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Scales and Scores to Measure Patient Satisfaction in Gingival Recession Defects – A Scoping Review

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Abstract

Background: Gingival recession, marked by the exposure of root surfaces due to apical displacement of the gingiva, poses not only clinical challenges but also significant esthetic and psychological concerns for patients. While traditional treatment success has been judged by objective clinical parameters, there is a growing emphasis on how patients perceive outcomes—especially in terms of appearance, comfort, and quality of life. As a result, patient-reported outcome measures (PROMs) have become increasingly vital in evaluating periodontal procedures for gingival recession.

Materials and Methods: A structured literature review was performed using databases including PubMed, Google Scholar, CINAHL database and the Grey literature. Studies published on management of gingival recession defects which incorporated PROMs were included for this review. In-vitro studies and those lacking PROMs data were excluded.

Results: From the 23 studies reviewed, a variety of surgical techniques were evaluated, most commonly coronally advanced flap (CAF) procedures with adjunctive materials such as connective tissue grafts (CTG), acellular dermal matrices (ADM), enamel matrix derivatives (EMD), guided tissue regeneration (GTR), and platelet-rich fibrin (PRF). Patient satisfaction was assessed through visual analog scales (VAS), esthetic rating tools, and structured questionnaires. CAF combined with CTG showed consistently higher satisfaction rates and esthetic outcomes. While clinicians often focused on complete root coverage, patients valued natural color match, minimal discomfort, and overall appearance. Discrepancies between professional assessments and patient perspectives highlighted the subjective nature of esthetic outcomes.

Conclusion: Modern periodontal care is shifting toward a patient-centered model where subjective experiences carry significant weight alongside clinical outcomes.

Tools like PROMs and esthetic scoring systems are essential for bridging the gap between clinical success and patient satisfaction. Incorporating these measures into routine practice promotes more tailored treatment planning, enhances communication, and ultimately leads to more meaningful and satisfactory results for patients.

Keywords: Patient-reported outcomes, gingival recession, patient satisfaction, Root coverage, coronally advanced flap, connective tissue graft, periodontal plastic surgery

Introduction

Gingival recession, defined as the apical displacement of the gingival margin relative to the cemento-enamel junction, is a prevalent clinical condition that affects a broad spectrum of the adult population. Its etiology is multifactorial, involving mechanical trauma (such as aggressive toothbrushing), periodontal disease, anatomical predispositions, and inadequate oral hygiene practices. Although often asymptomatic, gingival recession can have significant functional and psychosocial implications, including dentin hypersensitivity, increased risk of root caries, and dissatisfaction with dental aesthetics. These concerns can negatively influence a patient's daily comfort, self-image, and overall oral health–related quality of life (OHRQoL).[1]

In contemporary periodontal therapy, clinical success is no longer defined solely by objective clinical parameters such as root coverage percentage, probing depth, or attachment gain. Increasingly, the patient's perspective has gained prominence as a critical component of treatment evaluation.[2] The incorporation of patient-reported outcome measures (PROMs)—particularly patient satisfaction—reflects a shift towards more holistic and personalized approaches to periodontal care. This is especially relevant in aesthetic procedures like root coverage, where patient expectations regarding appearance, comfort, and quality of life often guide treatment decisions as much as clinical indications.[3]

Several tools and scales have been introduced to quantify patient satisfaction following periodontal procedures. These instruments aim to capture a patient's subjective appraisal of treatment outcomes, including pain experience, healing quality, aesthetic results, and willingness for retreatment. However, despite the growing use of such metrics, there is still no universally accepted or standardized scale for assessing patient satisfaction in the context of gingival recession therapy. The heterogeneity in measurement tools and reporting practices limits comparability across studies and challenges the translation of research findings into clinical practice.[4]

This review aims to critically evaluate the various instruments and scoring systems employed to assess patient satisfaction following gingival recession treatment. It will examine their development, psychometric properties, clinical applicability, and responsiveness to change. By synthesizing evidence from clinical trials, systematic reviews, and observational studies, this article seeks to offer clinicians and researchers a practical framework for selecting and applying patient-centered assessment tools in both research settings and daily practice. Ultimately, the integration of reliable patient satisfaction measures is essential for advancing evidence-based, patient-focused periodontal care.

Materials and Methods

Study Design

This review followed a structured literature review design aimed at identifying, synthesizing, and evaluating existing clinical studies that incorporated patient-reported satisfaction measures, particularly those using validated

scales, in the context of gingival recession treatment. The objective was to assess how these tools are applied, how patients' perspectives are captured, and how they correlate with clinician evaluations.

Search Strategy

A structured literature review was performed using databases including PubMed, Google Scholar, CINAHL database and the Grey literature. The search was limited to articles published in the English to capture both foundational and contemporary studies relevant to patient satisfaction in periodontal plastic surgery. (Fig. 1).

Additionally, a **manual review of reference lists** from selected studies and recent systematic reviews was performed to ensure inclusion of relevant studies that may not have appeared in the initial database results.

Inclusion Criteria

Studies were selected based on the following criteria:

- Human clinical trials or observational studies involving subjects who underwent periodontal plastic surgery.
- Studies where patients were asked to assess esthetic outcomes post-treatment using standardized tools and where clinicians independently scored the same outcomes.
- Research that reported comparisons between patient-reported scores and professional evaluations, or analyzed the relationship between esthetic scores and patient satisfaction.
- Articles that discussed the psychometric validation, clinical utility, or interpretation of satisfaction scores in the context of root coverage procedures.

Exclusion Criteria

The following types of studies were excluded:

- In vitro studies**,** animal studies**,** and purely laboratory-based research
- Studies that focused solely on clinical or radiographic outcomes without any patient-reported component
- Surveys, editorials, letters to the editor, and narrative reviews
- Articles lacking a direct comparison between patient-perceived and professionally evaluated outcomes
- Studies involving non-surgical periodontal interventions or non-root coverage procedures

Study Selection and Data Extraction

All identified articles were independently screened. Initial screening was based on titles and abstracts, followed by a full-text review to determine eligibility.

For each included study, the following data were extracted:

- Study design and sample size
- Type of surgical intervention
- Scales or tools used for patient satisfaction assessment
- Outcome measures for both patient and clinician assessments
- Key findings on agreement/discrepancy between patient and professional ratings
- Reported limitations or biases

Results

A total of 23 clinical studies met the inclusion criteria and were analyzed in this review. These studies evaluated a variety of treatment protocols for gingival recession defects, including Coronally Advanced Flap (CAF) procedures alone or in combination with adjunctive regenerative materials such as Connective Tissue Graft (CTG), Acellular Dermal Matrix (ADM), Guided Tissue Regeneration (GTR), Enamel Matrix Derivative (EMD), and Platelet-Rich Fibrin (PRF).

At the end of our study, the technique used for treatment of gingival recession defect included CAF+GTR[5,7],

CAF+CTG[5-9,11,13-19,22,25-27], CAF+ADM[6,10,27], CAF+EMD[14,27], CAF+PRF[19]. Among the shortlisted studies (n=23), 16 studies were on single tooth GRD management and 7 studies were on multiple GRD management.

The results were based upon the basic characteristic of the study. The results were tabulated into two major data charting forms (DCF).

1. PROMs 1- satisfaction based upon patient rating.
2. PROMs 2- Based upon objective rating.

PRISMA Flow Diagram – Study Selection Process

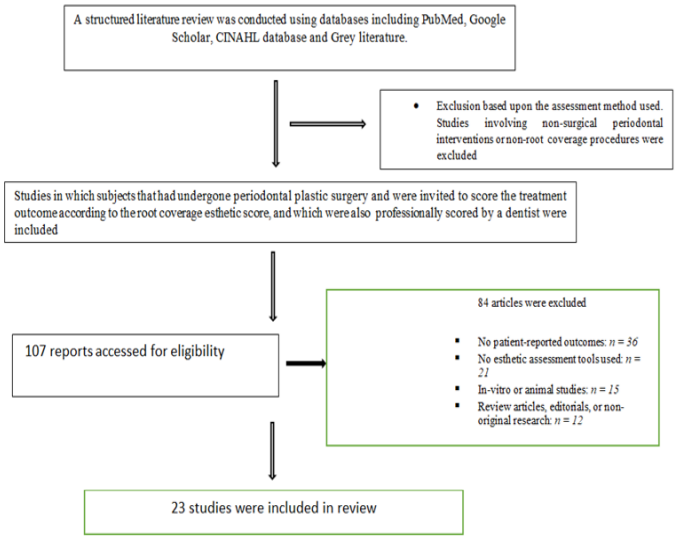

Figure 1: PRISMA Flow Diagram

Patient-Reported Outcomes (PROMs 1): Subjective Satisfaction

Across the studies that incorporated patient-reported measures, satisfaction with esthetic outcomes was consistently high, regardless of the surgical technique employed. Most studies utilized Visual Analog Scales (VAS), Likert scales (ranging from "excellent" to "poor"), or categorical "yes/no" responses to assess patients' perceptions of esthetic improvements, root coverage, color match, and tissue harmony.

CAF + CTG emerged as the gold standard, yielding high levels of subjective satisfaction across multiple trials. In Zucchelli et al. (2003, 2014)[8,25], patients consistently reported superior satisfaction in terms of natural tissue integration, color blending, and esthetic contour when CAF was combined with CTG, even when graft thickness was varied. Similarly, McGuire & Scheyer (2010)[13] demonstrated that both test (CAF + collagen matrix) and control (CAF + CTG) groups achieved high esthetic satisfaction scores, although objective root coverage was higher in the CTG group.

Interestingly, alternatives to CTG such as ADM and collagen membranes also received positive patient feedback despite showing slightly lower root coverage percentages. For instance, Aichelmann-Reidy et al. (2001)[6] reported that more patients rated the ADM results as "excellent" compared to CTG, particularly in terms of tissue appearance and postoperative comfort. Similarly, Wang et al. (2001)[7] observed equal satisfaction in terms of color match and root coverage between GTR membranes and SCTG, despite minor differences in objective metrics. In studies involving multiple gingival recession defects, the patient-reported satisfaction remained high for both vertical incision and envelope-type CAF techniques. Zucchelli et al. (2009)[12] noted no significant differences in VAS satisfaction scores between groups, but envelope-type flaps showed superior outcomes in terms of clinical root coverage and keratinized tissue gain.

Moreover, long-term data from McGuire & Scheyer (2016)[28] suggested that patient satisfaction remained stable over a 5-year follow-up period, even as root coverage percentages showed slight regression in the test group (CAF + collagen matrix). This suggests that patients value the visual and functional outcomes of surgery over absolute coverage metrics, especially when the procedure results in natural-looking tissue.

Overall, CAF in combination with CTG, ADM, or other biomaterials consistently resulted in high patient

satisfaction, particularly when esthetic parameters such as gum color, shape, and harmony were evaluated holistically.

Table 1: Patient-Reported Outcomes (PROMs 1) – Based on Patient Ratings

Study	Design	Duration	Test Group	Control Group	Assessment Method	Key Findings	Root Coverage/ Results
Rosetti et al. (2000)[5]	Split-mouth comparative	18 months	CAF + GTR + DFDBA	CAF + SCTG	Yes/No satisfaction	All patients satisfied; SCTG better in GR height	SCTG = 95.6%, GTR = 84.2%
Aichelmann-Reidy et al. (2001)[6]	Comparative	6 months	CAF + ADM	CAF + CTG	4-point scale (Excellent–Poor)	More patients rated ADM results as excellent	ADM = 65.9%, CTG = 74.1%
Wang et al. (2001)[7]	Split-mouth	6 months	CAF + GTRC	CAF + SCTG	Esthetic scoring (Excellent–No response)	Higher satisfaction with GTRC in color match	GTRC = 73%, SCTG = 84%
Zucchelli et al. (2003)[8]	Randomized split-mouth	1 year	CAF + CTG (thin)	CAF + CTG (thick)	4-point scale (Bad–Optimum)	Test group had better esthetic satisfaction	Test = 97.3%, Control= 94.7%
Bittencourt et al. (2006)[9]	Split-mouth randomized	6 months	SCPF	CAF + SCTG	Questionnaire (Bad–Excellent)	Both treatments rated satisfactory	SCPF=90.95%, SCTG= 96.10%
Mahajan et al. (2007)[10]	Randomized controlled	6 months	CPF	CPF + ADM	3-point scale (1–3)	No difference in overall satisfaction	CPF = 77.42%, ADM = 97.14%
Bittencourt et al. (2009)[11]	Split-mouth randomized	30 months	SCPF	CAF + SCTG	Questionnaire (Bad–Excellent)	General satisfaction with both techniques	SCRFE=70.2%, SCRF = 90.1%
Zucchelli et al. (2009)[12]	Randomized controlled	1 year	CAF (vertical incisions)	CAF (envelope type)	VAS (0–100)	No significant difference; envelope group had more CRC	Envelope group had better KTH & CRC
McGuire & Scheyer (2010)[13]	Split-mouth RCT	1 year	CAF + CM	CAF + CTG	5-point esthetic scale	Equivalent satisfaction in both groups	Test = 88.5%, Control= 99.3%
McGuire et al. (2012)[14]	Split-mouth RCT	10 years	CAF + EMD	CAF + CTG	Direct preference reporting	Equal satisfaction across procedures	CTG showed higher WKT than EMD
Roman et al. (2012)[15]	Prospective case series study	1 year	CAF+CTG (Single or multiple gingival recession)		Esthetic changes on a VAS questionnaire	Esthetic appearance improved in all patients	87.9% of the patients reported important in esthetics
Zucchelli et al., (2014)[16]	RCT	1year	CAF	CAF+CTG	Patients selected among 100 scores	Better esthetics in test group	Greater recession reduction in CAF+CTG

McGuire and Scheyer (2016)[17]	Split -mouth RCT	5 years	CAF+CM	CAF+CTG	Esthetic satisfaction on a 5 point scale	Patients satisfied with both therapies	Mean %RC changed 89.5% to 77.6% for CAF+CM and 97.5% to 95.5% for CTG+CAF

Professional Esthetic Evaluation (PROMs 2): Objective Outcomes

Objective esthetic evaluations were typically performed by independent, blinded periodontists using standardized assessment tools, such as the Root Coverage Esthetic Score (RES) or modified scales evaluating tissue color, contour, texture, and scar formation. Across nearly all studies, CAF + CTG demonstrated superior esthetic outcomes, both in terms of clinical root coverage and soft tissue appearance.

In multicenter studies by Cairo et al. (2009, 2010)[23,24], the RES system was validated and showed excellent inter-examiner reliability (k = 0.92), confirming its robustness for assessing esthetic outcomes in recession treatment. This scale, which evaluates parameters including gingival margin, tissue contour, soft tissue texture, mucogingival junction alignment, and gingival color, consistently favored CAF + CTG over other techniques.

Zucchelli et al. (2014)[25] further corroborated these findings in a randomized trial comparing large and small grafts; although both graft types achieved similar root coverage, small grafts yielded better color match and less keloid formation, reinforcing the importance of graft design in esthetic results.

Studies comparing ADM, GTR, and platelet-derived substitutes (e.g., Cheung & Griffin, 2004; Wang et al., 2001)[19,7] found that although these techniques achieved acceptable outcomes, CTG continued to outperform them in consistency and completeness of root coverage. However, these alternatives showed advantages in color blending and patient comfort, suggesting their utility in cases where harvesting autogenous grafts may not be feasible.

Retrospective evaluations over extended periods (Kerner et al., 2009)[20] revealed that esthetic perception can improve with time, and that subjective outcomes do not always correlate strictly with root coverage percentage. In fact, parameters such as color match, tissue volume, and absence of scars were more predictive of professional esthetic ratings than root coverage alone.

Table 2: Professional Esthetic Evaluation (PROM 2) – Based on Objective Ratings

Study	Design	Duration	Test Group	Control Group	Assessment Method	Key Findings	Root Coverage/ Esthetic Results
Bouchard et al. (1994)[18]	Comparative	6 months	CAF + CTG (epithelial collar exposed)	CAF + CTG	Photo/impression scored (Good–Moderate–Poor)	Trend toward better results in control group	Root coverage =69.2%; Gingival gain: CTG = 94.4%
Rosetti et al. (2000)[5]	Split-mouth comparative	18 months	CAF + GTR + DFDBA	CAF + SCTG	Photo evaluation by 5 blinded examiners	80% (SCTG) & 81.7% (GTR) rated "good"; SCTG superior in GR height	SCTG =95.6%, GTR = 84.2%

Aichelmann-Reidy et al. (2001)[6]	Comparative	6 months	CAF + ADM	CAF + CTG	4-point score: color, contour, consistency, keloid	ADM better in color & contour; both had similar texture & keloid scores	ADM= 65.9%, CTG = 74.1%
Wang et al. (2001)[7]	Split-mouth	6 months	CAF + GTRC	CAF + SCTG	Examiner-rated: color, contour, consistency, keloid	GTRC group scored higher for color & contour	GTRC = 73%, SCTG = 84%
Cheung & Griffin (2004)[19]	Split-mouth randomized	8 months	Platelet concentrate graft + CAF	SCTG + CAF	Clinical slides rated on color, texture, contour (1–4 scale)	PCG better in texture & contour; no significant difference in color	PCG = 80%, SCTG = 95% root coverage
Zucchelli et al. (2009)[12]	RCT	1 year	CAF with vertical incisions	CAF (envelope type)	VAS + Yes/No (contiguity, keloid)	Envelope technique better in contour, contiguity, keloid	Higher CRC and KTH in envelope type
Kerner et al. (2009)[20]	Retrospective	24 years	Multiple graft techniques	—	Panel scoring (5-point and 4-point ordinal)		Mean RC = 70%; Complete RC = 32.4%
Kerner et al.,(2009)[21]	Retrospective	24 years	Multiple graft techniques	_	5point ordinal scale	>70% judged good_ excellent overall esthetic results	Mean RC = 70.29%
Zucchelli et al. (2012)[22]	RCT	1 year	Laterally moved CAF	CAF + CTG	VAS and clinical esthetic evaluation	CAF+CTG had significantly higher VAS root coverage scores	LMCAF= 74.2%, CAF+CTG = 88.8%
Cairo et al. (2009)[23]	Prospective	6 months	31 patients with various techniques	—	RES (score out of 10)	77% had complete RC; mean RES = 8.9	Mean RC = 89.4%
Cairo et al. (2010)[24]	Multicenter observational	6 months	11 expert periodontists (RES inter-rater)	—	RES scored across 5 esthetic domains	High inter-rater agreement: k = 0.92	Reliable and reproducible esthetic index
Zucchelli et al. (2014)[25]	RCT	1 year	CAF + CTG (small graft)	CAF + CTG (big graft)	VAS for color, contour; contiguity/keloid (Y/N)	Small graft had better color match; more keloids in large graft group	No sig. diff. in GR; greater GT increase in big graft group
Zucchelli et al. (2014)[26]	RCT	1and 5 years	CAF + CTG for multiple gingival recessions	CAF for multiple gingival recessions	VAS for color, contour; contiguity/keloid (Y/N)	Better colour match in CAF patients after 1-5 years	Greater recession reduction, probability of CRC in test group
Cairo et al. (2016)[27]	Systematic Review + NMA	—	CAF + CTG, ADM, AF	CAF + CTG + EMD	RES and VAS-based esthetic analysis	Highest esthetic satisfaction with CAF+CTG and CAF+CTG+EMD (by VAS and RES)	RES probability: CAF+CTG = 44%, CTG+EMD = 26%

Discussion

The management of gingival recession has evolved considerably over recent decades, driven not only by clinical needs but also by growing emphasis on aesthetics and patient-centered outcomes. Traditionally, recession treatment was indicated primarily for root hypersensitivity and prevention of further attachment loss. However, in contemporary periodontal practice, aesthetic rehabilitation and patient-perceived satisfaction have become equally significant endpoints, especially in cases involving the anterior esthetic zone.[28]

This review revealed that Coronally Advanced Flap (CAF), particularly when combined with Subepithelial Connective Tissue Grafts (SCTG), remains the most consistently effective and well-accepted surgical approach, producing both superior root coverage and high patient satisfaction. The integration of adjunctive materials such as Acellular Dermal Matrix (ADM),[6,10,27] Enamel Matrix Derivatives (EMD),[14,27] Guided Tissue Regeneration (GTR),[5,7] and Platelet-Rich Fibrin (PRF)[19] has been explored as alternatives or complements to SCTG, especially to overcome limitations of donor tissue availability and reduce morbidity. Although these biomaterials often provide comparable esthetic outcomes and improved patient comfort, CAF+SCTG[5-9,11,13-19,22,25-27]continues to set the clinical benchmark in terms of both objective root coverage and esthetic perception.

An essential finding of this review is the divergence that often exists between patient-reported outcomes (PROMs) and professional esthetic assessments. Many patients rate the results of their treatment highly even when complete root coverage is not achieved. This reinforces the idea that subjective perceptions—such as improved color match, smoother contours, or reduced sensitivity—can carry more weight for patients than the strict numerical or photographic benchmarks used by clinicians. Furthermore, factors like pain, healing time, and donor site morbidity strongly influence a patient's overall satisfaction and willingness to undergo such procedures again.[29]

Donor site morbidity is particularly relevant when connective tissue grafts are harvested from the palate. Various harvesting techniques—such as the de-epithelialized free gingival graft, trapdoor approach, and single or double incision methods—have been associated with differing levels of postoperative discomfort. The depth and thickness of the harvested grafts also influence morbidity, as thicker grafts typically result in greater postoperative pain. Despite clinical preference for anterior or posterior donor sites, scientific evidence guiding this choice remains limited, and clinical decisions are often made based on tissue availability and operator experience.[30]

Interestingly, several studies within this review identified that allografts and xenografts (e.g., ADM) may lead to reduced patient morbidity compared to SCTG, while still achieving esthetic outcomes deemed acceptable by patients.[31] Although complete root coverage may be less predictable with these alternatives, they offer a valuable solution in patients for whom palatal harvesting is contraindicated or undesirable.[32]

The Visual Analog Scale (VAS) emerged as the most commonly used and effective tool for evaluating patient morbidity and satisfaction. It allows patients to communicate subjective experiences like pain intensity, esthetic satisfaction, and overall comfort. However, future research should move toward standardized PROMs assessment frameworks, encompassing not only esthetic satisfaction but also postoperative symptoms (pain, bleeding, dietary limitations), psychosocial effects, and treatment preference. Such holistic tools would

provide deeper insight into how patients perceive and adapt to surgical interventions.[33]

A key insight from the professional assessments reviewed is that clinicians typically evaluate outcomes based on color match, contour, soft tissue texture, and absence of scarring or keloid formation. The Root Coverage Esthetic Score (RES) and its variants have proven to be reproducible, with high inter-rater reliability among trained periodontists. Nevertheless, the discrepancy between clinical judgment and patient perception remains substantial. For instance, what clinicians deem as "suboptimal" due to incomplete root coverage might be viewed by the patient as a highly successful result if the visual improvement and sensitivity reduction meet their expectations.[34]

Moreover other researchers used photographic scales,[7,18,19] colour rating,[6] 3- point patient satisfaction scale based on functional, esthetic outcomes and cost of treatment.[10]

Another emerging theme from this review is the under appreciation of patient perspectives in treatment planning. The literature lacks robust data on patient expectations, motivations, and treatment decision-making behaviors. Consequently, treatment indications often stem from the periodontist's clinical judgment rather than patient-driven demand.

The findings of this review thus reinforce the importance of aligning clinical outcomes with patient expectations and preferences. It is increasingly recognized that complete root coverage, while desirable from a clinical standpoint, may not always be necessary or even prioritized by the patient.

Finally, while numerous studies have evaluated clinical techniques for root coverage, there remains a significant gap in standardized, validated PROMs instruments specific to periodontal esthetics. Integrating PROs such as quality of life (QoL), treatment acceptability, and psychosocial well-being into periodontal research and practice is not only warranted but essential for advancing truly patient-centered care. Long-term studies using responsive and disease-specific PROMs scales are critical for understanding how patients experience periodontal therapy over time.

Conclusion

This review offers a comprehensive synthesis of existing literature on patient-reported outcomes and professional aesthetic evaluations in the management of gingival recession, highlighting a critical shift toward patient-centered periodontal care. A key strength lies in the integration of diverse studies comparing multiple treatment modalities—including CAF, CTG, ADM, GTR, and PRF—and the inclusion of both subjective (PROMs) and objective (RES, PES/WES) outcome measures, providing a holistic view of treatment success. The detailed comparative analysis enhances clinical relevance by aligning therapeutic outcomes with patient expectations. However, limitations include significant heterogeneity across studies in terms of methodologies, follow-up durations, esthetic scoring systems, and grafting materials, which complicate direct comparisons and meta-analytic conclusions. Moreover, many studies lacked standardized PROMs tools, relied on unblinded self-assessments, or underrepresented long-term patient satisfaction. These factors underscore the need for more robust, standardized, and longitudinal studies to validate patient-centered metrics and optimize clinical protocols in gingival recession management.

The current evidence suggests that optimal care in gingival recession management should harmoniously balance measurable clinical improvements with meaningful patient perceptions to ensure outcomes that

are not only clinically sound but also deeply relevant to the individuals receiving care.

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