate patients' preferences regarding implant therapy and bone graft surgery. They included 150 consecutive patients seeking for dental implants. To assess patients' preferences, the authors used a rating methodology with an outcome prioritization tool that allowed patients to rank their concerns regarding implant therapy—including predictability of treatment success, time and cost efficiency, avoidance of removable dentures, and avoidance of bone grafting—from 1 (most important) to 5 (least important). The questionnaire was administered before the initiation of treatment. However, the study did not provide information about the questionnaire development methodology, pretesting, or measures to ensure patient comprehension. Patients ranked treatment predictability as the most important factor (59%), followed by avoidance of removable dentures (30%), cost efficiency (7%), time efficiency (3%), and avoidance of bone grafting (1%). There was no observed influence of gender, age, or profession on patients' preferences. The majority of participants (88%) were not willing to accept an increased risk of implant failure to shorten treatment duration. More than half of the patients (61%) expressed willingness to undergo bone

graft surgery to enable dental implant treatment. Regarding the donor site, 85% preferred the posterior mandible over the chin. Most participants (57%) favored autogenous bone over synthetic bone substitutes. Additionally, 67% of participants were willing to accept the additional costs associated with guided implant placement to avoid bone graft surgery. Students and pupils were significantly less motivated to spend additional money. Patient motivation to seek a second opinion was high (62%) if they did not qualify for dental implant treatment, particularly among men and patients younger than 50 years of age.

Bucchi et al. [19] conducted a multicenter, international study that included 330 patients seeking periodontal, surgical, and implant treatment. To assess patients' preferences and concerns regarding different types of bone grafts and the factors influencing their choices, the authors designed a self-administered questionnaire using a mixed methodology that was translated and validated in each participating country. The questionnaire included 10 questions about the level of acceptance for each type of bone graft (allograft, xenograft, autologous from an extraoral or intraoral donor site, and alloplastic) through multiple-choice questions, open-ended questions to record patients' spontaneous responses, and mixed questions aimed at identifying the reasons for refusal if applicable.

The highest percentage of refusal was reported for allograft (40.5%), followed by extraoral autologous bone grafts, xenografts, autologous bone grafts from an intraoral donor site, and alloplastic grafts. Sociodemographic factors, such as gender and age, were not associated with the degree of acceptance of each type of bone graft. However, the country of origin, religious affiliation, and education level were identified as predictors of refusal. Particularly, following a religion was associated with a higher rejection rate of autologous bone from intraoral donor sites compared to patients who did not follow a religion. The reasons for refusal varied by graft type. For autologous bone grafts, both intraoral and extraoral donor sites, the primary reason was fear of pain and discomfort. For xenografts, the main concerns were fear of disease transmission and opposition to using animals for human benefit. For allografts, ethical and moral concerns, fear of disease transmission, and religious motivations were the strongest reasons for rejection.

### 3.2.3 | Patients' Preferences by Willingness to Pay for Implant Therapy

Three studies addressed patients' preferences through their willingness to pay (WTP) for implant therapy (Table 1) [16, 17, 21].

Leung and McGrath [17] investigated a convenience sample of 51 patients in China. To assess the amount of WTP for a single implant treatment and identify the factors influencing this amount, the authors used a structured individual questionnaire interview. Patients were asked to choose their preferred treatment option for an anterior or posterior missing tooth. Several treatment options were proposed, including implant-supported prostheses, FPD, removable partial dentures, and no replacement. Hypothetical scenarios were presented using visual aids; participants were given 30 min to review the materials and were encouraged to ask questions for any unclear issues. Then,

using a contingent valuation methodology, patients were asked to determine the amount they were willing to pay for implant treatment if it was their preferred option. A bidding method was employed, where participants were given an initial bid of HKD 20000, which increased or decreased by HKD 1000 depending on their responses.

Most patients preferred implant treatment for a missing anterior tooth (94%) and a missing posterior tooth (84%) over FPD or removable partial dentures. No significant differences in the WTP for anterior versus posterior implant reconstruction were observed. After controlling for confounding factors, the WTP was associated with gender, educational level, and the presence of missing teeth, but not with income level, age, employment status, experience with tooth replacement, perceived dental health, or dental awareness. In particular, women were more willing to pay for replacing a missing anterior tooth or a posterior tooth compared to men. Patients with higher educational attainment were willing to pay 28 times more for an anterior implant restoration compared to those with a lower educational level, whereas no significant difference was observed for posterior restoration considering the educational level. Patients with existing missing teeth were willing to pay less than those without missing teeth for a posterior implant restoration, whereas no differences were observed for patients with missing teeth regarding an anterior implant restoration.

Augusti et al. [21] included 107 consecutive patients attending their first consultation in a private practice in Italy. To assess patient preferences for replacing a single missing tooth and their WTP, the authors conducted structured interviews performed by a single interviewer. Patients were asked to imagine a hypothetical scenario involving the loss of a single dental element in both the anterior and posterior areas. They were then asked to choose between two dental treatment options: a FPD or an implant-supported crown. A contingent valuation method was implemented to determine the maximum amount of money patients were willing to pay for their preferred treatment option. The same bidding method used by Leung and McGrath [17] was applied. Both treatment options were initially proposed at a cost of €2000, reflecting the average price in Italy. If a patient was willing to pay this price, increments of €100 were added until the patient was no longer willing to pay. Conversely, if the initial bid was too high, decrements of €100 were deducted until the patient was willing to pay or the amount reached zero. Finally, patients were asked to explain the reason for their choice, selecting from the following: documentation/information, past experience, or fear of surgical procedures.

The majority of patients preferred the dental implant solution (64%) compared with the traditional bridge (36%). In most cases (94.4%), the chosen option did not change according to the tooth location (anterior or posterior area). Previous treatment experience had a significant impact on the new choice, with patients who had previously experienced a bridge still preferring this solution, and the same trend was observed for implant therapy.

Considering sociodemographic segmentation criteria, patients with higher educational levels (tertiary) were more likely to choose implant therapy over a FPD in both anterior and posterior areas compared to those with lower educational levels (secondary or primary). Additionally, a high perceived dental health

status was most likely associated with choosing the implant option. Most participants explained their choice based on documentation and information (58%), while 27% based it on past experience, and 16% on a fear of surgery.

Contrary to the findings of Leung and McGrath [17], Augusti et al. [21] reported a significantly higher median WTP value for an implant in the anterior region compared to a posterior implant restoration ( $\Delta = \text{€}500$ ). After adjusting for confounders, perceived oral health, previous removable prosthesis experience, and gender were identified as predictors of WTP, while age, educational level, and previous implant therapy did not show any significant influence on WTP. Patients with a high perceived oral health status were willing to pay more (anterior: +€831.1; posterior: +€841.1). Conversely, patients who had previously undergone another therapy (removable prosthesis) were willing to pay less for the anterior sector (−€584.3). Women were willing to pay more for posterior implant restoration compared to men (−€195.3).

Finally, the same Italian team, in 2017, explored treatment preferences and the WTP for managing a tooth with a poor prognosis. The authors used a structured questionnaire interview. Patients were presented with two hypothetical treatment scenarios: a restorative approach involving root canal therapy (RCT) with crown positioning and a surgical approach consisting of tooth extraction followed by implant placement. The contingent valuation method applied followed the same procedure as previously described in Augusti et al. [21].

The majority of participants (76%) opted for the restorative solution, while 24% preferred the surgical option. A strong correlation between past experiences and current choices was found, consistent with the findings by Augusti et al. [21]. Most patients were willing to pay more for their preferred treatment option, with 46% expressing a WTP of an additional €300. 13% were willing to pay the proposed amount (€2000), and 42% were unwilling to pay this amount. The mean WTP value for the preferred treatment was €1926 (median: €2000). The WTP values were associated with dental care routines. Most patients who had regular dental visits once or twice a year (53%) expressed a WTP of an additional amount for their treatment choice (median WTP = €2100). Conversely, most patients who visited the dentist more than twice a year (67%) or did not visit at all (58%) showed less WTP for the treatment solution.

WTP values were not associated with gender, age, educational level, annual income, or type of employment. However, among patients who chose the restorative solution, significant differences in WTP were observed based on educational level and employment type. Patients with a higher educational level (tertiary) were willing to pay more than those with a lower level (secondary), and private practice workers were more willing to pay than employees.

### 3.3 | Critical Appraisal of the Evidence

The risk of bias in the included studies is presented in Table 2. All the included studies carried a serious risk of bias. Among the four subdomains analyzed by the ROBVALU tool, the most frequent risk of bias was identified for the data completeness

TABLE 2 | ROB VALU assessment.

Studies	Selection of participant	Completeness of data	Measurement instrument	Data analysis	Overall risk of bias
Leung et al., 2010 [17]	Probably no	Probably no	Probably no	Probably yes	Serious
Hof et al., 2012 [18]	Yes	Probably no	Probably no	Probably yes	Serious
Re et al., 2017 [16]	Probably yes	Probably no	Probably yes	Probably yes	Serious
Bucchi et al., 2019 [19]	Probably yes	Probably no	Probably yes	Probably yes	Serious
Croft et al., 2003 [15]	Probably yes	Probably no	Probably yes	Probably no	Serious
Vennedey et al., 2018 [14]	Probably yes	Yes	Probably yes	Probably yes	Serious
Leles et al., 2009 [20]	Probably yes	Probably no	Probably Yes	Probably yes	Serious
Augusti et al., 2013 [21]	Probably yes	Probably no	Probably no	Probably yes	Serious

Note: The significance of color shade are related to level of risk of bias.

items. Indeed, data completeness posed a significant concern, as nearly all studies failed to report participation rates, preventing a proper assessment of nonrespondent bias. Other potential sources of bias were identified in the study population selection process, methods, and outcome measures. For instance, formal validation of questionnaires and pretesting to ensure patient comprehension were rarely conducted.

## 4 | Discussion

This scoping review demonstrates that the evidence on patients' preferences in periodontal and dental implant treatments is limited. This shows that, despite its relevance, the topic remains underexplored. However, clear trends are identified, as patients tend to prefer treatments aiming at preserving teeth, and avoiding invasive surgical procedures. Patients appeared to be more willing to pay for their preferred treatment option, reinforcing the idea that aligning treatments with patients' preferences can enhance adherence and lead to better clinical outcomes [3].

### 4.1 | Patients' Preferences and Sociodemographic Segmentation Criteria

The most important attribute influencing patients' preferences for periodontal treatment was avoiding tooth loss, followed by treatment cost. The frequency of periodontal visits was ranked as the least important aspect. The patients surveyed considered gingival recession the worst symptom of periodontal disease, more concerning than tooth sensitivity [14]. Regarding SPC, patients preferred ultrasonic scaling because they found it more effective, less painful, and provided a cleaner feeling [15].

Patients preferred implant-supported FPD over removable or conventional tooth-supported FPD for replacing both posterior and anterior teeth [17, 21]. Additionally, they were more willing to pay for a dental implant restoration than for a conventional tooth-supported FPD. Furthermore, they preferred guided implant placement procedures to avoid bone graft surgery, even at

an additional cost. Interestingly, they were not willing to accept an increased risk of dental implant failure to shorten the treatment duration. Notably, a high variability in WTP was observed among the different studies and countries, particularly related to sociodemographic segmentation criteria.

Segmentation criteria, including age, educational level, experience of tooth replacement, perceived dental health, and oral health-related quality of life, were significant predictors of patients' preferences in dental implant treatment. Conversely, income and localization of edentulism (anterior vs. posterior) were not associated with differences in dental implant therapy preferences.

For dental implant treatment WTP, significant predictors included gender, educational level, need for treatment (missing teeth), experience with removable prostheses, localization of edentulism, preferred treatment option, frequency of dental check-ups, and perceived oral health. However, age, profession, dental awareness, and experience with dental implants therapy were not associated with differences in WTP. As an example, women showed a WTP higher than men for implant treatments, particularly for anterior restorations in China and posterior restorations in Italy [17, 21]. This discrepancy may reflect cultural and esthetic expectations according to genders and geographical regions. Similarly, patients with a higher educational level were more inclined to choose the dental implant option [20, 21] and were willing to pay more for anterior dental implant therapy in China [17], but not in Italy [16, 21]. Finally, patients with regular dental visits (once or twice a year) were more likely to pay more for implant treatment compared to those who rarely visited the dentist [16].

### 4.2 | Methodological Considerations

Investigating patients' preferences for treatment required a specific and complex methodology. The choice of the methodology—qualitative, quantitative, or mixed-methods—depends on the research objectives, available resources, and the specificity of the required information [22]. When the aim is to explore complex motivations and uncover new themes, a qualitative approach is ideal. For studies measuring the strength of

preferences and analyzing segmentation criteria such as age, education, or experience with tooth replacement, a quantitative approach is more suitable. In multifaceted scenarios, where a comprehensive understanding is needed, a mixed-methods approach provides the most balanced insights [23].

In the selected literature, only one study used a validated questionnaire [20], and only two reported the anonymous collection of patient data [14, 15]. Most frequently, a contingent valuation was applied [16, 17, 21]. This method offers several advantages: it provides a direct measure of perceived value by delivering a quantitative estimate of the economic interest in a medical service, it is easy to administer in surveys, and it can support the justification for funding new interventions. However, it also has some limitations: Participants may overestimate or underestimate their WTP depending on how the question is framed (cognitive bias), it does not always reflect actual decisions, and there is an equity issue—individuals with lower incomes might report a lower WTP, potentially biasing public decisions against vulnerable populations.

Through this scoping review, best practices in research methods for assessing patient preferences can be identified. First, the choice of the assessment tool should be guided by the specific research question, as no universally accepted gold standard exists. Researchers should aim to use recognized tools that align closely with their research objectives, including validated questionnaires or the development and validation of new questionnaires tailored to the study context. One of the primary challenges in designing questionnaires is managing complexity and ensuring participant comprehension. The complexity of questions can significantly affect how well participants understand and respond accurately. To address this, it is recommended to use clear and simple language and adhere to strict methodological standards for validation and pretesting, as suggested by Rothgeb et al. [24]. Additionally, Brosnan et al. [25] provide evidence that reducing cognitive load in questionnaire design can be achieved by simplifying question wording and offering intuitive response options. While there is no consensus in the literature on the ideal completion time for questionnaires, applying a reasonable duration can help minimize cognitive overload and enhance response quality [26].

Cultural and educational factors also play a significant role in how questionnaires are perceived and understood. Since a single set of questions cannot be universally applied, it is essential to implement a systematic pretest process to adapt questions to the cultural norms and educational standards of the target population. This approach ensures that the questions are both culturally sensitive and appropriately structured for respondents.

Secondly, to explore the potential influence of temporal effects on patient preferences, cohort studies could provide valuable longitudinal insights. Such studies can help determine whether preferences remain stable over time or are influenced by changing circumstances.

Thirdly, mitigating bias is crucial to enhancing the validity of research findings. This includes ensuring a diverse and

representative sample to reduce selection bias and improve the generalizability of the study results. Interviewer bias can be minimized through comprehensive interviewer training or by using self-administered questionnaires to maintain consistency in data collection. Furthermore, social desirability bias can be addressed by ensuring anonymity, thereby promoting honest and unbiased responses.

### 4.3 | Research Perspectives

The findings of this scoping review closely align with insights from broader medical fields such as oncology, pneumology, endocrinology, or rheumatology [4, 6, 27–29]. For instance, in oncology and chronic disease management, patients often prefer treatments that improve quality of life, minimizing pain, enhancing daily comfort, and maintaining independence, before considering financial implications [30]. Also in periodontology and implant dentistry, patients appeared to prioritize tooth preservation and choose dental implant treatments that enhance their quality of life, considering cost as a secondary factor [5, 31]. Across all these fields, the overarching trend reveals that while cost remains an important factor, patients consistently value outcome predictability, reduced discomfort, and the ability to maintain quality of life as the most significant drivers in their treatment decisions [32].

However, several sociodemographic factors appear to influence patients' preferences and WTP (Figure 2). In general, these are under investigated in the field of periodontal and implant treatments. Consistent with a recent systematic review exploring the WTP for all dental service [33], it is critical to understand which factors, such as gender, age, household income, employment status, marital status, previous treatment experiences, or regular visits to the dentist, influence motivations and constraints that drive patients' preferences toward treatments.

### 4.4 | Limitations

Although the study selection process shows a strong interviewer agreement and aims to map the existing literature with an exploratory and exhaustive approach, the results are exclusively descriptive and based on a limited number of studies. Thus, caution must be paid when interpreting or generalizing the findings, especially considering the three main domains investigated: periodontal therapy, implant therapy, and implant-supported prosthetic rehabilitation. Among the selected studies, a considerable heterogeneity was noted in settings, populations, tasks, outcomes, and questionnaire architectures. Moreover, they all employed a cross-sectional design and thus no evaluation of the evolution of patient's preferences over time and during treatment was addressed. Indeed, studies have shown that past experiences impact on patients' preferences, and this parameter should be taken into account in future longitudinal studies.

## 5 | Conclusion

Despite the cardinal role in the context of EBD principles and personalized cares, the literature on patients' preferences in

# PATIENTS' PREFERENCES

## PERIODONTAL THERAPY



### Periodontal disease and treatment :

- Most important factor : avoiding tooth loss, then the cost, then bleeding gums
- Less important factor : frequency of dental visit
- Worst symptom : gum recession, worst than tooth sensitivity



### Supportive Periodontal care :

- Preference for ultrasonic scaling over manual scaling during SPC
- Considered as more effective, less painful and better cleaner feeling.

## IMPLANT THERAPY



### Implant vs root canal therapy (RCT) + crown :

- Preference for RCT + crown



### Implant vs fixed vs removable partial denture :

- Preference for implant therapy and more WTP for an implant
- Cost was the most important reason for refusing implant therapy
- Choice based on information/documentation



### Bone grafting :

- Higher percentage of refusal for : 1. allograft, 2. autologous bone from extra oral donor site 3. xenograft, 4 autologous bone graft from intra oral donor site 5; alloplastic
- Most important factor : treatment predictability, followed by the avoidance of removable prosthesis
- Patients were not willing to increase of implant failure for shortening treatment duration
- Patients were willing to pay additional cost for guided surgery if it can avoid bone graft
- Patients were willing to undergo a bone graft surgery to enable implant placement

## SEGMENTATION CRITERIA INFLUENCE



### Age:

- Younger patient were more willing to prefer implant rather than fixed or removable partial denture; older were more willing to prefer removable prosthesis.



### Gender :

- Women were more willing to pay for an implant restoration compared to men



### Educational level :

- Higher educational level were more prone to chose the implant solution rather than fixed partial denture



### Income and profession related category :

- Do not affect patients' preferences



### Preferred treatment option

- Patients were willing to pay more for their preferred treatment option (+300€)



### Oral health quality of life and perceived oral health :

- Patient with higher Oral Health related Quality of life were more willing to chose the removable prosthesis over the fixed partial denture and the implant therapy
- Patients with high perceived oral health were willing to pay more for their treatment and more prone to chose the implant solution over the fixed partial denture



### Following a religion :

- Patients following a religion were more prone to refuse the autologous bone graft from intra oral donor site, Muslims patients were more prone to reject xenograft than Christians.



### Dental care routine and past experience :

- Patients who have regular dental check-ups once or twice a year are more willing to pay compared to those who visit more than twice or do not visit the dentist at all,
- Previous treatment choices had a significant impact on new decisions, with patients generally preferring the same choice as before.

**FIGURE 2** | Patients' preferences for periodontal and implant therapy and segmentation criteria influence.

periodontal and dental implant therapies is scarce. Clear tendencies are identified toward less invasive and more predictable treatments. However, further longitudinal studies are needed to understand patients' preferences over time, and the role of socio-demographic and cultural segmentation criteria that can influence patients' preferences in periodontal and dental implant treatments.

### 5.1 | Implication for Clinical Practice

From a clinical perspective, incorporating patients' preferences into treatment planning may enhance patient adherence to the treatment and assist the clinician in the final therapeutic decision.

### 5.2 | Implication for Research

In a research perspective, these findings highlight the need for more comprehensive studies with adequate methodology that explore patients' preferences across diverse populations and settings in relation to their sociodemographic status, thereby informing evidence-based guidelines.

### Conflicts of Interest

The authors declare no conflicts of interest.

### Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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### Supporting Information

Additional supporting information can be found online in the Supporting Information section.