



PERIODONTAL DISEASES

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Article history:	Abstract:
Received: 26 th April 2026 Accepted: 24 th May 2026	Periodontal diseases represent one of the most common groups of oral diseases and remain an important public health problem because of their high prevalence, chronic course, and potential impact on both oral and general health. These disorders affect the supporting structures of the teeth, including the gingiva, periodontal ligament, cementum, and alveolar bone. The development and progression of periodontal disease are associated with a complex interaction between microbial dental biofilm and the host immune-inflammatory response. Local factors such as inadequate oral hygiene, dental calculus, malocclusion, smoking, and poorly fitting dental restorations may contribute to disease progression, while systemic conditions, genetic susceptibility, hormonal changes, stress, and metabolic disorders can modify the severity of periodontal inflammation..
Keywords: periodontal diseases, gingivitis, periodontitis, dental biofilm, periodontal pocket, oral hygiene, inflammation, periodontal therapy, prevention, tooth loss.	

Periodontal diseases comprise a broad spectrum of inflammatory and destructive conditions affecting the tissues that surround and support the teeth. They are clinically important because periodontal tissues perform essential functions in maintaining tooth stability, protecting deeper oral structures, and preserving normal masticatory function. Among periodontal disorders, gingivitis and periodontitis are particularly significant. Gingivitis is primarily characterized by inflammation of the gingival tissues and is generally reversible when the causative factors are adequately controlled. Periodontitis, in contrast, involves progressive destruction of the periodontal attachment apparatus and alveolar bone and may ultimately result in tooth mobility and tooth loss. The transition from superficial gingival inflammation to destructive periodontal disease is not determined solely by the presence of microorganisms. Rather, it reflects a multifactorial process involving microbial communities, host immune responses, environmental influences, behavioral factors, and systemic conditions. Consequently, understanding the mechanisms underlying periodontal disease is essential for developing effective preventive and therapeutic strategies. The clinical significance of periodontal diseases extends beyond local oral manifestations. Persistent periodontal inflammation can affect nutrition, speech, comfort, aesthetics, and social well-being. In addition, periodontal health has been increasingly studied in relation to systemic conditions, particularly metabolic and cardiovascular disorders. Although the nature and strength of these associations may vary among individuals, the presence of chronic oral

inflammation emphasizes the importance of maintaining periodontal health as an integral component of overall healthcare. From a dental perspective, periodontal disease should therefore be considered not simply as an isolated oral problem but as a chronic condition requiring long-term monitoring and patient participation. principal initiating factor in most plaque-associated periodontal diseases is the accumulation of microbial dental biofilm on tooth surfaces and along the gingival margin. When oral hygiene is insufficient, microorganisms organize into a structured biofilm that becomes increasingly difficult to remove through ordinary brushing alone. The interaction between the biofilm and gingival tissues stimulates an inflammatory response. Initially, this response may remain localized and clinically manifest as gingivitis. However, when microbial deposits persist and the inflammatory reaction becomes prolonged or dysregulated, tissue destruction may develop in susceptible individuals. Dental calculus is another important local factor because its rough surface facilitates the retention of microbial deposits and makes effective plaque removal more difficult. Anatomical irregularities, crowded teeth, defective restorations, and certain prosthetic constructions may also create plaque-retentive areas. In addition, traumatic occlusal forces may aggravate periodontal tissue damage in particular clinical circumstances, although they should not be regarded as the primary cause of plaque-induced periodontal inflammation. The host response plays a central role in determining disease severity. Inflammation is a protective biological mechanism intended to control microbial challenges; however, persistent inflammatory



activity may also damage the tissues responsible for tooth support. Various inflammatory mediators, immune cells, and enzymes participate in the degradation of connective tissue and the resorption of alveolar bone. Therefore, periodontal destruction is largely the result of an interaction between the microbial challenge and the individual's inflammatory response rather than a direct consequence of bacterial invasion alone. Systemic and behavioral factors can substantially modify this process. Smoking is one of the most important modifiable risk factors because it can alter vascular responses, immune function, tissue healing, and the microbial environment. Diabetes mellitus, particularly when poorly controlled, may increase susceptibility to periodontal inflammation and impair tissue repair. Hormonal changes, nutritional deficiencies, psychosocial stress, genetic predisposition, and certain medications may also influence periodontal status. These factors demonstrate why successful periodontal management requires consideration of the patient's general health and lifestyle rather than focusing exclusively on local oral findings.

Clinical Manifestations. The clinical presentation of periodontal diseases varies according to the type and stage of the disorder. Gingival inflammation commonly presents with redness, swelling, changes in gingival contour, and bleeding during tooth brushing or periodontal examination. Some patients may experience unpleasant breath or a metallic taste, while others may have relatively few symptoms despite clinically significant inflammation. The absence of severe pain should not be interpreted as evidence of periodontal health, since chronic periodontal diseases can progress with minimal subjective discomfort. As periodontitis advances, pathological periodontal pockets may develop as a consequence of apical migration of the junctional epithelium and destruction of periodontal attachment. Clinical examination may reveal increased probing depths, bleeding on probing, gingival recession, clinical attachment loss, and, in more advanced cases, tooth mobility. Radiographic examination may demonstrate varying degrees of alveolar bone loss. Changes in tooth position, spacing, impaired mastication, and increased sensitivity may also occur. In severe disease, progressive destruction of periodontal support can result in tooth loss. An important clinical challenge is the detection of periodontal disease during its early stages. Patients frequently seek dental care because of pain or aesthetic concerns rather than because of gingival bleeding or mild inflammation. Consequently, routine periodontal screening is essential even when the patient does not report significant symptoms. A systematic clinical

examination, periodontal probing, assessment of plaque and calculus, evaluation of gingival tissues, and appropriate radiographic investigation allow the clinician to establish a more accurate diagnosis and determine disease severity.

Diagnosis. Accurate diagnosis is the foundation of effective periodontal treatment. The diagnostic process should include a detailed medical and dental history together with a comprehensive periodontal examination. The clinician should assess gingival condition, plaque accumulation, calculus, bleeding on probing, periodontal pocket depth, clinical attachment level, gingival recession, tooth mobility, furcation involvement where appropriate, and occlusal relationships.

Radiographic assessment provides valuable information regarding the condition of the alveolar bone and helps identify patterns and severity of bone loss that cannot be determined by visual examination alone. However, radiographs should complement rather than replace clinical periodontal assessment. Additional investigations may be indicated when systemic diseases or unusual periodontal manifestations are suspected.

Risk assessment is also essential. Information regarding smoking, diabetes, medications, oral hygiene practices, dietary habits, previous periodontal treatment, and family history can assist in identifying factors that may influence disease progression or treatment response. A patient-centered diagnostic approach allows treatment to be tailored to individual needs and improves the possibility of achieving stable long-term periodontal health.

Prevention. Prevention is the most effective strategy for reducing the burden of periodontal disease. The foundation of periodontal prevention is regular and technically correct oral hygiene. Tooth brushing should be performed systematically to remove biofilm from all accessible tooth surfaces, while interdental cleaning is necessary because ordinary toothbrushes cannot adequately clean many proximal areas. Depending on the patient's anatomy and manual abilities, dental floss, interdental brushes, or other appropriate cleaning devices may be recommended. Professional dental examinations are equally important. Even patients who maintain good oral hygiene may develop calculus or have areas that are difficult to clean effectively. Professional removal of plaque and calculus, combined with individualized oral hygiene instruction, can reduce the microbial burden and support periodontal health. Preventive visits should also provide an opportunity to identify early signs of gingival inflammation or periodontal attachment loss. Modification of risk factors is another essential component of prevention. Smoking cessation should be strongly encouraged, and patients



with diabetes should be supported in maintaining adequate metabolic control in cooperation with their medical providers. A balanced diet, appropriate management of stress, and regular dental care can further contribute to oral health. Importantly, prevention should not be limited to providing general instructions; dental professionals should demonstrate appropriate techniques, assess patient adherence, and adapt recommendations to individual circumstances.

Modern Principles of Treatment. The treatment of periodontal diseases depends on the diagnosis, severity, risk profile, and individual needs of the patient. The initial stage of therapy generally focuses on controlling the etiological factors responsible for inflammation. This includes professional removal of plaque and calculus, improvement of oral hygiene, and correction of local factors that promote biofilm retention. Patient education and motivation are fundamental because professional treatment alone cannot maintain periodontal stability if daily plaque control remains inadequate. Non-surgical periodontal therapy, including scaling and root surface instrumentation, is a key component of treatment for many patients with periodontitis. Its purpose is to reduce the microbial load and remove deposits that interfere with effective plaque control. Following initial treatment, the periodontal tissues should be reassessed to determine the response to therapy. Persistent deep pockets, ongoing inflammation, or complex anatomical defects may require additional interventions, including periodontal surgical procedures when clinically indicated. Antimicrobial agents may have a role in selected cases, but they should not be considered a universal substitute for mechanical plaque and calculus control. The indiscriminate use of systemic antibiotics is inappropriate because it may contribute to adverse effects and antimicrobial resistance. Pharmacological approaches should therefore be considered selectively and based on clinical indications.

Maintenance therapy is essential because periodontal disease is chronic and may recur when risk factors and microbial deposits are not adequately controlled. Supportive periodontal care should include regular reassessment of periodontal tissues, reinforcement of oral hygiene practices, professional plaque and calculus control, and monitoring of modifiable risk factors. The frequency of maintenance visits should be determined according to the patient's periodontal condition and individual risk profile.

Importance of Patient Education. Patient education is one of the most influential components of periodontal disease prevention and treatment. A technically excellent periodontal procedure may have limited long-

term value if the patient does not understand the importance of daily biofilm control. Patients should be informed about the relationship between dental plaque, gingival inflammation, periodontal tissue destruction, and tooth loss in language appropriate to their level of understanding. Motivational communication is particularly important in chronic disease management. Instead of simply instructing patients to brush more frequently, dental professionals should identify practical barriers to oral hygiene and help patients develop realistic routines. Demonstrating interdental cleaning techniques and providing individualized feedback can significantly improve adherence. Regular reinforcement is necessary because oral hygiene behavior is not a single intervention but a long-term habit.

Conclusion

Periodontal diseases are multifactorial chronic disorders that can compromise the supporting structures of the teeth and, in advanced stages, lead to tooth loss and impaired quality of life. Their development is associated with persistent microbial biofilm and an inflammatory host response, while systemic diseases, smoking, genetic susceptibility, hormonal influences, stress, and other risk factors may modify the clinical course. Gingivitis can often be controlled effectively when identified early, whereas periodontitis requires systematic diagnosis, active treatment, and long-term supportive care. The most effective approach to periodontal disease is based on prevention, early detection, individualized treatment, and continuous maintenance. Professional periodontal therapy should be combined with effective daily oral hygiene and modification of relevant risk factors. Patient education and motivation are therefore not secondary elements but fundamental components of successful periodontal care. A comprehensive and preventive approach involving both dental professionals and patients can reduce disease progression, preserve natural dentition, and contribute to better oral and general health. Further development of individualized diagnostic methods, preventive programs, and evidence-based periodontal therapies remains important for improving long-term clinical outcomes.

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