

Patient-Reported Outcome Measures in Dentistry: Conceptual Foundations, Clinical Applications, and Comparative Evaluation

Abstract:

Dentistry is increasingly transitioning from a disease-centered model toward a patient-centered approach, emphasizing outcomes that matter most to patients. Patient-Reported Outcome Measures (PROMs) have emerged as essential tools for capturing patients' perceptions of oral health, functional status, psychosocial well-being, and quality of life without clinician interpretation. This literature review aims to explore the conceptual foundations, evolution, classification, commonly used instruments, and clinical applications of PROMs in dentistry, with particular emphasis on prosthodontics and other dental specialties.

PROMs are grounded in health-related and oral health-related quality of life frameworks, including Locker's model, Wilson and Cleary's model, and the World Health Organization's International Classification of Functioning (ICF). Over time, dentistry has progressed from reliance on clinician-reported indices to the incorporation of validated generic, oral health-specific, age-specific, and disease-specific PROMs such as OHIP, GOHAI, OIDP, PIDAQ, CPQ, and ECOHIS. These instruments have demonstrated value in assessing outcomes related to pain, function, esthetics, psychological well-being, and social participation across dental disciplines including prosthodontics, periodontology, orthodontics, oral surgery, and pediatric dentistry.

The integration of PROMs into clinical practice enhances patient-provider communication, supports shared decision-making, and improves evaluation of treatment effectiveness beyond traditional clinical measures. However, challenges such as time constraints, cultural adaptation, response bias, and lack of routine implementation remain. Emerging digital PROMs (ePROMs), artificial intelligence-based adaptive tools, and integration with electronic health records offer promising solutions.

In conclusion, PROMs represent indispensable components of modern, evidence-based, and value-driven dental care. Their systematic adoption, supported by robust validation, digital integration, and policy endorsement, is essential for advancing patient-centered dentistry and improving both clinical outcomes and patient satisfaction.

Key-words: Patient-Reported Outcome Measures; Oral Health-Related Quality of Life; OHIP; Patient-Centered Care; Psychometrics; Dental Outcomes Research.

Introduction:

Dentistry, like all branches of health sciences, is gradually shifting from a strictly disease-centered model to a patient-centered care approach. As part of this evolution, Patient-Reported Outcome Measures (PROMs) have gained prominence. PROMs are tools used to assess health status, functional outcomes, and quality of life directly from the patient's perspective, without clinician interpretation.[1] They allow clinicians and researchers to measure treatment efficacy not just in terms of clinical success but also in how these interventions impact the patient's daily lives.

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In an era of evidence-based dentistry, PROMs provide valuable insights into the subjective experiences of dental patients. This is particularly relevant in dentistry, where psychological, aesthetic, and social factors often outweigh purely biomedical indicators of oral disease.[2]

The paradigm of health care evaluation has shifted from solely relying on objective clinical indicators to incorporating the patient's voice through **PROMs**. This shift underscores the growing recognition of the importance of **patient-centered care**, particularly in disciplines like prosthodontics, where comfort, function, and satisfaction significantly influence treatment success.[2]

Traditionally, outcomes in prosthodontics were measured using mechanical tests and clinician-reported indices. For example, denture retention was often evaluated using dislodging forces or spring-loaded devices, which, although objective, failed to fully capture the patient's lived experience.[3] Manoharan P S (2025) argues that these conventional measures offer only a partial picture and must be complemented with PROMs to evaluate real-world effectiveness and relevance of dental prostheses.

PROMs have their roots in pharmacological and palliative research, where survival was not the primary endpoint.[4] Over time, their application has expanded to surgery, chronic disease management, and now into oral health care. The ability of PROMs to assess **pain, psychological distress, functional limitation, and treatment satisfaction** makes them particularly valuable in dental specialties.

Several studies have demonstrated that the use of PROMs improve patient-provider communication, enhances satisfaction, and supports clinical decision-making. Currently PROMs are now employed both at micro-level (individual care) and macro-level (health care benchmarking and policy evaluation). However, their use at the policy level remains in its infancy, and most impact is noted at the individual level, particularly when PROMs are linked to care pathways and feedback loops.[5]

PROMs may be generic or condition-specific. Generic PROMs, such as EQ-5D (EuroQol Group) or SF-36, allow comparisons across health conditions, whereas disease-specific PROMs—such as the Oral Health Impact Profile (OHIP) tools like OHIP-14,49 & GOHAI Index focus on aspects relevant to specific diseases and dental treatments.[6] Churruca et al. (2021) noted that while the development of PROMs has grown steadily since the 1980s, challenges remain in selecting appropriate tools with adequate validity and reliability.

Finally, in prosthodontics, the emergence of Dental PROMs (dPROMs) tailored for geriatric, adult, or pediatric patients has enabled more refined evaluation of outcomes such as oral function, appearance, pain, and psychosocial impact.⁷ This aligns with the current evidence-based dental model, which emphasizes integrating patient preferences with clinical expertise and best available evidence.

2. Conceptual and Theoretical Frameworks:

PROMs in dentistry are grounded in theories of Health-Related Quality of Life (HRQoL) and Oral Health-Related Quality of Life (OHRQoL). The following conceptual models have significantly shaped the development and structure of dental PROM instruments.

2.1 Locker's Model (1988):

Based on the WHO's model of disablement, Locker proposed a linear and hierarchical relationship between:

- Impairment (biological dysfunction)
- Functional limitation
- Pain/discomfort
- Disability
- Handicap

This model emphasized the multidimensional impact of oral diseases, suggesting that clinical signs (e.g., caries or periodontal pockets) do not always translate directly into functional impairment or reduced quality of life.

Influence on Dental PROM Development:

Locker's model directly informed the structure of multidimensional instruments such as the Oral Health Impact Profile (OHIP), particularly its domain categorization into functional limitation, pain, psychological discomfort, disability, and handicap. Many early OHRQoL instruments adopted this hierarchical progression to conceptualize how oral disease translates into broader life impacts.

Criticisms and Limitations:

A major criticism of Locker's model is its assumption of a linear and unidirectional progression from impairment to handicap. In reality, patients may experience psychological or social impacts even in the absence of severe biological impairment. The model has also been critiqued for insufficiently accounting for contextual and personal factors, such as coping ability or socioeconomic status, which can moderate perceived impact.

2.2 Wilson and Cleary's Model (1995)

This model bridged the gap between clinical variables and HRQoL through intermediate levels such as:

- Biological and physiological variables
- Symptom status
- Functional status
- General health perceptions
- Overall quality of life

Influence on Dental PROM Development:

Wilson and Cleary's framework provided a structured pathway linking objective clinical findings with subjective patient experiences. This model influenced the development of PROMs that attempt to correlate clinical indices (e.g., attachment loss, edentulism, malocclusion severity) with symptom burden and perceived quality of life. It encouraged dental researchers to view PROMs not as isolated measures, but as part of a continuum connecting disease, symptoms, function, and overall well-being.

Criticisms and Limitations:

Although conceptually integrative, the model has been criticized for maintaining a partially biomedical orientation, with clinical variables positioned as primary drivers of quality of life. It may underrepresent the bidirectional relationship between psychosocial factors and symptom perception. Additionally, it does not fully elaborate on environmental and cultural determinants of health perceptions, which are highly relevant in oral health contexts.

2.3 The WHO International Classification of Functioning (ICF, 2001)

The ICF framework describes health as a dynamic interaction between body function and structure, activities, participation, and contextual factors (environmental and personal). It supports a biopsychosocial model, increasingly applied in oral health research.

Influence on Dental PROM Development:

The ICF framework broadened the conceptualization of oral health beyond disease and impairment to include participation and contextual factors. It has influenced newer dental PROMs and adaptations that incorporate social participation (e.g., eating in public, smiling confidently), environmental influences, and personal modifiers. The biopsychosocial orientation of the ICF aligns closely with modern value-based dentistry and geriatric oral health research.

Criticisms and Limitations:

Despite its comprehensive scope, the ICF is often criticized for its complexity and difficulty in operationalization within routine clinical research. Mapping dental PROM domains precisely onto ICF categories can be challenging, leading to variability in interpretation. Furthermore, its broad structure may lack specificity when applied to narrowly defined dental conditions.

3. Development of PROMs in Dentistry

PROMs in dentistry were developed in response to limitations in traditional clinical parameters like DMFT index, probing depth, or radiographic bone loss, which fail to reflect:

- Psychosocial outcomes
- Functional disability
- Subjective experience of pain and discomfort

The early PROMs in dentistry were often generic, but the need for condition-specific and population-specific tools led to the development of a wide variety of instruments.

4. Evolution of PROMs in Dentistry

The development of PROMs in dentistry began in the late 20th century with instruments such as the Geriatric Oral Health Assessment Index (GOHAI) and the Oral Health Impact Profile (OHIP). These instruments assessed multiple dimensions, including physical pain, psychological discomfort, and social disability. Since then, several domain-specific tools have emerged such as

- OHIP (Oral Health Impact Profile)
- GOHAI (Geriatric Oral Health Assessment Index)
- OIDP (Oral Impacts on Daily Performance)
- CPQ (Child Perception Questionnaire)
- PIDAQ (Psychosocial Impact of Dental Aesthetics Questionnaire)
- ECOHIS (Early Childhood Oral Health Impact Scale)
- RSES (Rosenberg Self-Esteem Scale)
- SEI (Self Esteem Index)
- DIDL (Dental Impact on Daily Living)
- OHIP-EDENT (Oral Health Impact Profile for Edentulous Patients)

5. Classification of PROMs in Dentistry

PROMs in dentistry can be classified based on scope, target population, and clinical specificity. Appropriate selection

depends on the research objective, patient demographics, and the outcome domains of interest.

5.1 Generic vs. Oral Health–Specific PROMs

Generic PROMs Examples include the Short Form-36 (SF-36) and the EQ-5D. These instruments assess overall health-related quality of life and allow comparisons across different medical conditions and populations. However, they lack sensitivity to oral health–specific concerns such as mastication, speech, or esthetic dissatisfaction.

Oral health–specific PROMs

Examples include the Oral Health Impact Profile (OHIP), Geriatric Oral Health Assessment Index (GOHAI), and Oral Impacts on Daily Performance (OIDP). These instruments focus specifically on the functional, psychological, and social consequences of oral conditions and are more sensitive to dental treatment outcomes than generic measures.

5.2 Age-Specific PROMs

Certain PROMs are tailored to specific age groups to ensure developmental appropriateness and conceptual relevance.

Adults:

- OHIP
- GOHAI
- DIDL (Dental Impact on Daily Living)

Children and Adolescents:

- CPQ8–10 and CPQ11–14 (Child Perceptions Questionnaire), designed to capture child-reported oral health impacts across developmental stages
- ECOHIS (Early Childhood Oral Health Impact Scale), proxy-reported by parents for preschool children

Elderly:

- GOHAI
- OHIP-EDENT (designed specifically for completely edentulous individuals)

Age-specific instruments improve validity by incorporating language, domains, and concerns relevant to each life stage.

5.3 Disease- or Condition-Specific PROMs

Disease-specific PROMs are designed to assess the impact of particular oral conditions. These instruments generally

demonstrate greater responsiveness and sensitivity within their target populations but have limited comparability across broader groups.

Examples include:

- **DHEQ (Dentine Hypersensitivity Experience Questionnaire):**

Measures the impact of dentine hypersensitivity on daily activities, emotional well-being, and coping behaviors. It is particularly useful in clinical trials evaluating desensitizing agents.

- **XI (Xerostomia Inventory):**

Assesses the subjective experience of dry mouth severity and its functional consequences. Commonly used in patients with Sjögren's syndrome, medication-induced xerostomia, or post-radiotherapy salivary dysfunction.

- **OTIC (Orthodontic Treatment Impact Questionnaire):**

Evaluates patient-reported experiences during orthodontic treatment, including discomfort, social Impact, and treatment burden.

- **OES (Orofacial Esthetic Scale):**

Focuses on patient satisfaction with dental and facial appearance. It is particularly relevant in esthetic dentistry, prosthodontics, and orthodontics.

While disease-specific instruments enhance precision and clinical relevance, their narrow focus may limit generalizability and reduce comparability across studies. In clinical and research settings, combining an oral health–specific PROM with a disease-specific instrument may provide a more comprehensive assessment of patient-centered outcomes. Selection should be guided by study objectives, patient characteristics, and the domains most relevant to the intervention under evaluation.

6. Commonly Used PROMs in Dentistry

6.1 Oral Health Impact Profile (OHIP)

- Developed by Slade and Spencer (1994).¹¹
- Measures the frequency of 49 oral health–related impacts (short version: OHIP-14).
- Domains include functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.
- Validated in more than 30 languages and widely regarded as the reference standard for measuring oral health–related quality of life (OHRQoL).

- The OHIP-14 has demonstrated strong internal consistency (Cronbach's alpha >0.80) and construct validity across diverse populations.²²

6.2 Geriatric Oral Health Assessment Index (GOHAI)

- Developed by Atchison and Dolan (1990).¹²
- Focuses on functional limitations, psychosocial impact, and pain, particularly in elderly populations.
- Suitable for edentulous or medically compromised older adults.
- Demonstrates good reliability and validity in geriatric and prosthodontic research.

6.3 Oral Impacts on Daily Performance (OIDP)

- Developed by Adulyanon and Sheiham (1996).¹³
- Measures the impact of oral conditions on daily activities such as eating, speaking, smiling, and social interaction.
- Demonstrates cross-cultural validity and strong responsiveness in community-based studies.

6.4 Dental Impact on Daily Living (DIDL)

- Assesses five dimensions: appearance, pain, oral comfort, general performance, and eating.
- Commonly used in prosthodontic outcome research.
- Provides a patient-centered perspective on prosthetic rehabilitation outcomes.

6.5 Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ)

- Developed by Klages et al. (2006).¹⁴
- Measures orthodontic and esthetic concerns in adolescents and young adults.
- Subscales include dental self-confidence, social impact, psychological impact, and esthetic concern.
- Demonstrates strong internal consistency and discriminant validity in orthodontic populations.

6.6 Early Childhood Oral Health Impact Scale (ECHOIS)

- Developed by Pahel et al. (2007).¹
- Proxy-reported by parents or caregivers.
- Suitable for children under six years of age.
- Assesses both child impact and family impact domains.

7. Applications of PROMs in Dental Specialties

PROMs are increasingly incorporated across dental specialties to evaluate dimensions of care not captured by clinical or radiographic indices alone. While traditional outcome measures focus on biological or mechanical success, PROMs assess symptom burden, functional limitation, psychosocial impact, and patient satisfaction.

7.1 Prosthodontics

Prosthodontic outcomes such as comfort, chewing efficiency, speech clarity, and esthetic satisfaction are largely subjective and strongly influence treatment acceptance. Instruments such as OHIP, GOHAI, DIDL, and OHIP-EDENT are widely used to measure oral health-related quality of life following prosthetic rehabilitation.

Ellis et al. demonstrated significantly greater improvements in OHIP scores among patients treated with implant-supported overdentures compared with conventional complete dentures, highlighting the ability of PROMs to differentiate treatment modalities beyond mechanical retention or stability.¹⁶ Similarly, Allen emphasized the discrepancy between clinician-assessed technical success and patient satisfaction, underscoring the importance of PROM integration in prosthodontic evaluation.¹⁷

7.2 Periodontology

Periodontal disease is traditionally assessed using probing depth, attachment loss, and bleeding indices. However, patients perceive disease burden through symptoms such as bleeding, halitosis, mobility, discomfort, and esthetic concerns.

McGrath and Bedi reported that periodontal disease significantly affects self-image and social functioning, even in cases with moderate clinical severity.¹⁸ This highlights the role of PROMs in capturing psychosocial and functional improvements that may not be reflected solely by periodontal indices. Increasingly, treatment success is interpreted in terms of symptom relief and quality-of-life enhancement in addition to clinical stability.

7.3 Orthodontics

Orthodontic treatment has substantial psychosocial implications due to its influence on facial appearance and social confidence. PROMs such as PIDAQ and CPQ are used to assess emotional and social dimensions of malocclusion and treatment impact.

Evidence suggests that orthodontic treatment is associated with improvements in child and adolescent oral health-related quality of life, as validated through instruments such as CPQ.²⁰ These findings demonstrate that patient-perceived esthetic and psychosocial benefits may occur even when objective occlusal changes are modest.

7.4 Oral Surgery and Oral Oncology

In oral and maxillofacial surgery, clinical success does not necessarily equate to satisfactory patient outcomes. Procedures for oral cancer and major reconstructive surgery may restore anatomical structure while leaving residual functional or psychological challenges.

Rogers et al. reported that patients undergoing primary surgery for oral cancer frequently experienced persistent deficits in speech, swallowing, or social interaction despite technically successful procedures.¹⁹ PROMs such as UW-QOL and EORTC QLQ-H&N35 are therefore essential for evaluating postoperative recovery and broader quality-of-life outcomes.

7.5 Pediatric Dentistry

In pediatric dentistry, PROMs capture child-reported and parent-reported experiences of oral disease, including pain, emotional distress, and limitations in eating or school participation.

Jokovic et al. validated the Child Perceptions Questionnaire (CPQ) as a reliable and valid measure of oral health-related quality of life in school-aged children.²⁰ Additionally, ECOHIS extends PROM application to preschool children through parent proxy reporting, enabling assessment of both child impact and family burden.

Integrative Perspective

Across dental specialties, PROMs consistently demonstrate that clinical indicators and patient-perceived outcomes may diverge. By integrating validated instruments into specialty-specific care, clinicians can better align treatment goals with patient expectations and advance patient-centered, value-based dentistry.

8. Integration of PROMs in Clinical Practice

Despite robust evidence supporting their value, the routine integration of PROMs into everyday dental practice remains inconsistent. While PROMs are well established in research settings, their translation into chairside clinical workflows faces structural, educational, and systemic barriers.

One of the primary challenges is **time constraint within busy dental practices**, where additional data collection may be perceived as burdensome. Clinicians may also lack formal training in selecting, interpreting, and applying PROM data to clinical decision-making. Furthermore, the absence of standardized reimbursement mechanisms for PROM administration reduces institutional incentives for implementation.

Another barrier is **interpretation complexity**. PROM scores require contextual understanding, including baseline assessment, minimally clinically important differences (MCIDs), and responsiveness to change. Without standardized interpretative frameworks, clinicians may struggle to translate numeric scores into actionable treatment modifications.

Digital transformation offers promising solutions. The integration of electronic PROMs (ePROMs) into electronic health records (EHRs) allows automated scoring, longitudinal tracking, and real-time visualization through dashboards. In oncology, Basch et al. demonstrated that systematic electronic symptom monitoring improved symptom control, patient satisfaction, and even survival outcomes.²¹ Although dental-specific data remain limited, similar digital frameworks are increasingly being explored in prosthodontics, orthodontics, and oral oncology.

Additionally, ePROM systems can:

- Reduce administrative burden
- Enable remote monitoring
- Facilitate shared decision-making
- Identify unmet patient needs early

However, digital integration raises considerations regarding data privacy, patient literacy, and the digital divide, particularly in geriatric and underserved populations.

For effective clinical integration, PROM implementation should be:

1. Purpose-driven (aligned with specific treatment objectives)
2. Brief and feasible for routine use
3. Validated in the target population
4. Supported by clinician training

Ultimately, PROMs should not be viewed as additional paperwork, but as structured communication tools that enhance patient-centered dialogue and support individualized care planning.

9. Role of PROMs in Research and Policy

Beyond individual clinical encounters, PROMs play a critical role in dental research, quality assurance, and health policy development. Their inclusion reflects a broader shift toward value-based healthcare, where outcomes meaningful to patients are prioritized alongside clinical indicators.

In research settings, PROMs are increasingly incorporated as primary or secondary endpoints in clinical trials, particularly in prosthodontics, orthodontics, oral oncology, and implant dentistry. They provide insight into treatment impact beyond technical success and enable comparison of competing interventions based on patient-perceived benefit. Systematic reviews have demonstrated that feedback of PROM data to healthcare professionals can improve patient outcomes and satisfaction.⁵

At the policy level, PROMs contribute to:

- Benchmarking healthcare performance
- Informing reimbursement models
- Evaluating service effectiveness
- Supporting health technology assessment

Organizations such as the World Health Organization (WHO) and the International Consortium for Health Outcomes Measurement (ICHOM) advocate incorporating patient-reported outcomes into health system evaluation frameworks. In some healthcare systems, including the United Kingdom's NHS, PROMs are used to assess service effectiveness and justify funding allocation, reflecting their increasing institutional relevance.

However, policy-level adoption in dentistry remains less mature compared to medicine. Standardization challenges persist, including:

- Variability in PROM selection across studies
- Inconsistent reporting standards
- Limited consensus on core outcome sets for dental conditions

Furthermore, cross-cultural adaptation and linguistic validation remain essential to ensure equity in global implementation.

For PROMs to meaningfully influence dental policy, future initiatives should focus on:

- Establishing standardized core outcome sets for major dental conditions
- Defining clinically meaningful thresholds

- Integrating PROM data into national oral health surveillance systems
- Linking outcome measures to quality improvement frameworks

The integration of PROMs into research and policy ultimately strengthens accountability, transparency, and patient-centered evaluation within dental healthcare systems.

10. Comparative Evaluation of Common PROMs in Dentistry

Although numerous PROM instruments are available in dentistry, they differ substantially in conceptual foundation, domain coverage, psychometric robustness, sensitivity to change, and clinical applicability. Selection should therefore be guided not only by popularity but by methodological appropriateness for the research question or clinical objective.

10.1 Conceptual Breadth and Domain Coverage

The Oral Health Impact Profile (OHIP), particularly OHIP-14, remains the most extensively used oral health-specific PROM. Its multidimensional structure—derived from Locker's conceptual framework—captures functional limitation, pain, psychological discomfort, disability, and social handicap. Its broad domain coverage enhances construct validity and allows cross-population comparison. However, its comprehensiveness may reduce specificity for narrowly defined interventions, particularly in short-term clinical trials.

GOHAI, in contrast, emphasizes functional limitation and pain, making it particularly suited to geriatric and edentulous populations. While this focused structure enhances relevance in older adults, it provides less detailed assessment of social disability and esthetic concerns, potentially limiting its sensitivity in younger or esthetically driven populations.

OIDP adopts an activity-based framework, linking oral conditions directly to performance in daily tasks. This improves clinical interpretability and patient communication. However, psychological and emotional constructs are less comprehensively represented compared with OHIP, which may limit its use in specialties such as orthodontics or oral oncology where psychosocial outcomes are prominent.

10.2 Psychometric Strength and Responsiveness

Most widely used instruments (OHIP, GOHAI, OIDP, CPQ, PIDAQ) demonstrate strong internal consistency (Cronbach's alpha typically >0.80) and acceptable test-retest reliability.

However, psychometric robustness extends beyond reliability.

Responsiveness to change—the ability to detect clinically meaningful improvement—is particularly critical in interventional studies. Disease-specific instruments such as OHIP-EDENT, DHEQ, and the Xerostomia Inventory often demonstrate superior responsiveness within their target populations compared with generic oral health measures. This makes them valuable for clinical trials evaluating prosthetic rehabilitation, desensitizing agents, or salivary therapies.

Conversely, broad instruments such as OHIP may demonstrate **ceiling or floor effects** in populations with mild disease or high baseline function, reducing sensitivity to subtle improvements. Short-form instruments (e.g., OHIP-14) improve feasibility but may sacrifice granularity compared with longer versions.

Another important consideration is the **Minimal Clinically Important Difference (MCID)**, which represents the smallest change perceived as beneficial by patients. Few dental PROMs have well-established MCID thresholds across populations, limiting interpretability in clinical practice.

10.3 Population and Contextual Suitability:

Age-appropriate instruments (CPQ, ECOHIS, GOHAI) enhance validity by aligning language and conceptual domains with developmental or functional realities. Proxy-reported instruments (e.g., ECOHIS) are necessary in early childhood but introduce potential reporting bias.

Esthetic- and orthodontic-specific tools such as PIDAQ and OES demonstrate strong discriminant validity for appearance-related outcomes but lack applicability in broader restorative or periodontal contexts. Similarly, highly condition-specific tools offer superior precision but limit cross-study comparability and large-scale epidemiological application.

10.4 Comparative Synthesis:

No single PROM can be considered universally optimal. Broad instruments such as OHIP are advantageous for comprehensive assessment and cross-condition comparison, whereas disease-specific tools offer superior responsiveness and treatment sensitivity. In many research and clinical contexts, combining a general oral health-specific instrument with a targeted disease-specific PROM provides the most meaningful evaluation.

Future comparative research should prioritize:

- Direct head-to-head psychometric comparisons
- Standardized reporting of responsiveness and MCID
- Cross-cultural validation using modern measurement theory (e.g., Rasch analysis, item response theory)

The choice of PROM should therefore be explicitly justified in relation to the study objective, intervention type, patient demographics, and expected outcome domains. Comparative critique is provided in Table 1.

11. Limitations of PROMs:

Although PROMs represent a major advancement in patient-centered dentistry, their application is accompanied by methodological and practical limitations that must be acknowledged.

11.1 Subjectivity and Inter-Individual Variability:

PROMs are inherently subjective, relying on patient self-report rather than objective clinical parameters. As emphasized in broader healthcare literature, individual responses may be influenced by mood, expectations, personality traits, cultural norms, and socioeconomic factors.¹ Consequently, patients with comparable clinical findings may report markedly different quality-of-life impacts. This variability limits direct inter-individual comparability and complicates interpretation in epidemiological research.

11.2 Cultural and Linguistic Adaptation:

Cross-cultural adaptation requires rigorous translation, back-translation, and psychometric validation to ensure conceptual equivalence. Failure to perform appropriate validation threatens construct validity and measurement accuracy.⁷ Cultural differences in pain expression, esthetic perception, and social functioning may significantly influence OHRQoL responses, necessitating population-specific validation studies.

11.3 Recall Bias and Response Shift:

Many PROMs rely on retrospective recall of symptoms or functional limitation, introducing potential recall bias. Additionally, the phenomenon of response shift—where patients recalibrate internal standards over time—can distort longitudinal comparisons. Patients undergoing long-term dental rehabilitation may adapt to functional changes, altering their internal benchmarks of well-being. This dynamic recalibration challenges interpretation of change scores in longitudinal research.

11.4 Psychometric and Interpretative Challenges

Although widely used dental PROMs demonstrate acceptable reliability and validity, not all instruments have well-established responsiveness or Minimal Clinically Important Difference (MCID) thresholds.⁷ Without defined interpretative benchmarks, clinicians may struggle to determine whether changes in PROM scores represent clinically meaningful improvement. Overreliance on statistical significance without contextual clinical interpretation may reduce practical applicability.

11.5 Administrative and Implementation Burden:

In routine clinical settings, PROM administration may increase documentation time and workflow complexity. Boyce and Browne reported that feedback of PROM data improves outcomes only when systems are structured to integrate the information effectively.⁵ Without structured feedback loops, PROM collection risks becoming a passive data exercise rather than a tool for clinical decision-making.

11.6 Risk of Misapplication:

PROMs should not be used outside validated populations or as sole indicators of treatment success. As highlighted in health services research, inappropriate use of PROM data for performance benchmarking without contextual risk adjustment may lead to misinterpretation.¹ Careful methodological alignment is therefore essential.

Recognition of these limitations ensures responsible integration of PROMs and strengthens their scientific credibility.

12. Future Directions:

The evolution of PROMs in dentistry is closely aligned with advancements in digital health, psychometrics, and value-based healthcare models.

12.1 Digital Integration and ePROMs:

The integration of electronic PROMs (ePROMs) into electronic health records enables automated scoring, longitudinal tracking, and real-time feedback. In oncology, Basch et al. demonstrated that systematic electronic symptom monitoring significantly improved symptom control and patient outcomes.²¹ Although dental-specific evidence remains emerging, similar models offer potential for prosthodontics, orthodontics, and oral oncology follow-up.

12.2 Advanced Psychometric Methodologies:

Future refinement of dental PROMs should incorporate modern psychometric approaches such as Item Response Theory (IRT) and Rasch modeling. These approaches improve measurement precision and enable development of shorter yet psychometrically robust instruments. Systematic reviews of dental PROMs have emphasized the need for stronger methodological validation and responsiveness testing.⁷

12.3 Standardized Core Outcome Sets:

To enhance comparability across studies, consensus-driven core outcome sets should be developed for major dental conditions. Standardization would reduce heterogeneity in PROM selection and strengthen meta-analytic evidence synthesis.

12.4 Defining Clinically Meaningful Change:

Establishing Minimal Clinically Important Differences (MCIDs) and normative reference values is essential for translating PROM data into actionable clinical insights. Without defined thresholds, interpretation remains largely statistical rather than clinically grounded.

12.5 Policy Integration and Value-Based Care:

PROMs are increasingly recognized as essential indicators in value-based healthcare frameworks. The WHO's biopsychosocial approach to functioning and disability supports integration of patient-reported measures into broader health system evaluation.¹⁰ As dentistry aligns with outcome-based reimbursement models, PROMs may serve as central indicators of service quality—provided they are implemented with appropriate risk adjustment and ethical safeguards.

12. Future Directions:

- Digital PROMs (ePROMs) integrated with EHRs.
- Real-time dashboards for clinicians and patients.
- AI-based adaptive PROMs for shorter, smarter assessments.
- Linking PROMs to reimbursement and outcome-based care.
- Development of chairside PROM kiosks in clinics.

Conclusion:

Patient-Reported Outcome Measures have emerged as essential tools for evaluating treatment effectiveness in dentistry beyond conventional clinical indicators. By

systematically capturing functional, psychological, and social dimensions of oral health, PROMs provide critical insight into the real-world impact of dental interventions across specialties.

However, their scientific value depends on rigorous instrument selection, psychometric validation, and appropriate interpretation of clinically meaningful change. Future research should prioritize responsiveness testing, establishment of Minimal Clinically Important Differences, development of standardized core outcome sets, and integration of advanced measurement models to enhance precision and comparability.

Strengthening methodological consistency and digital integration will be central to advancing PROM-based evidence. As dentistry continues to evolve toward outcome-driven and patient-centered care, PROMs will play a pivotal role in shaping research standards and defining meaningful measures of treatment success.

Table 1: Comparative Critique of Major PROMs Used in Dentistry

PROM Instrument	Target Population / Use	Key Strengths	Key Limitations	Best Clinical Research Application
OHIP OHIP-14	General dental population; prosthodontics	Gold standard; excellent validity and reliability; multidimensional (functional, psychological, social); widely translated	May lack sensitivity to short-term or treatment-specific changes; longer versions can be time-consuming	Broad assessment of oral health-related quality of life; prosthodontic and implant outcome studies
GOHAI	Elderly and edentulous patients	Focuses on function, pain, and psychosocial aspects relevant to older adults; simple and quick to administer	Limited assessment of esthetics and social disability; less suitable for younger populations	Geriatric dentistry; complete denture and implant overdenture evaluation
OIDP	Adults and adolescents	Activity-based; directly links oral conditions to daily performance; easy interpretation	Underrepresents emotional and psychological dimensions	Community studies; functional impact assessment
DIDL	Prosthodontic patients	Emphasizes appearance, comfort, and eating; useful for prosthetic outcome evaluation	Less commonly used; limited cross-cultural validation	Fixed and removable prosthodontics research
PIDAQ	Adolescents and young adults	Highly sensitive to esthetic and psychosocial effects; ideal for orthodontics	Narrow scope; not suitable for general oral health assessment	Orthodontic and esthetic outcome evaluation
CPQ (8-10, 11-14)	Children and adolescents	Captures child-specific perceptions; validated across age groups	Requires age-appropriate administration; proxy bias possible	Pediatric dentistry and orthodontics
ECOHIS	Preschool children (proxy-reported)	Captures family and child impact; useful in early childhood caries	Parent-reported; may not fully reflect child experience	Pediatric dentistry; early intervention studies
OHIP-	Completely edentulous	Tailored for edentulous population; sensitive to denture-related issues	Limited applicability beyond edentulous patients	Complete denture and geriatric prosthodontic research
EDENT	patients			
Disease-specific PROMs (DHEQ, XI, OES)	Condition-specific populations	High responsiveness and sensitivity for targeted conditions	Poor comparability across populations; limited generalizability	

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