

Review

Bridging Periodontology and Prosthodontics: Contemporary Perspectives on Oral Rehabilitation Following Periodontal Therapy

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Highlights

What are the main findings?

- Individualized periodontal assessment and treatment planning are fundamental for selecting appropriate prosthodontic rehabilitation strategies.
- Long-term preservation of strategically important teeth may be achieved in carefully selected and compliant patients receiving successful periodontal therapy and structured supportive periodontal care.

What are the implications of the main findings?

- Successful oral rehabilitation requires close interdisciplinary collaboration between periodontists and prosthodontists throughout all treatment phases.
- Patient compliance, plaque control, and regular supportive periodontal care are critical determinants of long-term periodontal and prosthetic success.

Abstract

This narrative review aimed to summarize the contemporary evidence regarding the integration of periodontal and prosthodontic treatment. A narrative literature review was conducted using PubMed, Scopus, Web of Science, and Google Scholar, including studies published between January 1990 and May 2026. Relevant studies, systematic reviews, meta-analyses, consensus reports, and clinical guidelines published in English were analyzed. Current evidence highlights the importance of comprehensive periodontal assessment before prosthodontic treatment, including evaluation of probing depth, attachment loss, furcation involvement, tooth mobility, periodontal phenotype, and oral hygiene status. Appropriate periodontal preparation and supportive periodontal care contribute significantly to the long-term success of both tooth-supported and implant-supported restorations. Successful oral rehabilitation requires close interdisciplinary collaboration between periodontology and prosthodontics. Periodontal stability, patient compliance, and long-term maintenance remain key factors for predictable treatment outcomes.

Keywords: periodontal therapy; tooth survival; supportive periodontal care; oral rehabilitation



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1. Introduction

When tooth loss occurs as a consequence of periodontitis, successful oral rehabilitation requires a holistic and interdisciplinary approach, as periodontal and prosthodontic treatments are closely interconnected [1]. Effective treatment aims to restore oral function, aesthetics, and patient comfort; however, its long-term success depends largely on the health and stability of the supporting periodontal tissues [2]. Periodontal diseases remain among the most prevalent chronic inflammatory conditions worldwide and represent a major cause of tooth loss, attachment loss, and alveolar bone destruction, all of which may significantly compromise prosthodontic outcomes [3,4].

The relationship between periodontology and prosthodontics is reciprocal. Untreated periodontal inflammation may adversely affect the prognosis of permanent and removable prosthetic restorations by exacerbating attachment loss, gingival recession, and tooth mobility, and ultimately leading to restorative failure [5].

Furthermore, inadequately constructed prosthetic restorations may facilitate plaque accumulation, impair oral hygiene practices, and establish conditions favorable to initiation or advancement of periodontal disease [6,7]. Therefore, including periodontal principles into prosthodontic treatment planning is a crucial requirement for attaining reliable and sustainable clinical results.

Modern principles assert that prosthodontic rehabilitation should be viewed not as a standalone restoration intervention, but as the concluding phase of a meticulously orchestrated therapy process [8]. A thorough periodontal evaluation, precise diagnosis, risk assessment, and suitable periodontal intervention are essential before starting definitive prosthetic treatment [9]. Special emphasis must be placed on the maintenance of supracrestal tissue attachment, management of periodontal abnormalities, inflammatory control, and enhancement of soft tissue conditions, since these elements directly affect both biological and aesthetic results [10].

In recent years, advances in periodontal therapy, restorative materials, digital dentistry, and treatment planning protocols have further strengthened the collaboration between periodontists and prosthodontists. These developments allow clinicians to achieve improved functional rehabilitation while simultaneously preserving periodontal health and enhancing patient satisfaction [11,12].

Therefore, the aim of this narrative review is to provide an updated overview of the contemporary concepts linking periodontology and prosthodontics, with particular emphasis on periodontal assessment, periodontal preparation before prosthodontic treatment, prosthodontic rehabilitation following periodontal therapy, and long-term maintenance strategies required for predictable oral rehabilitation.

2. Literature Review

2.1. Search Strategy

A structured literature search was conducted on 28 May 2026, using the PubMed, Scopus, Web of Science, and Google Scholar databases to identify relevant studies addressing the interaction between periodontology and prosthodontics. Articles published between January 1990 and May 2026 were considered.

The search strategy combined Medical Subject Headings (MeSH), where applicable, and free-text keywords using Boolean operators. The principal search string was: ("periodontology" OR "periodontal disease" OR "periodontal therapy") AND ("prosthodontics" OR "prosthodontic rehabilitation" OR "oral rehabilitation") AND ("periodontal assessment" OR "supportive periodontal care" OR "crown lengthening" OR "restorative margins" OR "supracrestal tissue attachment"). The search strategy was adapted according to the indexing requirements of each database.

2.2. Eligibility Criteria

Original research articles, systematic reviews, meta-analyses, narrative reviews, clinical studies, consensus reports, and clinical practice guidelines published in English were considered eligible for inclusion. Studies focusing on periodontal assessment, periodontal preparation before prosthodontic treatment, periodontal surgical procedures, prosthodontic rehabilitation, and long-term maintenance protocols were included.

Editorials, conference abstracts, letters to the editor, and publications not directly related to the interdisciplinary relationship between periodontology and prosthodontics were excluded.

2.3. Study Selection and Data Synthesis

All records retrieved from PubMed, Scopus, Web of Science, and Google Scholar were exported into a reference management software, where duplicate records were identified and removed. A total of 412 records were initially identified through the database search. After the removal of 96 duplicate records, 316 publications remained for title and abstract screening. During this stage, 201 records were excluded because they were not directly related to the interdisciplinary relationship between periodontology and prosthodontics, did not address the objectives of the present review, represented conference abstracts, editorials, letters to the editor, or were published in languages other than English. The remaining 115 potentially eligible articles underwent full-text assessment. Following full-text evaluation, 40 studies were excluded because they did not meet the predefined eligibility criteria, presented insufficient methodological or clinical relevance, focused on topics outside the scope of the review, or provided duplicate evidence already reported in more comprehensive publications.

Consequently, 75 studies were included in the final narrative synthesis. The selected evidence was analyzed narratively and organized into thematic sections covering periodontal assessment before prosthodontic treatment, periodontal preparation, prosthodontic rehabilitation following periodontal therapy, long-term tooth survival and supportive periodontal care, and future perspectives in interdisciplinary oral rehabilitation.

The workflow of the literature search and study selection process is presented in Figure 1.

As a narrative review, this study does not follow a formal systematic review protocol and therefore may be subject to selection bias. Although multiple databases were searched and a structured search strategy was applied, the inclusion of studies was based on their relevance to the review objectives rather than on predefined quantitative criteria. Furthermore, only articles published in English were considered, which may have resulted in the exclusion of relevant evidence reported in other languages. Nevertheless, the inclusion of original studies, systematic reviews, meta-analyses, consensus reports, and clinical guidelines allowed for a comprehensive overview of the contemporary concepts linking periodontology and prosthodontics.

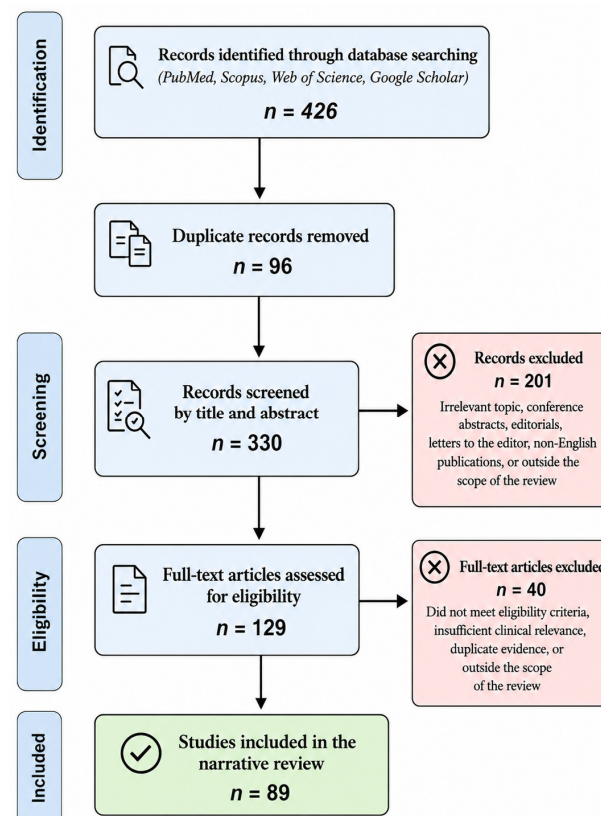


Figure 1. Flowchart of the literature search and study selection process.

3. Periodontal Evaluation Before Prosthodontic Treatment

A comprehensive periodontal examination represents the foundation of successful prosthodontic treatment planning [13]. Before initiating any restorative procedure, clinicians must evaluate the periodontal condition of the remaining dentition and supporting tissues in order to identify active disease, determine prognosis, and establish the need for periodontal intervention [14].

The relevance of periodontal assessment prior to prosthodontic rehabilitation has been demonstrated in several clinical studies. Cabanilla et al. investigated the relationship between periodontal diagnosis, periodontal prognosis, and the survival of prosthodontic abutment teeth in a retrospective study [15]. Their findings demonstrated that teeth with a favorable periodontal prognosis exhibited significantly greater long-term survival when used as prosthetic abutments. However, the decision to extract a tooth and the long-term outcome of prosthodontic rehabilitation are multifactorial, depending not only on periodontal status but also on patient preferences, restorative feasibility, technical complications, disease progression, and interdisciplinary clinical decision-making [15]. These findings emphasize the importance of periodontal diagnosis as one component of comprehensive prosthodontic treatment planning and prognosis assessment.

The importance of preserving periodontal tissues during restorative and prosthodontic procedures has been highlighted by Schätzle et al. [16], who evaluated the influence of restoration margins on periodontal tissues over a 26-year observation period. The authors reported that teeth restored with subgingival margins exhibited significantly greater attachment loss, increased probing depths, and more pronounced gingival recession compared with non-restored control teeth [16]. These findings suggest that restoration margin placement may have long-term biological consequences and emphasize the need for careful periodontal assessment before prosthodontic treatment. Consequently, the position of restorative margins should be deter-

mined not only according to prosthetic and aesthetic requirements but also according to the periodontal status and anatomical characteristics of the supporting tissues [16].

The influence of restorative margin placement on periodontal health has recently been evaluated in a systematic review and meta-analysis by Cortés-Sánchez et al. [17]. The authors analyzed the available evidence regarding the periodontal consequences of full-crown preparation margin positioning and reported that subgingival margins were generally associated with less favorable periodontal outcomes, including increased gingival inflammation, bleeding on probing, and greater plaque accumulation when compared with supragingival or equigingival margins. The review emphasized that the biological response of periodontal tissues is strongly influenced by the location of restorative margins and highlighted the importance of preserving periodontal integrity during prosthodontic treatment planning [17]. These findings reinforce the need for a thorough periodontal assessment before crown preparation in order to determine the most appropriate margin location while minimizing the risk of long-term periodontal complications.

Similarly, Bader et al. [18] assessed the influence of crown margins on periodontal conditions in regularly attending dental patients. The authors reported that subgingival crown margins were associated with increased gingival inflammation and deeper periodontal pockets when compared with supragingival margins. These observations underline the importance of evaluating gingival architecture, sulcus depth, and tissue health before determining the final position of restorative margins [18].

The position of restorative margins remains one of the most important determinants of periodontal health. Supragingival margins generally facilitate plaque control and oral hygiene procedures, whereas subgingival margins may increase plaque retention and contribute to periodontal inflammation. The principal periodontal consequences associated with different margin locations are summarized in Figure 2.

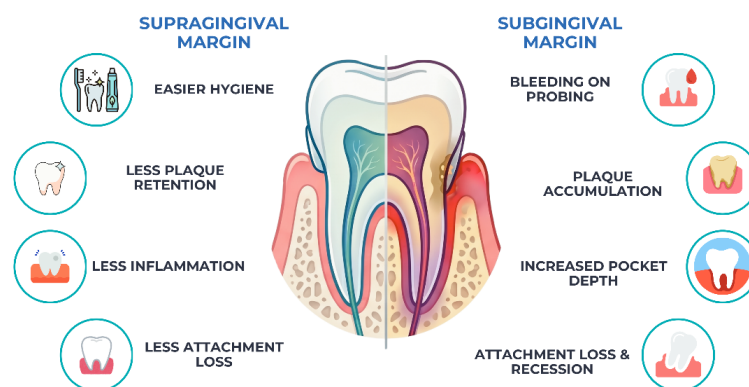


Figure 2. Biological and periodontal consequences associated with supragingival and subgingival restorative margin placement.

Radiographic assessment is equally important during periodontal evaluation. Watanabe et al. [19] investigated radiographic predictors associated with the 10-year survival of removable partial denture abutment teeth and found that alveolar bone level and bone density were significant factors influencing long-term abutment survival. These findings support the inclusion of radiographic periodontal analysis as an essential component of prosthodontic treatment planning, particularly when selecting strategic abutment teeth [19].

Recent advances in digital dentistry have expanded the scope of periodontal assessment beyond conventional clinical and radiographic examination. Artificial intelligence (AI)-assisted image analysis, digital periodontal charting, and cone-beam computed tomography (CBCT)-based evaluation may improve diagnostic consistency, facilitate risk assessment, and support interdisciplinary treatment planning before prosthodontic rehabilitation [20].

Current evidence indicates that AI-based systems can achieve diagnostic performances comparable to experienced clinicians for several periodontal parameters, particularly in detecting radiographic bone loss and assisting periodontal classification. However, most currently available AI models have been developed using relatively small or highly selected datasets, and their external validation across different populations and clinical settings remains limited.

AI should currently be regarded as an adjunctive decision-support tool that may improve diagnostic consistency and reduce inter-examiner variability, rather than as a replacement for professional judgment. Comprehensive clinical and radiographic evaluation of periodontal phenotype, tooth prognosis, restorative feasibility, and patient-specific biological and systemic factors remains essential, while prospective multicenter studies using standardized validation protocols are required before AI-based systems can be routinely integrated into periodontal and prosthodontic practice.

Beyond radiographic findings, comprehensive periodontal assessment should include a detailed evaluation of tooth mobility, furcation involvement, and the amount of residual periodontal support. These parameters play a decisive role in determining whether a tooth can be preserved and incorporated into a future prosthodontic design. Increased tooth mobility is frequently associated with attachment loss, reduced alveolar bone support, inflammation, or occlusal trauma.

The prognostic relevance of tooth mobility has been confirmed in long-term maintenance studies. Martinez-Canut [8] identified tooth mobility among the clinical variables significantly associated with an increased probability of future tooth loss in periodontally compromised patients. The author emphasized that mobility should be interpreted together with attachment loss, residual bone support, and patient-related risk factors when establishing the long-term prognosis of individual teeth. Therefore, mobility assessment represents an important component of periodontal evaluation before prosthodontic rehabilitation and may substantially influence abutment selection.

Furcation involvement represents another critical factor during periodontal evaluation, particularly in multirooted teeth considered for use as prosthetic abutments. Furcation defects complicate plaque control procedures and are associated with increased susceptibility to disease progression. Several longitudinal studies have demonstrated that teeth exhibiting advanced furcation involvement present a less favorable prognosis and a greater risk of future tooth loss compared with teeth without furcation defects [21,22]. Consequently, identification and classification of furcation involvement should be considered an essential component of the pre-prosthetic periodontal examination.

Assessment of probing pocket depth and clinical attachment level remains fundamental for evaluating disease severity and treatment outcomes. Residual periodontal pockets may serve as reservoirs for pathogenic microorganisms and have been associated with an increased risk of recurrent periodontal breakdown [23]. Therefore, the presence of deep residual pockets should be carefully considered before initiating definitive prosthodontic treatment. Whenever active inflammation or persistent deep pockets are detected, periodontal therapy should be completed, and periodontal stability re-established before restorative procedures are undertaken.

The evaluation of gingival phenotype also contributes to prosthodontic treatment planning. Thin periodontal phenotypes are generally more susceptible to recession following restorative and surgical procedures, whereas thick phenotypes tend to exhibit greater tissue stability [24]. Knowledge of gingival phenotypes may therefore assist clinicians in determining restoration margin placement, selecting appropriate restorative materials, and predicting the long-term aesthetic outcome of treatment [25]. Careful assessment of soft tissue architecture is particularly important in aesthetically demanding areas where gingival recession may compromise the final prosthetic result.

Periodontal assessment should also include an evaluation of oral hygiene status and patient compliance. Plaque accumulation remains one of the principal etiological factors for periodontal disease progression and may significantly affect the longevity of prosthodontic restorations [26]. Patients demonstrating inadequate plaque control during the active periodontal treatment and early supportive periodontal care phases frequently experience less favorable periodontal outcomes after rehabilitation. Consequently, oral hygiene practices, plaque scores, and patient compliance should be evaluated over time, with definitive prosthodontic treatment being initiated only after periodontal stability and adequate adherence to supportive periodontal care have been demonstrated [27].

A thorough review of the patient's oral hygiene practices, compliance, and long-term maintenance potential should be included in the periodontal assessment that precedes prosthodontic rehabilitation, according to the available evidence. These considerations are critical for treatment planning and may have a major impact on the stability of the gums and the lifetime of the prosthesis. In order to achieve predictable biological and functional outcomes, it is crucial to conduct a comprehensive preprosthetic periodontal assessment.

Although the available evidence consistently emphasizes the importance of comprehensive periodontal assessment before prosthodontic rehabilitation, some heterogeneity exists regarding the relative prognostic value of individual clinical parameters. While most studies identify probing depth, clinical attachment loss, tooth mobility, and furcation involvement as key predictors of long-term outcomes, their relative contribution varies according to study design, patient characteristics, and maintenance protocols. Furthermore, emerging technologies such as artificial intelligence-assisted diagnosis appear promising; however, the current evidence is still based on a limited number of validation studies and requires further prospective clinical confirmation before widespread implementation in routine practice.

The available evidence supports a structured interdisciplinary approach in which comprehensive periodontal assessment, risk evaluation, periodontal therapy, and confirmation of periodontal stability precede definitive prosthodontic rehabilitation. The principal stages of this clinical workflow are illustrated in Figure 3.

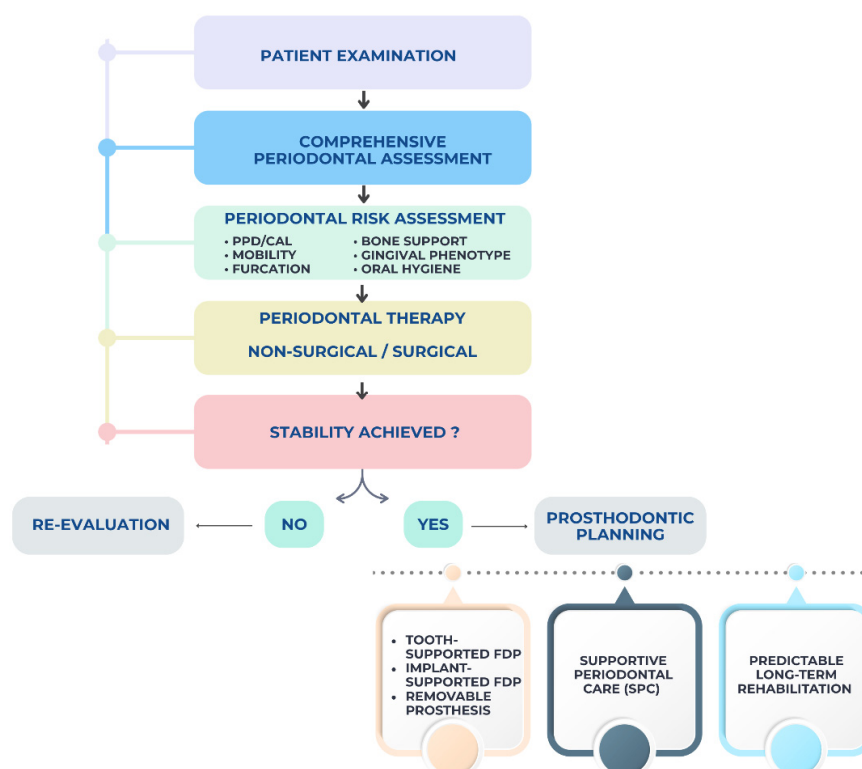


Figure 3. Clinical workflow for periodontal assessment and preparation before prosthodontic rehabilitation.

4. Periodontal Preparation for Prosthodontic Treatment

Periodontal preparation represents a critical phase before definitive prosthodontic rehabilitation, aiming to establish healthy periodontal tissues capable of supporting long-term restorative treatment [28]. Depending on the clinical situation, this phase may include control of periodontal inflammation, correction of biological width violations, crown-lengthening procedures, soft tissue management, and supportive periodontal therapy [29].

The biological basis of pre-prosthetic periodontal therapy was comprehensively reviewed by Padbury et al. [30], who emphasized the close relationship between restorative dentistry and periodontal health. The authors discussed the concept of biologic width, the influence of restorative margin location, materials, and restoration contours on periodontal tissues, and highlighted the indications for surgical crown lengthening when restorative procedures risk compromising periodontal integrity. Their review reinforced the importance of respecting periodontal biological principles during restorative treatment planning [30].

Among periodontal surgical procedures, crown lengthening remains one of the most frequently performed interventions before prosthodontic rehabilitation. Lanning et al. [31] evaluated periodontal tissue changes following surgical crown lengthening in 23 patients requiring additional tooth structure for prosthetic retention, management of caries, fractures, or pre-existing restorative margins. The authors observed that the biologic width was re-established to its original vertical dimension within six months after surgery, while a consistent gain of approximately 3 mm of coronal tooth structure was achieved [31]. These findings support the predictability of crown lengthening as a pre-prosthetic procedure when adequate healing time is allowed before definitive restoration placement [31].

Comparable findings were reported by Shobha et al. [32] in a six-month prospective clinical study involving 15 patients. The authors demonstrated significant apical displacement of the free gingival margin following surgery and confirmed that the biologic width returned to baseline values after six months. Furthermore, a consistent gain of approximately 2 mm of supracrestal tooth structure was maintained throughout the observation period. Their results further support the biological stability achieved after crown-lengthening procedures and the importance of postoperative maturation before restorative treatment [32].

More recently, Carneiro et al. [33] investigated the stability of periodontal tissues following esthetic crown-lengthening surgery over a 12-month period. The study demonstrated that although some soft tissue rebound occurred during healing, it was not clinically significant [33]. Clinical crown length remained substantially increased compared with baseline values, probing depth tended to return toward its original dimensions, and supracrestal soft tissues became thicker over time. The authors concluded that esthetic crown lengthening is an effective and biologically stable procedure when properly planned and executed [33].

Evidence from higher levels of scientific synthesis was provided by Smith et al. [34], who conducted a systematic review and meta-analysis evaluating periodontal tissue changes following crown-lengthening surgery. Four controlled clinical trials comprising 182 procedures in 111 patients were included [34]. The analysis demonstrated no significant differences between treated and adjacent sites regarding supracrestal tissue attachment levels, bone level, or probing depth after three and six months. These findings indicate that crown-lengthening surgery generally results in stable periodontal tissues and predictable healing outcomes over time [34].

The integration of periodontal surgery with prosthetic planning was illustrated by Amato et al. [35], who described a prosthetically driven approach to crown lengthening based on guided soft and hard tissue preparation. Their protocol emphasized that peri-

odontal surgery should be planned according to the final restorative objectives, allowing clinicians to achieve harmonious gingival contours, adequate restorative space, and improved esthetic outcomes. This interdisciplinary concept highlights the importance of coordinating periodontal and prosthodontic treatment phases rather than considering them as independent procedures [35].

Long-term periodontal and prosthetic stability following appropriate tissue preparation was demonstrated by Serra-Pastor et al. [36] in a four-year prospective clinical study evaluating restorations placed using the biologically oriented preparation technique. The authors reported gingival thickening of 32.5%, marginal stability in 98.6% of teeth, a restoration survival rate of 96.6%, and low rates of biological and mechanical complications. These findings suggest that appropriate management of periodontal tissues before definitive restoration contributes substantially to long-term clinical success [36].

Further evidence regarding the importance of periodontal preparation and maintenance was provided by Di Febo et al. [37], who evaluated fixed prosthodontic treatment outcomes in periodontal patients over a 20-year period. Among 948 prosthetic abutments initially included, 90.1% remained functional after two decades of supportive periodontal care. Progression of periodontitis accounted for only 31% of abutment loss, whereas plaque accumulation, bleeding scores, oral parafunctions, and endodontic status significantly influenced long-term outcomes. The authors concluded that prosthodontic rehabilitation could achieve excellent long-term success when preceded by adequate periodontal therapy and followed by regular maintenance programs [37].

The assessment of periodontal prognosis requires the integration of multiple clinical, radiographic, and patient-related variables. These parameters should be evaluated collectively when determining the long-term maintainability of teeth intended for prosthodontic rehabilitation. The principal factors influencing periodontal prognosis are summarized in Figure 4.

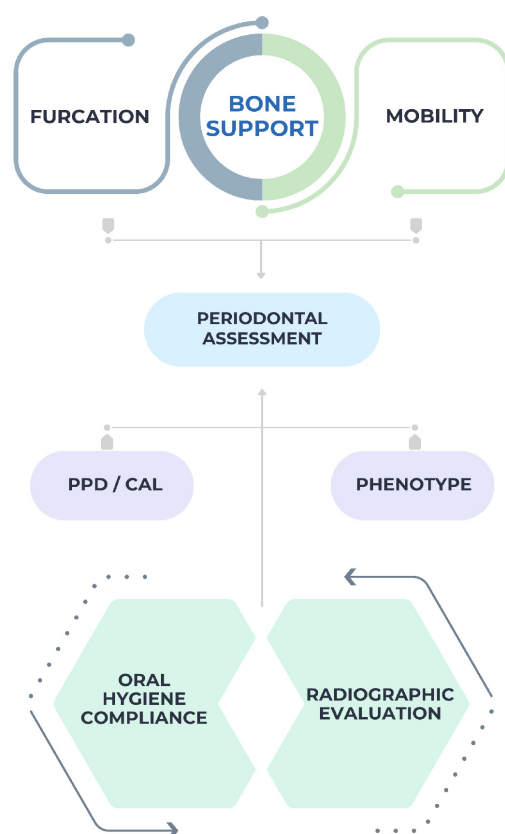


Figure 4. Main clinical and radiographic parameters influencing periodontal prognosis and abutment tooth selection.

The available evidence highlights that periodontal preparation should be regarded as an integral component of prosthodontic treatment rather than a separate preliminary phase. Successful rehabilitation depends not only on the correction of periodontal defects but also on the establishment of a stable periodontal environment capable of supporting long-term prosthetic function. Procedures such as non-surgical periodontal therapy, surgical crown lengthening, soft tissue management, and biologically oriented preparation techniques contribute to the preservation of periodontal health and facilitate the achievement of favorable restorative outcomes. Consequently, individualized periodontal preparation remains a prerequisite for predictable and durable prosthodontic rehabilitation. The characteristics and principal findings of the studies supporting these concepts are summarized in Table 1.

Table 1. Evidence supporting periodontal preparation before prosthodontic treatment.

Study	Design	Sample	Intervention	Main Findings	Clinical Relevance for Prosthodontics	Evidence Type
Padbury et al. [30]	Narrative review	–	Restorative–periodontal interface	Reviewed the concepts of biologic width, restorative margin location, restorative materials, crown contours, and indications for surgical crown lengthening	Provides the biological principles guiding periodontal preparation before restorative treatment	Narrative review
Lanning et al. [31]	Clinical study	23 patients	Surgical crown lengthening	Biologic width was re-established to its original dimension after 6 months; approximately 3 mm of coronal tooth structure was gained	Supports the predictability of crown lengthening before prosthodontic rehabilitation	Clinical study
Shobha et al. [32]	Prospective clinical study	15 patients	Surgical crown lengthening	Biologic width returned to baseline values after 6 months; approximately 2 mm gain of coronal tooth structure was maintained throughout follow-up	Confirms periodontal stability following crown-lengthening procedures	Prospective clinical study
Carneiro et al. [33]	Prospective clinical study	20 patients	Esthetic crown lengthening	Esthetic crown lengthening was effective; limited soft tissue rebound occurred but was not clinically significant; supracrestal soft tissue thickening was observed	Demonstrates biological stability after esthetic crown-lengthening procedures	Prospective clinical study
Smith et al. [34]	Systematic review and meta-analysis	4 studies; 111 patients; 182 procedures	Crown-lengthening surgery	No significant differences in supracrestal tissue attachment, bone level, or probing depth between treated and adjacent sites; periodontal healing remained stable over time	Supports the predictability of periodontal healing following crown lengthening	Systematic review and meta-analysis

Table 1. *Cont.*

Study	Design	Sample	Intervention	Main Findings	Clinical Relevance for Prosthodontics	Evidence Type
Amato et al. [35]	Clinical report	10 patients; 38 teeth	Prosthetically driven crown lengthening	Presented a guided soft and hard tissue preparation protocol based on the final restorative design, achieving predictable esthetic and biological outcomes	Illustrates interdisciplinary planning between periodontal surgery and prosthodontics	Clinical report
Serra-Pastor et al. [36]	Prospective clinical study	149 teeth	Biologically oriented preparation technique	Gingival thickening increased by 32.5%; marginal stability was observed in 98.6% of teeth; restoration survival reached 96.6% after 4 years	Demonstrates favorable periodontal behavior and long-term prosthetic stability	Prospective clinical study
Di Febo et al. [37]	20-year cohort study	100 patients; 948 prosthetic abutments	Fixed prosthodontic rehabilitation after periodontal treatment and supportive periodontal care	90.1% of prosthetic abutments remained functional after 20 years; plaque accumulation, bleeding scores, parafunctions, and endodontic status influenced abutment survival	Highlights the importance of periodontal preparation and long-term maintenance for prosthetic success	Long-term cohort study

Overall, the available evidence supports periodontal preparation as an essential pre-requisite for successful prosthodontic rehabilitation. Nevertheless, important methodological differences among the included studies should be considered. Variations in surgical techniques, healing periods, patient selection, and outcome assessment make direct comparisons difficult. In addition, much of the available evidence originates from observational studies and prospective cohorts, whereas randomized controlled trials remain relatively limited. Consequently, although current findings consistently support pre-prosthetic periodontal therapy, further high-quality multicenter studies are required to establish standardized clinical protocols.

5. Prosthodontic Rehabilitation Following Periodontal Therapy

Prosthodontic rehabilitation after periodontal therapy should be performed only after periodontal inflammation has been controlled and the remaining dentition has been reassessed from both periodontal and prosthetic perspectives. In stage IV periodontitis, rehabilitation is frequently required because patients may present tooth loss, masticatory dysfunction, occlusal instability, migration, spacing, and reduced functional support. The EFP S3 guideline for stage IV periodontitis states that several options may be considered in partially edentulous patients, including tooth-supported fixed dental prostheses, implant-supported fixed dental prostheses, removable dental prostheses, or even no prosthetic rehabilitation when sufficient function is present [38,39].

Current evidence does not support an automatic extraction-and-implant approach in all periodontally compromised patients. Montero et al. showed that tooth-supported fixed prostheses can be a valid treatment option for restoring masticatory function in partially edentulous patients with stage IV periodontitis [40]. Similarly, Tomasi et al. evaluated full-arch fixed rehabilitations and found that the available evidence does not clearly prove the superiority of implant-supported full-arch prostheses over tooth-supported full-arch prostheses

in patients with stage IV periodontitis [41]. Although contemporary evidence supports both tooth-supported and implant-supported rehabilitation in periodontally treated patients, direct comparisons remain challenging due to differences in study design, patient selection, disease severity, and maintenance protocols. Current evidence does not support a generalized extraction-oriented approach, as many periodontally compromised teeth can achieve long-term survival when periodontal stability is established and supportive care is maintained.

5.1. Tooth-Supported Fixed Dental Prostheses (FPDs)

The success of tooth-supported fixed dental prostheses depends on the biological compatibility of the restoration and the stability of the surrounding periodontium. Ercoli and Caton emphasized that restoration margins, emergence profile, contour, finish-line design, and plaque-retentive factors may influence periodontal outcomes around tooth-supported fixed prostheses [42]. Srimaneepong et al. also highlighted that periodontal health plays a central role in the longevity of fixed prosthetic restorations, and that prosthetic design and materials must be planned to minimize plaque retention and tissue irritation [13]. Thus, prosthetic margins should be accessible for oral hygiene and professional monitoring, while over contoured restorations, open margins, and subgingival extensions should be avoided whenever possible.

Beyond biological complications, technical complications should also be considered when restoring periodontally compromised teeth. Reduced periodontal support and increased tooth mobility may expose fixed prosthetic restorations to unfavorable biomechanical loading, potentially increasing the risk of ceramic chipping or fracture, framework or veneering material failure, loss of retention due to cement degradation, screw loosening in combined tooth-implant restorations, and debonding of restorations. In addition, progressive periodontal attachment loss may alter the crown-to-root ratio and occlusal load distribution over time, further increasing the likelihood of mechanical complications. Consequently, careful prosthetic design, appropriate material selection, controlled occlusal loading, and regular supportive periodontal care are essential to minimize both biological and technical failures in periodontally compromised patients.

Abutment selection remains a critical determinant of long-term prognosis. Teeth with reduced but stable periodontal support may function successfully as prosthetic abutments if inflammation is controlled and occlusal forces are properly distributed [43]. However, teeth with residual deep pockets, progressive attachment loss, advanced furcation involvement, mobility, unfavorable crown-root ratio or compromised endodontic/restorative status require cautious evaluation [44]. Müller et al. showed that periodontally treated patients receiving prosthetic reconstructions had a higher risk of further tooth loss than patients without prostheses; however, this risk was also influenced by age, diabetes, socioeconomic status, aggressive periodontitis, initial bone loss, and compliance [45]. This indicates that prosthetic treatment should be interpreted within the patient's global periodontal risk profile rather than as an isolated determinant.

5.2. Removable Partial Dentures (RPDs)

Removable partial dentures remain an important option when fixed or implant-supported restorations are not feasible. However, removable prostheses may increase plaque accumulation and impose additional mechanical stress on abutment teeth. Watanabe et al. [19] reported that RPD (Removable Partial Denture) abutment teeth are at higher risk of loss than non-abutment teeth and that predictors of RPD abutment survival include root canal treatment, changes in crown-root ratio, and radiographic changes in alveolar bone density [19]. Therefore, removable prostheses in periodontally treated patients should be designed with rigid support, reduced plaque-retentive areas, favorable force distribution, and regular periodontal and radiographic monitoring [46].

5.3. Implant-Supported Prosthetic Rehabilitation

Implant-supported prostheses can be highly useful in advanced periodontal cases, especially when the number or distribution of remaining teeth is insufficient to support fixed rehabilitation [47]. The EFP guideline suggests implant-supported fixed dental prostheses for free-end situations requiring additional occluding units, while metal-framework removable dental prostheses may be considered when implants are not possible [38,39]. Nevertheless, patients with a history of periodontitis remain at increased risk of peri-implant biological complications, and implant-supported restorations require strict supportive care. The guideline also notes that implants in people previously affected by periodontitis show a higher risk of peri-implantitis and implant loss [38,39].

An important aspect emerging from the available literature is the absence of complete agreement regarding the optimal rehabilitation strategy for periodontally compromised patients. While several studies support the preservation of strategically important teeth whenever periodontal stability can be maintained, others emphasize the predictability of implant-supported rehabilitation in selected clinical situations. These differences are likely explained by variations in disease severity, patient-related risk factors, maintenance compliance, prosthetic design, and follow-up duration rather than by true contradictions in the available evidence. Therefore, current evidence supports individualized treatment planning instead of a universal preference for either tooth preservation or implant replacement.

Taken together, these findings emphasize that successful prosthodontic rehabilitation extends beyond the restoration itself and requires careful consideration of the biological and periodontal environment. Respecting periodontal principles during treatment planning and execution contributes to improved functional stability, esthetic integration, and long-term maintenance of restorative outcomes. The key concepts are illustrated in Figure 5.

The decision between preserving a periodontally compromised tooth and replacing it with a dental implant remains one of the most debated issues in contemporary interdisciplinary dentistry [38,39].

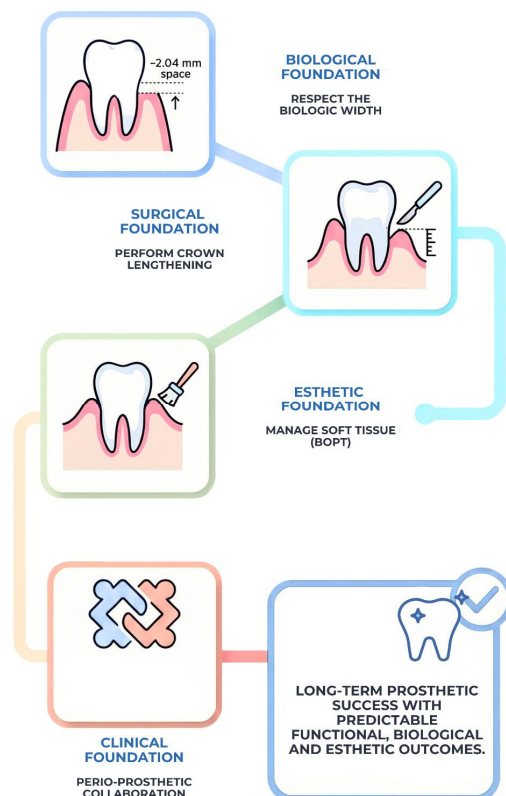


Figure 5. Integration of periodontal considerations into prosthodontic planning.

5.4. Tooth Preservation Versus Implant Replacement

Recent systematic reviews have challenged the widespread perception that implant therapy consistently provides superior long-term outcomes compared with the preservation of periodontally compromised teeth [48,49]. Levin and Halperin-Sternfeld reported that survival rates of periodontally treated teeth may be comparable to those observed for dental implants when adequate maintenance programs are implemented [48]. Similarly, Sarafidou et al. demonstrated that both treatment approaches may achieve favorable long-term outcomes, with patient compliance and supportive care representing major determinants of success [49].

An important limitation of implant-centered treatment philosophies is the tendency to focus primarily on survival rates while underestimating the biological and technical complications associated with both tooth preservation and implant-supported rehabilitation. Although implant therapy is considered a highly predictable treatment modality, peri-implant mucositis, peri-implantitis, prosthetic complications, and maintenance requirements may significantly influence long-term outcomes [50]. Likewise, biological complications affecting periodontally compromised teeth and technical complications involving tooth-supported prostheses may substantially influence the long-term prognosis and should be considered when deciding whether to preserve or extract a tooth. Consequently, treatment decisions should not rely exclusively on survival statistics but should also consider biological stability, technical feasibility, treatment complexity, patient-centered outcomes, and long-term maintenance burden [51].

5.4.1. Comparative Outcomes and Biological Considerations

The concept of strategic tooth preservation has therefore gained increasing attention in contemporary interdisciplinary dentistry. Current evidence emphasizes that treatment planning should consider the strategic value of individual teeth within the overall prosthodontic design rather than focusing solely on traditional prognostic parameters. Factors such as tooth position, remaining periodontal support, restorative feasibility, patient motivation, systemic health conditions, and long-term maintenance potential should all be integrated into the decision-making process [52,53].

Economic considerations should also be acknowledged. Recent evidence suggests that preservation and maintenance of periodontally compromised teeth may represent a cost-effective treatment strategy compared with extraction followed by implant placement, particularly when long-term maintenance and management of implant-related complications are considered [54,55].

5.4.2. Economic Considerations

Economic considerations extend beyond the initial treatment costs and should also include the long-term expenses associated with maintenance and the management of biological complications. Several economic analyses have suggested that preserving strategically important teeth through comprehensive periodontal therapy and structured supportive periodontal care may represent a cost-effective approach, particularly when long-term tooth survival is achieved [54,55].

Long-term data are particularly relevant for patients previously treated for stage III or IV periodontitis. Wörner et al. followed up with patients undergoing supportive periodontal therapy for approximately 20–30 years and reported peri-implantitis in 33% of implant-treated patients and in 25% of implants. Overall, 11% of all implants were lost within 10 years because of peri-implantitis, while 45% of implants affected by peri-implantitis were ultimately lost. These findings indicate that the economic assessment of implant-supported rehabilitation should account not only for the initial placement costs

but also for repeated maintenance, peri-implantitis treatment, prosthetic intervention, and the potential need for implant removal and replacement [56].

In contrast, although implant-supported rehabilitation may provide predictable functional outcomes, biological complications such as peri-implantitis frequently require repeated nonsurgical or surgical interventions, adjunctive antimicrobial therapy, regenerative procedures, prosthetic modifications, and prolonged maintenance, substantially increasing cumulative treatment costs [57–59].

5.4.3. Patient-Centered Decision-Making

Clinical decision-making must be individualized and based on a comprehensive evaluation of periodontal, prosthodontic, restorative, systemic, and patient-related factors. Extraction may represent the most appropriate treatment option in teeth presenting a hopeless periodontal prognosis; extensive attachment and bone loss incompatible with long-term function; severe mobility that cannot be stabilized; vertical root fractures; non-restorable carious destruction; or persistent endodontic or periodontal infections, or when adequate prosthetic rehabilitation cannot be achieved while maintaining biological stability [60]. In such situations, attempts to preserve the tooth may unnecessarily prolong treatment, increase biological complications, and compromise the overall rehabilitation [61].

Patient-related factors should also be incorporated into treatment planning. Age, systemic diseases, smoking habits, oral hygiene, compliance with supportive periodontal care, financial resources, treatment expectations, esthetic demands, and the patient's willingness to undergo complex periodontal therapy may substantially influence the final therapeutic decision [61,62]. Consequently, identical clinical findings may lead to different treatment approaches depending on the individual patient's circumstances.

Finally, contemporary periodontal and prosthodontic care should be based on shared decision-making. Patients should receive clear information regarding the prognosis of the remaining dentition, available treatment alternatives, expected longevity, biological and technical complications, maintenance requirements, treatment duration, and financial implications [63]. Integrating the best available scientific evidence with clinical expertise and patient preferences remains essential for achieving predictable and patient-centered rehabilitation outcomes.

6. Long-Term Tooth Survival and Supportive Periodontal Care in Prosthodontics

Long-term preservation of natural dentition is one of the primary objectives of contemporary periodontal therapy [64]. The evidence available from long-term observational studies consistently demonstrates that periodontally compromised teeth can be successfully maintained for decades when active periodontal treatment is followed by structured supportive periodontal care [65].

The prevention of further tooth loss is a primary goal of periodontal therapy and depends on effective active treatment followed by consistent patient adherence to supportive periodontal care. Any prosthodontic or implant-supported intervention introduces additional plaque-retentive, biomechanical, or peri-implant risks and may therefore contribute to further tooth loss, particularly in patients with incomplete periodontal stabilization or poor maintenance compliance [45,47]. Accordingly, the extent of rehabilitation should be limited to that required to restore acceptable function, comfort, and aesthetics. In appropriately informed patients with stage IV periodontitis and sufficient occluding and masticatory units, maintaining or restoring a shortened dental arch without replacing posterior free-end spaces may represent a successful conservative treatment alternative [38].

Several longitudinal investigations have reported remarkably low rates of tooth loss despite the inclusion of patients presenting with moderate to severe periodontal destruction. Pretzl et al. observed that only 201 out of 1639 teeth were lost during a 20-year follow-up period, corresponding to a mean annual tooth loss rate of 0.14 teeth per patient [66]. Similarly, Agudio et al. reported that only 201 teeth (5.1%) were lost during 30 years of supportive periodontal care, with merely 39 teeth being lost because of periodontal reasons [67]. These findings strongly support the effectiveness of comprehensive periodontal treatment combined with long-term maintenance protocols in preserving natural dentition even in patients with advanced periodontal breakdown.

Comparable results have been reported in patients diagnosed with generalized aggressive periodontitis. Graetz et al. followed up with 57 patients for a mean period of 17.4 years and found that one-third of the patients did not lose a single tooth during supportive periodontal therapy, while approximately 84% of the surviving teeth exhibited stable or improved bone levels [64]. Likewise, Petsos et al. demonstrated that 93.4% of all teeth remained functional after 10 years of supportive periodontal care, confirming that periodontal maintenance can substantially reduce tooth loss even in highly susceptible individuals [29].

The prognostic importance of patient compliance emerged consistently across studies. Pretzl et al. identified non-compliance with supportive periodontal therapy as a major determinant of tooth loss over a 20-year period [66]. Similarly, De Backer et al. [68] reported that compliance significantly influenced the survival of severely compromised mandibular incisors, with survival probabilities remaining exceptionally high when regular maintenance visits were respected. Their study demonstrated that even teeth exhibiting more than 50% alveolar bone loss could achieve survival probabilities of 91% after 15 years and 78% after 20 years [68]. These findings challenge traditional extraction-oriented approaches and support conservative treatment strategies whenever adequate periodontal maintenance can be guaranteed.

Several patient-related factors have repeatedly been associated with an increased risk of tooth loss. Age, smoking, diabetes mellitus, cardiovascular diseases, and male gender have been identified as important risk indicators. Pretzl et al. [66] demonstrated significant associations between tooth loss and smoking, age, diabetes, cardiovascular disease, and living alone. Agudio et al. [67] further reported that age and male gender significantly increased the probability of tooth loss during long-term maintenance. In contrast, De Backer et al. did not observe significant effects of smoking or diabetes, likely because of the relatively small number of affected patients included in their cohort [68].

Tooth-related factors appear to play an equally important role in determining long-term prognosis. Petsos et al. [29] found that furcation involvement, tooth mobility, clinical attachment loss, probing pocket depth, and extensive bone loss significantly increased the likelihood of tooth loss during supportive periodontal therapy. Similarly, Graetz et al. reported markedly increased hazard ratios for teeth exhibiting furcation involvement, mobility grade III, residual periodontal pockets, and localization in the maxillary arch [64]. Agudio et al. further demonstrated that molars, root canal-treated teeth, crowned teeth, and teeth presenting advanced bone loss were significantly more likely to be lost during long-term follow-up [67].

Across the available long-term studies, patient compliance consistently emerges as one of the strongest predictors of tooth retention. Regular attendance at supportive periodontal care visits, adequate plaque control, smoking cessation, and adherence to professional recommendations appear to influence long-term outcomes more profoundly than many baseline clinical parameters. Consequently, patient-related factors should be regarded as essential components of prognosis assessment and long-term treatment planning [29,66].

Müller et al. [45] observed that patients requiring prosthodontic reconstructions experienced higher rates of tooth loss than patients without prosthetic treatment. However, tooth loss was also influenced by patient-related factors, including age, diabetes, baseline periodontal destruction, and compliance with supportive periodontal care. More recent long-term evidence further supports these observations.

Fardal et al. demonstrated that, following 30 years of supportive periodontal care, long-term tooth retention is achievable, although smoking, residual periodontal destruction, and inadequate compliance remain major risk factors for tooth loss [69]. Likewise, Eger et al. reported that, after a mean follow-up of approximately 22 years, patients with stage III/IV periodontitis rehabilitated with removable or extensive fixed dental prostheses experienced higher annual tooth-loss rates than controls, whereas implant-supported fixed prostheses were not independently associated with increased tooth loss [70]. These findings highlight that long-term outcomes depend not only on the type of prosthetic rehabilitation but also on successful periodontal therapy, supportive periodontal care, and individual patient risk factors.

Nevertheless, tooth loss was not determined exclusively by the type of prosthetic reconstruction but was also influenced by systemic and behavioral factors, including diabetes and compliance with maintenance care [71]. Fixed dental prostheses were associated with lower abutment tooth loss compared with removable prosthetic designs, suggesting that careful prosthetic planning remains essential for the long-term preservation of strategically important teeth [72,73].

Recent evidence has further emphasized the importance of controlling residual inflammation during maintenance. Isola et al. demonstrated that supportive periodontal care including subgingival instrumentation achieved significantly greater reductions in bleeding on probing compared with supragingival prophylaxis alone [74]. Persistent deep pockets and smoking negatively affected treatment outcomes, highlighting the importance of individualized maintenance strategies targeting residual periodontal inflammation.

Interestingly, the systematic review and meta-analysis conducted by Rattu et al. [75] revealed that only a small proportion of patients achieved the strict periodontal stability endpoints proposed by contemporary classifications. Nevertheless, most patients retained the vast majority of their dentition during 10–13 years of supportive periodontal care, with only 3.14% of teeth being lost overall [75]. Failure to achieve controlled periodontitis or to eliminate residual deep pockets significantly increased the risk of future tooth loss, emphasizing the prognostic value of residual periodontal inflammation while simultaneously demonstrating that complete clinical perfection is not a prerequisite for long-term tooth retention [76–78].

Collectively, these long-term studies support a conservative tooth-preserving philosophy while demonstrating that treatment outcomes are strongly influenced by patient-related risk factors. Compliance with supportive periodontal care consistently emerged as one of the most important determinants of long-term tooth survival. Eger et al. reported lower annual tooth-loss rates in fully adherent patients than in partially adherent individuals after a mean follow-up of 21.7 years, whereas smoking more than 10 cigarettes per day remained an independent predictor of tooth loss.

Similarly, Fardal et al. identified a first-degree family history of periodontitis, initiation of periodontal treatment before the age of 35 years, diabetes, and teeth with an initially hopeless prognosis as important prognostic indicators over the 30-year follow-up [69]. Furthermore, Fardal et al. demonstrated that although most patients remained stable throughout long-term maintenance, a minority experienced substantial tooth loss after 15–20 years, emphasizing that outcomes cannot be extrapolated from shorter observation periods [69].

These findings reinforce that successful periodontal and subsequent prosthodontic rehabilitation depends not only on treatment selection but also on sustained supportive periodontal care and careful control of individual risk factors, as summarized in Table 2.

Table 2. Long-Term Tooth Survival and Prognostic Factors Following Periodontal Therapy and Supportive Periodontal Care: Evidence from Longitudinal Studies and Systematic Reviews.

Study	Follow-Up	Main Findings	Prognostic Factors	Evidence Type
Petsos et al. [29]	10 years	93.4% of teeth retained; periodontal tooth loss represented only 33.6% of all extractions	Furcation involvement, tooth mobility, CAL, PPD (Probing Pocket Depth), severe bone loss	Retrospective cohort study
Müller et al. [45]	9.7 years	Prostodontically rehabilitated patients exhibited greater tooth loss than controls	Prosthetic treatment, age, diabetes, socioeconomic status, aggressive periodontitis, non-compliance	Retrospective study
Graetz et al. [57]	17.4 years	Low tooth loss despite generalized aggressive periodontitis; 84% of surviving teeth showed stable or improved bone levels	Smoking, furcation involvement, mobility, residual PPD, maxillary location	Retrospective longitudinal study
Pretzl et al. [66]	20 years	201/1639 teeth lost; 0.14 teeth/patient/year	Age, smoking, diabetes, cardiovascular disease, poor SPC (Supportive Periodontal Care) compliance	Retrospective cohort study
Agudio et al. [67]	30 years	Only 5.1% of teeth lost during SPC; 39 teeth lost for periodontal reasons	Age, male sex, molars, pocket depth, mobility, bone loss, root canal treatment, crowns	Long-term cohort study
De Backer et al. [68]	17.7 years	79.6% complete survival and 89.2% effective survival of severely compromised mandibular incisors	Compliance, periodontal status, baseline bone loss	Retrospective cohort study
Isola et al. [74]	24 months	SPC including subgingival instrumentation achieved superior inflammatory control	Smoking, residual pockets, deep PPDs	Randomized controlled trial
Rattu et al. [75]	10–13 years (meta-analysis)	Only 3.14% of teeth lost overall despite limited achievement of stability endpoints	Failure to achieve controlled periodontitis; residual periodontal pockets	Systematic review with meta-analyses
Fardal et al. [69]	30 years	Most patients remained stable during the first 15–16 years. Among the 103 patients completing at least 30 years of follow-up, mean periodontal tooth loss was 1.05 teeth in the low-loss group, 4.83 in the moderate-loss group, and 11.90 in the high-loss group	First-degree family history of periodontitis; periodontal treatment initiated before 35 years of age; diabetes; teeth with an initially hopeless prognosis	Retrospective cohort study
Eger et al. [70]	Mean 21.7 ± 2.7 years (range: 10–29 years)	Annual tooth loss was 0.40 ± 0.39 for clasp-retained RPDs, 0.35 ± 0.42 for double-crown RPDs, 0.23 ± 0.33 for FPDs, 0.15 ± 0.22 for iFPDs, and 0.05 ± 0.08 teeth/patient/year for controls. At 10 years, 67% of clasp-retained RPDs, 75% of double-crown RPDs, 93% of FPDs, and 83% of iFPDs remained functional	Age; smoking > 10 cigarettes/day; clasp- and double-crown-retained RPDs; extensive tooth-supported FPDs. iFPDs were not independently associated with increased tooth loss	Retrospective cohort study with prospective observational extension

FPD, tooth-supported fixed partial denture; iFPD, implant-supported fixed partial denture; RPD, removable partial denture. Annual tooth-loss values are expressed as teeth/patient/year.

Although the included studies differ considerably in design, follow-up duration, and patient characteristics, their overall findings are remarkably consistent. Long-term retrospective cohort studies, including those by Pretzl et al. [66], Agudio et al. [67], Graetz et al. [57], Petsos et al. [29], and De Backer et al. [68], consistently demonstrated high long-term survival rates of periodontally compromised teeth when comprehensive periodontal therapy was followed by structured supportive periodontal care.

More recent evidence synthesized in the systematic review and meta-analysis by Rattu et al. [75] further reinforces these observations by showing that overall tooth loss remained low despite variations in periodontal stability criteria among the included studies. While retrospective cohorts provide valuable long-term clinical data under real-world conditions, meta-analyses offer a higher level of evidence by integrating results across multiple populations and clinical settings. Taken together, these complementary sources of evidence strengthen the conclusion that long-term tooth preservation is a predictable therapeutic option when appropriate periodontal treatment and supportive periodontal care are maintained.

The available long-term evidence also permits a cautious comparison of prosthetic treatment options in patients with treated stage III/IV periodontitis. Table 3 summarizes the reported 10-year functionality of different prosthetic designs, the associated tooth-loss rates during follow-up periods exceeding 20 years, and their principal clinical implications. These results should support individualized clinical decision-making and should not be interpreted as a definitive therapeutic hierarchy.

Table 3. Long-term outcomes and clinical considerations for prosthetic rehabilitation in treated stage III/IV periodontitis.

Prosthetic Therapy	Functionality After 10 Years	Outcome During Follow-Up Exceeding 20 Years	Clinical Interpretation
Tooth-supported FPD	93% of FPDs remained functional; functional FPDs were retained by 90% of patients	Tooth loss: 0.23 ± 0.33 teeth/patient/year over 23.8 ± 3.0 years. Cross-arch stabilizing bridges showed a 14.4% failure rate at a mean of 16.1 years in the Fardal study	May be considered when strategically important teeth are periodontally stable, restorable, and adequately distributed as abutments. Favorable hygiene, controlled occlusal loading, and regular SPC are essential
Implant-supported FPD (iFPD)	83% remained functional; functional iFPDs were retained by 76% of patients	Tooth loss: 0.15 ± 0.22 teeth/patient/year over 23.8 ± 2.9 years; iFPD was not independently associated with increased tooth loss	May be considered when the number or distribution of maintainable teeth is insufficient for tooth-supported fixed rehabilitation. Periodontal stabilization and lifelong peri-implant maintenance remain mandatory
Clasp-retained RPD	67% remained functional; functional RPDs were retained by 75% of patients	Tooth loss: 0.40 ± 0.39 teeth/patient/year over 23.2 ± 3.1 years	May be used when fixed or implant-supported treatment is not feasible. It showed the highest tooth-loss rate and lowest 10-year functionality, requiring careful design and intensified SPC
Double-crown-retained RPD	75% remained functional; functional prostheses were retained by 80% of patients	Tooth loss: 0.35 ± 0.42 teeth/patient/year over 24.2 ± 2.6 years	May be considered when removable rehabilitation is required and suitable teeth remain for telescopic retention. It performed more favorably than clasp-retained RPDs at 10 years, although tooth loss remained higher than with fixed alternatives

Despite the remarkable consistency regarding the beneficial role of supportive periodontal care, caution is warranted when interpreting the available evidence. Definitions of treatment success, patient compliance, residual disease activity, and tooth survival vary considerably across studies, limiting direct comparisons and quantitative synthesis. Moreover, most long-term investigations are retrospective observational studies, which remain susceptible to selection bias and uncontrolled confounding factors. Nevertheless, the overall consistency of the reported findings strongly supports supportive periodontal care as one of the principal determinants of long-term tooth preservation.

7. Critical Appraisal of the Available Evidence

Although the available literature consistently supports the importance of integrating periodontal and prosthodontic principles to achieve predictable long-term rehabilitation outcomes, several methodological limitations should be acknowledged. The evidence included in this narrative review is heterogeneous with respect to study design, patient populations, periodontal disease severity, prosthodontic interventions, outcome measures, and follow-up duration, making direct comparisons between studies difficult.

The majority of the available evidence originates from retrospective cohort studies, observational investigations, narrative reviews, and clinical reports, while relatively few randomized controlled trials are available. Consequently, the overall level of evidence varies considerably across the different clinical topics addressed in this review. Long-term observational studies provide valuable information regarding tooth survival and supportive periodontal care; however, they remain susceptible to selection bias, confounding factors, incomplete follow-up, and differences in maintenance protocols.

Furthermore, several systematic reviews included in the present review reported substantial clinical and methodological heterogeneity among the primary studies, limiting the possibility of drawing definitive conclusions. Variations in periodontal case definitions, prosthodontic treatment protocols, maintenance regimens, and outcome assessment methods further contribute to this heterogeneity.

As a narrative review, this manuscript does not include a formal assessment of study quality or risk of bias, nor does it follow a predefined systematic review protocol. Therefore, the conclusions should be interpreted as a comprehensive synthesis of the currently available evidence rather than as quantitative evidence derived from meta-analysis. Nevertheless, the inclusion of systematic reviews, meta-analyses, clinical practice guidelines, consensus reports, and long-term clinical studies provides a broad and clinically relevant overview of the interdisciplinary relationship between periodontology and prosthodontics.

8. Future Perspectives

Clinicians' approaches to periodontally compromised patients' rehabilitation are being transformed by recent developments in prosthodontics, digital dentistry, and periodontology. In order to improve long-term results and, whenever possible, preserve natural dentition, future improvements are anticipated to center on treatment procedures that are more customized, driven by biology, and helped by technology.

Beyond technological advances, future research should also address several important knowledge gaps identified in the current literature. Well-designed prospective clinical studies, standardized outcome measures, and randomized controlled trials comparing different interdisciplinary treatment strategies are still limited. Greater methodological standardization would facilitate more reliable comparisons between studies and strengthen the evidence supporting clinical decision-making in periodontology and prosthodontics.

The use of digital tools in multidisciplinary treatment planning is one of the most encouraging trends. A more thorough assessment of periodontal structures and prosthetic

needs can be achieved through the integration of computer-aided prosthetic processes, digital smile design, intraoral scanning, and cone-beam computed tomography. These technologies may improve diagnostic accuracy, communication among clinicians, and the predictability of treatment outcomes [79,80].

Periodontal and prosthodontic decision-making are two areas where artificial intelligence (AI) shows great promise. Automated evaluation of radiographic bone loss, classification of periodontal disease, and prediction of tooth prognosis have all shown promising outcomes when applied to machine learning algorithms. Potentially useful applications of AI in healthcare include the prediction of treatment outcomes over the long term, the optimization of individual treatment programs, and the identification of high-risk individuals [81,82].

Routine clinical integration of AI will require standardized external validation, transparent algorithms, representative datasets, regulatory approval, and compliance with data-protection requirements. Future multicenter studies should evaluate the cost-effectiveness and long-term clinical impact of AI-assisted technologies in interdisciplinary periodontal and prosthodontic rehabilitation.

Making customized risk assessment models is another crucial step in the right direction. Although clinical and radiological criteria have long been the backbone of prognostic systems, newer methods are beginning to take into account systemic diseases, genetic predisposition, behavioral variables, and patient-reported outcomes. In patients with periodontal disease, these models have the potential to enhance long-term decision-making by offering a more thorough comprehension of treatment risks [83,84].

Future well-designed prospective clinical studies and randomized controlled trials are needed to strengthen the current evidence base. Standardized outcome measures and longer follow-up periods would facilitate more robust comparisons between different periodontal and prosthodontic treatment strategies [85].

Multidisciplinary treatment plans may potentially be impacted by developments in regenerative therapeutics. The potential for periodontal regeneration and preservation of strategically essential teeth could be enhanced by the creation of new biomaterials, growth factors, biologically active matrices, and tissue engineering techniques [86,87]. These developments provide credibility to a less invasive treatment approach that prioritizes preserving the patient's original teeth whenever feasible, which could lead to a decrease in extraction procedures [85,88,89].

9. Conclusions

Current evidence supports the preservation of strategically important teeth whenever periodontal stability can be achieved and maintained through appropriate periodontal therapy and supportive periodontal care. Successful oral rehabilitation requires close interdisciplinary collaboration between periodontists and prosthodontists, with treatment decisions based on comprehensive periodontal assessment, biological principles, prosthetic requirements, and individual patient characteristics rather than on a single therapeutic approach.

Treatment planning should remain patient-centered and individualized, carefully balancing tooth preservation and extraction according to periodontal prognosis, restorative feasibility, systemic conditions, patient compliance, functional requirements, and patient preferences. Regular supportive periodontal care remains one of the most important determinants of long-term periodontal and prosthetic success.

Despite the growing body of evidence, important knowledge gaps remain. Considerable heterogeneity among published studies, as well as differences in study design, follow-up periods, outcome measures, and maintenance protocols, limit direct comparisons and the formulation of universally applicable clinical recommendations. Furthermore, most

available evidence originates from observational studies, whereas high-quality randomized controlled trials remain relatively limited.

From a clinical perspective, preventing further tooth loss through effective periodontal therapy and sustained compliance with supportive periodontal care should remain the principal therapeutic objective. Because any prosthodontic or implant-supported intervention introduces additional biological and technical risks, the extent of rehabilitation should be limited to that required to achieve acceptable function, comfort, and aesthetics. In appropriately informed patients with stage IV periodontitis and sufficient occluding and masticatory units, a shortened dental arch may represent a successful conservative alternative to extensive prosthodontic or implant-supported rehabilitation. Treatment planning must therefore remain patient-centered and individualized, balancing periodontal prognosis, restorative feasibility, systemic conditions, patient compliance, functional requirements, and patient preferences.

The long-term evidence suggests that tooth-supported FPDs may provide favorable functional longevity when suitable and periodontally stable abutments are available. Among patients requiring major prosthetic rehabilitation, iFPDs were associated with the lowest annual tooth-loss rate, whereas removable designs showed higher rates, particularly clasp-retained RPDs [69,70]. Nevertheless, these findings originate from observational cohorts and should not be interpreted as supporting a universal therapeutic hierarchy; prosthetic selection must remain individualized according to periodontal stability, abutment prognosis, anatomical conditions, patient preferences, and adherence to lifelong supportive care.

Future research should focus on well-designed prospective multicenter clinical studies, standardized outcome measures, long-term evaluation of interdisciplinary treatment protocols, and the integration of validated digital technologies and artificial intelligence into clinical decision-making. Addressing these challenges will strengthen the evidence base and contribute to more predictable, evidence-based, and patient-centered periodontal–prosthodontic rehabilitation.

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Abbreviations

The following abbreviations are used in this manuscript:

AI	Artificial Intelligence
CBCT	Cone-Beam Computed Tomography
RPD	Removable Partial Denture
SPC	Supportive Periodontal Care
PPD	Probing Pocket Depth
CAL	Clinical Attachment Level

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