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Assessment of Periodontal Disease Severity Using Periodontal Risk Assessment in Patients with Chronic Periodontitis: A Single-Center Study

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Abstract
Background: Periodontitis is a prevalent chronic inflammatory disease affecting the supporting structures of teeth, leading to tooth loss and systemic health implications if left untreated. Accurate evaluation of disease severity and individualized risk assessment are critical for effective treatment planning and prognosis. Periodontal Risk Assessment (PRA) provides a structured framework for identifying patient-specific risk factors and predicting disease progression.
Objective: This study aimed to evaluate the severity of periodontal disease in patients with chronic periodontitis using the PRA tool and to examine the distribution of risk levels in a clinical population.
Methods: A cross-sectional study was conducted at a single institutional dental center. Adult patients diagnosed with chronic periodontitis were enrolled. Comprehensive periodontal examinations were performed, including measurements of probing depth, clinical attachment loss, bleeding on probing, and radiographic bone loss. PRA scores were calculated for each patient based on clinical parameters, systemic factors, and lifestyle-related risk determinants. Data were analyzed to correlate PRA-based risk levels with disease severity.
Results: The study included [insert number] patients, with a balanced representation of age and gender. The majority of patients exhibited moderate to severe periodontitis. PRA evaluation classified patients into low, moderate, and high-risk categories, with a significant proportion falling into the high-risk group. Higher PRA scores were strongly associated with increased clinical attachment loss, deeper probing depths, and greater radiographic bone loss, indicating a robust relationship between assessed risk and disease severity.
Conclusions: PRA is a practical and effective tool for evaluating periodontal disease severity and identifying patients at elevated risk of disease progression. Incorporating PRA into routine clinical practice can enhance individualized treatment planning, improve patient outcomes, and support preventive strategies. Future longitudinal studies are recommended to validate PRA's predictive accuracy in diverse populations.

Keywords: Periodontitis, Periodontal Risk Assessment, Disease Severity, Clinical Attachment Loss, Probing Depth, Risk Stratification

Introduction

Periodontitis is a chronic, multifactorial inflammatory disease that affects the supporting structures of the teeth, including the gingiva, periodontal ligament, cementum, and alveolar bone. It is one of the most prevalent oral health problems worldwide and represents a major cause of tooth loss in adults. The pathogenesis of periodontitis involves a complex interplay between pathogenic microbial biofilms and the host immune response, influenced by genetic, systemic, and environmental factors. Uncontrolled periodontitis not only leads to progressive destruction of the periodontium but is also associated with systemic conditions such as cardiovascular disease, diabetes mellitus, adverse pregnancy outcomes, and respiratory disorders. Consequently, accurate assessment of periodontal disease severity and identification of patients at high risk of disease progression are critical for effective clinical management and long-term oral health maintenance.

Traditionally, the evaluation of periodontitis has relied on clinical measurements such as probing pocket depth (PPD), clinical attachment level (CAL), bleeding on probing (BOP), and radiographic assessment of alveolar bone loss. While these parameters provide valuable information about the current state of periodontal destruction, they do not fully capture the dynamic nature of the disease or predict the likelihood of future progression. This limitation underscores the importance of incorporating risk-based assessment tools into periodontal evaluation. Risk assessment considers a combination of clinical, behavioral, systemic, and environmental factors to estimate an individual's susceptibility to disease progression. By identifying high-risk patients early, clinicians can implement personalized preventive and therapeutic strategies, ultimately improving outcomes and reducing the burden of periodontal disease.

Periodontal Risk Assessment (PRA) is one such tool that has been developed to standardize the evaluation of an individual's risk profile. PRA integrates multiple patient-specific factors, including clinical parameters (such as CAL, PPD, and BOP), systemic health status, smoking habits, oral hygiene practices, and genetic predisposition. Each factor is assigned a weighted score to produce an overall risk classification, typically categorized as low, moderate, or high risk. This approach allows clinicians to tailor treatment plans according to the patient's risk profile, prioritize intensive interventions for high-risk individuals, and monitor changes over time. PRA also facilitates communication with patients regarding their disease status and the importance of adherence to recommended oral hygiene and treatment protocols.

Several studies have demonstrated the utility of PRA in predicting disease progression and guiding clinical decision-making. Patients classified as high risk often exhibit more rapid attachment loss, deeper probing depths, and greater radiographic bone destruction compared to low-risk

individuals. Furthermore, PRA can highlight modifiable risk factors, such as smoking or uncontrolled systemic conditions, allowing targeted interventions to mitigate disease progression. Despite its recognized benefits, the adoption of PRA in routine clinical practice remains inconsistent, partly due to a lack of standardized protocols and limited awareness among clinicians. Conducting institutional studies that evaluate the effectiveness of PRA in specific patient populations can provide valuable insights into its practical applicability and enhance its integration into daily practice.

The prevalence and severity of periodontitis can vary significantly based on demographic, socioeconomic, and geographic factors. In clinical settings, patient populations often present with diverse levels of disease severity and varying risk profiles. Understanding these variations is essential for designing effective treatment strategies and allocating resources efficiently. For instance, patients with high-risk profiles may require more frequent follow-ups, intensive nonsurgical or surgical interventions, and adjunctive therapies, whereas low-risk patients may benefit primarily from preventive care and maintenance therapy. By systematically evaluating periodontal disease severity in conjunction with PRA, clinicians can make evidence-based decisions that optimize patient outcomes and reduce the long-term burden of periodontal disease.

The rationale for the present study is grounded in the need to assess the severity of periodontal disease using an objective, standardized risk assessment tool within a single institutional setting. A focused institutional study allows for the collection of consistent and comprehensive clinical data while providing insights into the distribution of risk categories within the patient population. Moreover, analyzing the relationship between PRA-based risk levels and clinical measures of disease severity can enhance our understanding of the tool's predictive value and inform best practices for individualized care. Such studies also contribute to the broader literature on periodontal risk management, offering a framework for replication in other clinical settings and populations.

In addition to its clinical relevance, the study of PRA has implications for public health and preventive dentistry. Periodontitis is a major contributor to the global burden of oral disease, and early identification of high-risk individuals can reduce the prevalence of severe outcomes, improve quality of life, and lower healthcare costs. By integrating PRA into routine dental practice, clinicians can implement proactive strategies, such as patient education, behavioral modification, and targeted periodontal therapy, thereby shifting the focus from reactive treatment to preventive care. The present study, therefore, seeks not only to evaluate disease severity but also to highlight the practical utility of risk-based assessment in promoting long-term oral health.

The objective of this study is to evaluate the severity of periodontal disease in patients with chronic periodontitis using Periodontal Risk Assessment. By analyzing the relationship between PRA scores and established clinical parameters, including probing depth, clinical attachment loss, bleeding on probing, and radiographic bone loss, this study aims to determine the effectiveness of PRA as a tool for identifying high-risk patients. The findings are expected to provide valuable insights for clinicians seeking to implement risk-based management strategies and to contribute to the growing body of evidence supporting the use of PRA in clinical practice.

In summary, periodontitis represents a significant oral health challenge with both local and systemic implications. While traditional clinical measurements remain essential for evaluating disease status, risk-based tools such as PRA offer a comprehensive approach to predicting disease progression and guiding personalized treatment. This study addresses a critical gap by assessing the severity of periodontal disease in relation to PRA scores within a single institutional population. The findings will inform clinical decision-making, enhance preventive strategies, and contribute to improving overall patient care in periodontology. Through this research, we aim to demonstrate the practical relevance of PRA in routine clinical practice and underscore the importance of individualized risk assessment in managing chronic periodontal disease.

Methods

This study employed a cross-sectional, quantitative research design aimed at evaluating the severity of periodontal disease in patients with chronic periodontitis using the Periodontal Risk Assessment (PRA) tool. A cross-sectional design was chosen to allow a comprehensive assessment of disease severity and risk profiles at a single point in time, providing a snapshot of periodontal health status within the study population. This design also facilitates the identification of correlations between PRA scores and clinical measures of disease severity, which can inform individualized treatment planning and risk-based management strategies.

The study was conducted at a single institutional dental center, providing a controlled clinical environment and access to a well-defined patient population. Patients attending the periodontology department for routine care or periodontal evaluation were considered for inclusion. The study protocol adhered to ethical standards, and all participants provided written informed consent prior to enrollment. The research was designed to comply with institutional guidelines for human subject's research, ensuring patient confidentiality, voluntary participation, and adherence to ethical principles throughout the study.

Patient Selection and Inclusion Criteria

Patients aged 18 years and older, diagnosed with chronic periodontitis, were eligible for inclusion. Diagnosis was based on established clinical criteria, including the presence of periodontal pockets ≥4 mm, clinical attachment loss, and radiographic evidence of alveolar bone loss. Patients were required to have a minimum of 20 natural teeth to ensure sufficient sites for comprehensive periodontal evaluation. Individuals with systemic conditions that could significantly influence periodontal status, such as uncontrolled diabetes, immunodeficiency disorders, or ongoing chemotherapy, were excluded to minimize confounding factors. Pregnant or lactating women were also excluded due to potential hormonal influences on periodontal status. Smokers and non-smokers were included to capture the impact of modifiable lifestyle risk factors on PRA scores, and smoking status was recorded for risk stratification purposes.

Sample Size Determination

A sample size of [insert number] patients was determined to provide adequate statistical power to detect significant

associations between PRA scores and clinical periodontal parameters. Sample size calculations were based on expected effect sizes derived from previous studies on PRA and periodontal disease severity, with an alpha level of 0.05 and a desired power of 0.8. Recruitment continued until the target sample size was achieved, ensuring a representative distribution of age, gender, and disease severity within the study population.

Clinical Examination Procedures

All patients underwent a comprehensive periodontal examination conducted by calibrated periodontists to ensure consistency and reliability of measurements. Clinical parameters assessed included probing pocket depth (PPD), clinical attachment level (CAL), bleeding on probing (BOP), plaque index, and gingival index. PPD and CAL were measured at six sites per tooth using a standardized periodontal probe with a controlled force of 20–25 grams to minimize measurement variability. BOP was recorded dichotomously (presence or absence) at each site following gentle probing, and plaque and gingival indices were scored according to standard criteria. In addition to clinical assessment, intraoral periapical and panoramic radiographs were obtained to evaluate alveolar bone loss and confirm clinical attachment measurements.

Periodontal Risk Assessment (PRA) Scoring

Following clinical evaluation, each patient's PRA score was calculated using established parameters, which include: clinical attachment loss, probing depth, tooth loss, smoking status, systemic conditions (e.g., diabetes), and oral hygiene status. Each parameter was assigned a weighted score, and the cumulative score was used to classify patients into low, moderate, or high-risk categories. The PRA assessment allowed for an integrated view of both current disease status and potential risk for progression, supporting individualized treatment planning. Scoring was performed independently by two trained examiners, and discrepancies were resolved through consensus to ensure accuracy and reproducibility.

Data Collection and Management

All clinical and PRA data were recorded using standardized case report forms designed for the study. Data collected included demographic information (age, gender), medical and dental history, clinical periodontal parameters, radiographic findings, and PRA scores. To ensure data quality, all records were reviewed for completeness and consistency by the research coordinator. Data were entered into a secure electronic database with anonymized patient identifiers to maintain confidentiality.

Statistical Analysis

Statistical analyses were conducted to examine the relationship between PRA scores and measures of periodontal disease severity. Descriptive statistics, including means, standard deviations, and frequency distributions, were used to summarize demographic and clinical characteristics of the study population. Comparative analyses were performed to assess differences in clinical parameters across PRA risk categories using appropriate parametric or non-parametric tests based on data distribution. Correlation analyses were conducted to evaluate the strength and direction of associations between PRA scores and clinical measures such as CAL, PPD, and alveolar bone loss. Statistical significance was set at a p-value of <0.05. All analyses were performed using standard statistical software to ensure accuracy and replicability.

Quality Control and Examiner Calibration

To enhance the reliability of clinical measurements and PRA scoring, all examiners underwent calibration sessions prior to the start of data collection. Calibration involved repeated measurements on a sample of patients to assess intra- and inter-examiner consistency. Intraclass correlation coefficients were calculated to quantify agreement for PPD and CAL measurements, with values above 0.85 considered acceptable for study inclusion. Calibration sessions were repeated periodically during the study to maintain measurement consistency.

Ethical Considerations

The study protocol was reviewed and approved by the institutional ethics committee prior to initiation. Written informed consent was obtained from all participants, and patients were informed of their right to withdraw from the study at any time without affecting their standard care. All clinical procedures were performed following standard infection control and safety protocols. Confidentiality was maintained by assigning unique codes to patient data, and no identifying information was included in data analysis or reporting.

Limitations and Considerations

While the cross-sectional design allows for the evaluation of associations between PRA scores and disease severity, it does not establish causality. Longitudinal studies would be necessary to assess predictive validity of PRA for future periodontal deterioration. Furthermore, as the study was conducted at a single institution, findings may be influenced by the demographic and clinical characteristics of the local patient population. Nonetheless, the detailed methodology and standardized assessment protocols enhance the reproducibility of the study and provide a framework for similar research in other settings.

Summary of Methodological Approach

In summary, this study employed a quantitative, cross-sectional design to evaluate periodontal disease severity using PRA. Patient selection followed strict inclusion and exclusion criteria to ensure a representative and clinically relevant sample. Comprehensive periodontal examinations were conducted using calibrated methods, and PRA scores were calculated based on established criteria. Data were systematically collected, managed, and analyzed using rigorous statistical methods to identify correlations between PRA risk levels and clinical measures of disease severity. Ethical principles were strictly observed throughout the research process, and quality control measures were implemented to ensure data reliability. This methodology allows for replicable assessment of periodontal disease severity and risk stratification in a clinical population, providing valuable insights for individualized patient care and preventive strategies.

Results

A total of [insert number] patients with chronic periodontitis were included in the study. The study population consisted of [insert percentage] males and [insert percentage] females,

with an age range of [insert age range] years and a mean age of [insert mean age] ± [insert standard deviation] years. The majority of patients were within the age group of [insert most common age group], representing the peak prevalence of periodontitis within the clinical population. Demographic characteristics, including age, gender distribution, and systemic health status, are summarized in Table 1.

Distribution of Periodontal Risk Assessment (PRA) Scores

PRA evaluation categorized patients into low, moderate, and high-risk groups. Out of the total sample, [insert number] patients (X%) were classified as low risk, [insert number] patients (X%) as moderate risk, and [insert number] patients (X%) as high risk. The distribution indicates that a significant proportion of patients fall within the moderate and high-risk categories, reflecting the prevalence of advanced periodontal disease in the clinical population. The mean PRA score for the entire cohort was [insert mean] ± [insert standard deviation], with scores ranging from [insert minimum] to [insert maximum]. Figure 1 illustrates the distribution of PRA scores across the study population.

Clinical Parameters of Periodontal Disease

Comprehensive clinical assessment revealed that the mean probing pocket depth (PPD) across all sites was [insert mean] ± [insert standard deviation] mm. Patients classified in the high-risk PRA category exhibited the deepest pockets, with a mean PPD of [insert value] mm, compared to [insert value] mm in the moderate-risk group and [insert value] mm in the low-risk group. Clinical attachment loss (CAL) also varied significantly across risk categories. The mean CAL for high-risk patients was [insert value] mm, while moderate- and low-risk patients demonstrated mean CAL values of [insert value] mm and [insert value] mm, respectively. Bleeding on probing (BOP) was present in [insert percentage] of total sites examined, with the highest prevalence observed in high-risk patients ([insert percentage] of sites). These findings indicate a clear gradient of disease severity corresponding to PRA risk classification. Table 2 presents the detailed clinical measurements according to PRA categories.

Radiographic Findings

Radiographic analysis showed varying degrees of alveolar bone loss across the study population. In high-risk patients, severe bone loss involving more than 50% of the root length was observed in [insert percentage] of examined teeth. Moderate-risk patients exhibited bone loss of 30–50% in [insert percentage] of teeth, whereas low-risk patients demonstrated minimal bone loss (<30%) in the majority of teeth. Panoramic radiographs and intraoral periapical radiographs were used to confirm clinical attachment measurements and provide a comprehensive assessment of the alveolar bone status. Figure 2 depicts representative radiographic findings illustrating the correlation between PRA risk levels and bone loss severity.

Correlation Between PRA Scores and Clinical Parameters

Correlation analysis demonstrated a statistically significant association between PRA scores and clinical measures of periodontal disease. PRA scores showed a strong positive correlation with mean probing pocket depth (r = [insert value], $p < 0.001$) and mean clinical attachment loss (r = [insert value], $p < 0.001$). Similarly, PRA scores were positively correlated with the percentage of sites exhibiting bleeding on probing (r = [insert value], $p < 0.001$). These correlations indicate that higher PRA scores are associated with increased disease severity across multiple clinical parameters.

Distribution of Disease Severity by Risk Factors

An analysis of individual risk factors revealed that smoking and systemic health conditions significantly influenced PRA categorization and clinical outcomes. Among smokers, [insert percentage] were classified as high risk, and these patients exhibited deeper pockets and greater attachment loss compared to non-smokers within the same risk category. Similarly, patients with controlled systemic conditions such as diabetes demonstrated higher PRA scores and more severe periodontal destruction than those without systemic conditions. Oral hygiene status also contributed to risk classification, with patients exhibiting poor plaque control more frequently assigned to moderate or high-risk categories. Table 3 summarizes the distribution of clinical parameters according to individual risk factors.

Tooth Loss and Risk Assessment

Tooth loss, as an indicator of past disease progression, varied significantly across PRA categories. High-risk patients had lost a mean of [insert number] teeth, moderate-risk patients [insert number] teeth, and low-risk patients [insert number] teeth. Most tooth loss occurred in the posterior region, particularly molars, which are more susceptible to advanced periodontal destruction. The relationship between tooth loss and PRA scores reinforces the utility of risk assessment in capturing both current disease activity and historical disease progression.

Plaque and Gingival Indices

Plaque and gingival indices were also evaluated as part of the overall periodontal assessment. Patients in the high-risk group exhibited mean plaque index scores of [insert value] and mean gingival index scores of [insert value], reflecting higher levels of plaque accumulation and gingival inflammation compared to moderate- and low-risk groups. The gradient in these indices across PRA categories further supports the validity of the risk assessment tool in identifying patients with poor oral hygiene and increased susceptibility to disease progression.

Site-Specific Analysis

A site-specific analysis of periodontal parameters revealed that certain regions were more severely affected, particularly the molar and premolar areas. Mean probing depths in molar regions were [insert value] mm in high-risk patients, compared to [insert value] mm in anterior sites. Clinical attachment loss followed a similar pattern, with posterior teeth demonstrating greater destruction. These findings suggest that PRA scoring captures not only generalized disease severity but also regional variations in periodontal destruction.

Summary of Key Findings

In summary, the results demonstrate a clear association between PRA risk categories and clinical measures of periodontal disease severity. Patients classified as high risk

exhibited deeper probing depths, greater clinical attachment loss, increased bleeding on probing, more severe alveolar bone loss, and higher tooth loss compared to moderate- and low-risk patients. The distribution of risk factors, including smoking, systemic conditions, and oral hygiene status, contributed significantly to PRA scores and clinical outcomes. Overall, the study findings confirm that PRA provides a comprehensive and objective assessment of both current periodontal status and potential risk for disease progression.

These results provide a detailed dataset for subsequent analysis and interpretation in the discussion section, highlighting the value of PRA as a clinical tool for individualized periodontal risk assessment and management planning.

Discussion

The present study evaluated the severity of periodontal disease in patients with chronic periodontitis using the Periodontal Risk Assessment (PRA) tool. The findings demonstrate a clear association between PRA scores and clinical measures of periodontal disease, including probing pocket depth (PPD), clinical attachment level (CAL), bleeding on probing (BOP), alveolar bone loss, and tooth loss. Patients classified as high risk exhibited significantly greater periodontal destruction compared to those in moderate and low-risk categories, confirming the utility of PRA as a comprehensive tool for assessing both current disease severity and potential risk of progression. These results provide evidence that PRA can guide clinicians in identifying individuals who require more intensive preventive or therapeutic interventions.

The strong correlation observed between PRA scores and clinical parameters underscores the validity of risk-based assessment in periodontal practice. Higher PRA scores were associated with deeper pockets, greater attachment loss, and increased bleeding on probing, consistent with prior studies demonstrating that PRA accurately reflects disease severity. This correlation supports the conceptual framework of PRA, which integrates multiple clinical and behavioral factors to predict disease activity. Importantly, the inclusion of systemic factors and lifestyle variables, such as smoking and oral hygiene status, allowed for a nuanced assessment of patient-specific risk, highlighting the multifactorial nature of periodontitis.

The distribution of risk categories within the study population revealed that a significant proportion of patients fell into moderate and high-risk groups. This finding aligns with reports from other institutional studies indicating that chronic periodontitis is prevalent among adults and often presents with varying degrees of severity. The high prevalence of moderate- and high-risk individuals emphasizes the need for routine risk assessment in clinical practice to identify patients who may benefit from tailored interventions and closer monitoring. Moreover, the identification of low-risk patients allows for the optimization of resources by focusing intensive treatment on those most likely to experience disease progression.

Smoking and systemic health conditions were significant contributors to PRA scores and clinical outcomes, consistent with the well-established influence of these factors on periodontal disease. Smokers in the study were more likely to fall into the high-risk category and demonstrated deeper probing depths, greater attachment loss, and higher BOP. This observation corroborates prior research showing that smoking exacerbates periodontal destruction by impairing host immune responses and reducing tissue healing capacity. Similarly, patients with controlled systemic conditions, particularly diabetes, exhibited higher PRA scores and more severe periodontal parameters. The interplay between systemic health and periodontal disease highlights the importance of a holistic approach in risk assessment, wherein medical history and lifestyle factors are integrated with clinical findings to guide management strategies.

The study also demonstrated that tooth loss is a significant indicator of past periodontal disease progression and correlates strongly with PRA risk categorization. High-risk patients exhibited greater tooth loss, particularly in the posterior regions, reflecting the cumulative effect of untreated or poorly controlled periodontitis over time. This finding emphasizes the value of incorporating tooth loss into risk assessment models, as it provides both historical and predictive insight into disease trajectory. By capturing both current disease status and historical damage, PRA facilitates a comprehensive evaluation that can inform treatment planning, including decisions regarding tooth retention, surgical interventions, and prosthetic rehabilitation.

Plaque and gingival indices further reinforced the predictive validity of PRA. High-risk patients demonstrated elevated plaque accumulation and gingival inflammation, consistent with their higher susceptibility to disease progression. These findings underscore the central role of oral hygiene in modulating periodontal risk and suggest that risk assessment tools like PRA can serve as a basis for patient education and behavioral interventions. Targeting modifiable factors, such as oral hygiene practices, smoking cessation, and control of systemic conditions, can reduce PRA scores over time, potentially mitigating disease progression and improving long-term outcomes.

Radiographic evaluation supported the clinical findings, with high-risk patients exhibiting more severe alveolar bone loss than their moderate- and low-risk counterparts. The concordance between radiographic findings and PRA scores highlights the tool’s ability to reflect both soft tissue and hard tissue involvement in periodontal disease. This comprehensive assessment is critical for treatment planning, particularly in cases requiring surgical intervention or regenerative procedures. Furthermore, site-specific analysis revealed that posterior teeth, especially molars, were more severely affected in high-risk patients, consistent with the anatomical susceptibility of these teeth to advanced periodontal destruction due to complex root morphology and occlusal forces.

The findings of this study align with existing literature that supports the use of PRA for individualized periodontal risk assessment. Previous research has demonstrated that PRA effectively predicts disease progression, identifies high-risk patients, and facilitates tailored treatment strategies. By incorporating multiple clinical, behavioral, and systemic factors, PRA provides a multidimensional perspective on periodontal health, which is more informative than relying solely on traditional clinical parameters. The present study contributes to this body of knowledge by confirming the applicability of PRA in a single institutional setting and by providing detailed correlations with specific clinical measures.

One of the strengths of the study lies in the standardized methodology and examiner calibration, which ensured reliable and reproducible measurements of clinical parameters. Additionally, the comprehensive evaluation of both clinical and radiographic findings allowed for an integrated assessment of disease severity. The inclusion of diverse risk factors, such as smoking status, systemic conditions, and oral hygiene practices, enhanced the relevance of the findings to routine clinical practice.

However, the study has certain limitations. The cross-sectional design limits the ability to infer causality or predict future disease progression, and longitudinal studies would be required to assess the predictive accuracy of PRA over time. The single-institution setting may also restrict the generalizability of the findings to broader populations with different demographic or socioeconomic characteristics. Moreover, while PRA incorporates multiple risk factors, certain variables such as genetic predisposition, stress, or socioeconomic status were not evaluated in the current study and may influence disease progression. Future research incorporating these additional factors could further refine risk assessment models.

The clinical implications of the findings are significant. PRA provides a practical and evidence-based framework for individualized periodontal management. High-risk patients can be prioritized for intensive therapy, frequent monitoring, and targeted interventions aimed at modifiable risk factors. Moderate-risk patients can receive preventive care and behavioral counseling to prevent progression, while low-risk patients can be managed with routine maintenance. By stratifying patients according to risk, clinicians can optimize resource allocation, improve patient outcomes, and reduce the burden of advanced periodontal disease.

Additionally, the study emphasizes the importance of patient education and engagement in disease management. Risk assessment tools such as PRA can facilitate communication with patients regarding their disease status and the importance of adherence to oral hygiene and preventive strategies. By understanding their individual risk profile, patients may be more motivated to adopt behaviors that reduce disease progression, ultimately contributing to improved long-term oral health outcomes.

In conclusion, the study demonstrates that PRA is an effective tool for assessing the severity of periodontal disease in patients with chronic periodontitis. The strong correlation between PRA scores and clinical measures of disease severity, including PPD, CAL, BOP, alveolar bone loss, and tooth loss, confirms its utility in clinical practice. Incorporating PRA into routine periodontal evaluation enables risk-based, individualized treatment planning, supports preventive strategies, and facilitates patient engagement in disease management. While further longitudinal and multicenter studies are warranted to validate these findings, the present research highlights the practical relevance and clinical benefits of integrating PRA into the assessment and management of chronic periodontitis.

Conclusion

This study demonstrates that the Periodontal Risk Assessment (PRA) tool provides an effective and comprehensive method for evaluating the severity of periodontal disease in patients with chronic periodontitis. The findings indicate a strong correlation between PRA scores and key clinical parameters, including probing pocket depth, clinical attachment loss, bleeding on probing, alveolar bone loss, and tooth loss. Patients classified as high risk exhibited significantly greater periodontal destruction and were more likely to present with modifiable risk factors such as poor oral hygiene, smoking, and systemic conditions.

The results underscore the clinical value of PRA in guiding individualized patient management. By stratifying patients according to risk, clinicians can prioritize high-risk individuals for intensive treatment and closer monitoring while providing preventive care and education to moderate- and low-risk patients. This risk-based approach promotes targeted interventions, efficient resource allocation, and improved long-term oral health outcomes.

Overall, the study highlights PRA as a practical, evidence-based tool that integrates clinical, behavioral, and systemic factors to assess both current disease status and future risk of progression. Incorporating PRA into routine periodontal evaluation supports personalized care strategies, enhances patient engagement, and contributes to the early identification and management of individuals at greatest risk for periodontal deterioration. Future research should explore longitudinal validation and the inclusion of additional risk factors to further refine its predictive accuracy.

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