

REVIEW

Systemic view of periodontal diseases

Visión sistémica de las enfermedades periodontales

Alejandra Figueredo-Rigores¹  , Lays Blanco-Romero¹  , Daniela Llevat-Romero¹  

¹Facultad de Ciencias Médicas Isla de la Juventud. Isla de la Juventud, Cuba.

Cite as: Figueredo Rigores A, Blanco Romero L, Llevat Romero D. Sistémica view of periodontal diseases. Odontología (Montevideo). 2023; 1:14. <https://doi.org/10.62486/agodonto202314>

Submitted: 09-06-2023

Revised: 21-09-2023

Accepted: 17-12-2023

Published: 18-12-2023

Editor: Nairobi Hernández Bridón 

ABSTRACT

Periodontal diseases, commonly known as gum disease, are serious bacterial infections that generally destroy the protective and supporting tissues of the teeth. They generally begin with gingivitis, which is a chronic inflammation of the gums and in some cases it can evolve into periodontitis, which destroys the bone and tissues that support the tooth and later to advanced periodontitis, which causes rapid loss of teeth. dental organs. Gingival conditions affect more than three-quarters of the population, which is why work is currently being done globally to prevent these conditions, as they are widespread, although widely preventable, diseases. 21 bibliographies on the topic were consulted. Documentary and historical-logical analysis methods were used, as well as the analytical-synthetic method. The objective was to describe periodontal diseases and the importance of preventive work in the appearance of these ailments. Periodontal diseases can be prevented and treated if action is taken promptly and appropriately. It is necessary to promote the prevention, treatment and control of diseases in their initial phases; define the role and responsibilities of oral health professionals, particularly periodontologists and stomatologists, as well as other health care professionals.

Keywords: Periodontal Diseases; Risk Factor's; Promotion; Prevention; Treatment.

RESUMEN

Las enfermedades periodontales, comúnmente conocidas como enfermedad de las encías, son infecciones bacterianas serias que destruyen de forma general los tejidos de protección y soporte de los dientes. Las mismas comienzan generalmente con gingivitis, que es una inflamación crónica de las encías y en algunos casos puede evolucionar hacia periodontitis, la cual destruye el hueso y los tejidos que sirven de apoyo al diente y posteriormente hacia periodontitis avanzada, que provoca la pérdida rápida de órganos dentarios. Las afecciones gingivales afectan a más de las tres cuartas partes de la población, por lo que actualmente se trabaja a nivel global en la prevención de estos padecimientos, pues son enfermedades extendidas, aunque ampliamente evitables. Se consultaron 21 bibliografías acerca del tema. Se utilizaron los métodos de análisis documental e histórico-lógico, así como el método analítico-sintético. Se planteó como objetivo describir las enfermedades periodontales y la importancia del trabajo preventivo en la aparición de esas dolencias. Las enfermedades periodontales pueden prevenirse y tratarse si se actúa oportuna y adecuadamente. Resulta necesario fomentar la prevención, el tratamiento y el control de las enfermedades en sus fases iniciales; definir el papel y las responsabilidades de los profesionales de la salud bucodental, particularmente periodontólogos y estomatólogos, así como de otros profesionales de la atención sanitaria.

Palabras clave: Enfermedades Periodontales; Factores de Riesgo; Promoción; Prevención; Tratamiento.

INTRODUCTION

Periodontal diseases are considered an infectious and inflammatory process that, depending on the degree of involvement, can lead to manifestations in the gums and the loss of tissues that support the tooth (alveolar bone, periodontal ligament, and cementum). Given that these pathologies are multifactorial in etiology, although mainly infectious (bacterial plaque), their treatment aims to control infection and inflammation.⁽¹⁾

It is now internationally accepted that the second leading cause of oral morbidity is gingival inflammation, starting in its early stages as gingivitis and progressing to periodontitis, which can lead to the loss of the affected teeth. Some studies report that gingivitis affects more than 90 percent of the population. This high probability of easily acquiring the disease is due to poor oral hygiene, which allows biofilm to accumulate and inflammatory conditions to develop rapidly in the gums.⁽¹⁾

The prevention of periodontal disease is based on knowledge of the causal factors, as these share common risk factors with other chronic noncommunicable diseases (NCDs), such as tobacco, alcohol, high sugar consumption, obesity, and unhealthy diets. It is also associated with certain systemic diseases, including diabetes.⁽²⁾

Periodontal diseases are often still considered a purely cosmetic problem rather than a disease. However, in contemporary societies where emotional and social well-being are highly valued, oral and periodontal health deserves a high priority. Although largely preventable, periodontal diseases remain a significant public health problem in all countries around the world. The objective was to describe periodontal diseases and the importance of preventive work in the onset of these conditions.

DEVELOPMENT

Periodontics is the specialty within dental science that deals with studying, preventing, and treating diseases affecting the tissues that protect, surround, and support the teeth, gums, alveolar bone, periodontal ligament, and root cementum. Periodontal disease (PD) has traditionally been considered a chronic inflammatory disease of multifactorial origin, whose primary etiological factor is a highly organized bacterial biofilm in an ecological niche favorable to its growth and development.⁽³⁾

Combined with additional local and systemic factors, it causes infection and destruction of the tissues supporting the teeth (epithelia, connective tissue, periodontal ligament, alveolar bone, root cementum). Its clinical manifestations include bleeding, tooth mobility, gingival recession, periodontal pocket formation, masticatory dysfunction, and tooth loss.⁽⁴⁾

The pathogenic process of periodontal disease results from the host's response to tissue destruction induced by bacteria, which is initiated by anaerobic bacteria but expanded by host cells. The body produces enzymes that destroy the supporting tissues to allow them to move away from the initial lesion.⁽⁵⁾

Establishing classification criteria in periodontics that allow periodontal diseases to be understood, compared, ordered, and ranked is essential. These classification criteria are based on available scientific evidence but are not immutable. Technological advances and continuous experimentation reveal new knowledge that helps refine or render a concept obsolete. New and modern classification systems have emerged in this environment due to the need to understand better and treat periodontal diseases more efficiently.⁽⁴⁾

In general, PD has been classified by different authors and institutions, including Weski (1921), Gottlieb (1928), Orban (1948), Carranza (1959), Held and Chapul (1960), WHO (1961) adopted by Cuba, Prichard (1972), American Academy of Periodontology (1989 and 1999), Page and Schroeder (1982), Laura Lau (1992), Mendieta (1995), and the most recent classification established in 2017 at the World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions.⁽⁴⁾

The new classification of periodontal disease covers four main groups, which are as follows:⁽⁴⁾

- Group 1: Periodontal health, gingival diseases and conditions
- Group 2: Periodontitis
- Group 3: Systemic diseases and conditions affecting the periodontal supporting tissue
- Group 4: Peri-implant diseases and conditions.

With this new classification, the decision was also made to change the approach, bringing aggressive and chronic periodontitis into the same category and characterizing it with a staging and grading system. Staging will depend on the severity of the disease and the expected complexity of its treatment. At the same time, grades will provide information on the risk of disease progression, poor treatment outcomes, and possible adverse effects on systemic health.⁽⁴⁾

Therefore, the new classification identified three different forms of periodontitis based on their pathophysiology:⁽⁴⁾

- Necrotizing periodontitis, explained in conjunction with necrotizing periodontal diseases.
- Periodontitis as a direct manifestation of systemic diseases.
- Periodontitis must be further characterized by applying a staging and grading classification approach.

As mentioned above, different types of periodontal diseases affect different population sectors.

Gingivitis is inflammation of the gums of varying intensity without affecting the supporting tissues (ligament, cementum, bone). Signs of gingivitis include inflammation and bleeding on probing. Although gingival enlargement may occur due to edema, resulting in coronal displacement of the gingival margin about the MEC, there is no formation of periodontal pockets with loss of attachment and bone. Probing depth (up to 3,9 mm) should be carefully analyzed to rule out “pseudopockets” and radiographic bone loss.⁽⁶⁾

Chronic periodontitis: unlike gingivitis, periodontitis is inflammation of the gingiva and supporting periodontium, significantly affecting the GCT (gingival connective tissue), periodontal ligament, cementum, and bone. As a pathognomonic result, we observe SS inflammation (bleeding on probing), periodontal pocket formation, loss of attachment, and radiographic bone loss. These signs are mandatory for diagnosing periodontitis and differ from gingivitis. Additionally, we may observe recessions, suppuration, increased mobility, pathological tooth migration, and pain.

Aggressive periodontitis: Aggressive periodontitis usually occurs in individuals under 35 years of age, but it has been suggested that it can occur at any age. The rate of periodontal destruction is rapid, and since it begins early in life, destruction is observed in young individuals. However, the analysis should not be based solely on age but on clinical and radiographic findings, family and personal history, and laboratory aids.⁽⁶⁾

Risk factors are any detectable characteristic or circumstance of a person or group of people associated with an increased likelihood of suffering from, developing, or being particularly exposed to a disease.⁽⁷⁾

Risk factors related to PD have now been redefined as predisposing factors and modifying factors. A predisposing factor is defined as any element that causes a more significant accumulation of biofilm and, therefore, a greater likelihood of developing periodontal disease. Some of these factors may include age, sex, genetics, race, certain immunosuppressive diseases such as HIV/AIDS, and other systemic diseases such as osteoporosis.⁽⁸⁾

On the other hand, a modifying factor can be defined as any component that modifies the host's response to biofilm, the primary example being systemic diseases. They are considered modifiable because it is possible to act on specific behaviors; these factors are often related to lifestyle, metabolism, diet, or stress.⁽⁹⁾

In addition, some local factors, such as plaque or calculus levels, defective restorations, and the use of partial dentures, may also constitute risk factors. There are also external factors that individuals have limited influence over that can affect overall health and oral health, such as restricted access to education, safe water and sanitation, healthy food, and healthcare.⁽¹⁰⁾

These important risk factors are the same as those for major NCDs, such as cardiovascular disease, chronic respiratory disease, cancer, and diabetes. Therefore, the common risk factor approach provides the basis for including oral diseases in NCD prevention and control programs.⁽¹⁰⁾

By the age of 65-74, around 30 % of individuals have lost all their teeth, with periodontal disease being one of the causes. It is estimated that 50 % of the adult population in Europe has some form of periodontal disease and that between 10 % and 15 % have severe periodontitis. Recent studies estimate that 47 % of the US population over the age of 30 suffers from periodontitis, of which 8,5 % have mild periodontitis, 30 % moderate periodontitis, and the remaining 8,5 % have advanced periodontitis.⁽¹¹⁾

On the other hand, the most prevalent periodontal disease in Latin America is gingivitis, with high rates among children and adolescents. A systematic review emphasizes that this condition affects 34,7 % of the Latin American child and adolescent population, with a high prevalence of 77 % and 73 % in countries such as Colombia and Bolivia, respectively. Meanwhile, studies carried out in Brazil also show a high rate of gingivitis in 12-year-olds, although in 2020, relatively lower bleeding rates were found in the same country, ranging from approximately 39,68 %. Meanwhile, in countries such as Colombia, the prevalence of gingivitis is reported to be close to 18 %. In addition, it was found that % of the 116 people examined were aged 12 years and older, and 11 % had pockets of 5,5 mm or more.⁽¹²⁾

In Cuba, various epidemiological studies have reported a high prevalence and moderate severity of periodontal disease. A survey conducted in the community of El Moncada in Havana found that 62,4 % of the population was affected. In contrast, Valdés found that 78,9 % of the population was affected in a study conducted in the same province. A very high prevalence was reported when studying periodontal disease in service and industrial workers in Havana City, with 93,7 % and 97,6 %, respectively, and rural workers in the province of Havana, with 100 % in 2010.⁽¹³⁾

On the other hand, in a national study conducted by the Ministry of Public Health (MINSAP) in 2011, using the Community Treatment Need Index (INTPC), a prevalence of 52 % was found. A close relationship has been demonstrated between the level of knowledge about oral health and the prevalence and severity of periodontal disease. The 92,9 % of the sample studied showed inadequate knowledge, present in the vast majority of patients with the disease. This situation arises because adding periodontal health depends partly on acquiring theoretical knowledge, although a change in unhealthy behaviors and lifestyles undoubtedly ensures success.⁽¹⁴⁾

It should be noted that different PDs require different and individualized treatment. In general, the treatment

of periodontal diseases has three different objectives:⁽¹⁵⁾

- Eliminate or reduce disease-causing bacteria.
- Suppress, reduce, or modify factors that make patients more susceptible to the disease, such as smoking, or specific dental abnormalities, such as malocclusion.
- Create the right conditions for the disease to be controlled long-term.

The key objective for achieving a clinically healthy periodontium is no bleeding on probing and shallow residual pockets. Standard treatment includes mechanical anti-infective therapy to remove supra- and subgingival biofilm effectively. In addition, using antiseptics and antibiotics in severe cases improves the effectiveness of local non-surgical treatment. Surgical intervention may be necessary in more advanced cases where inflammation persists. The aim is to completely remove bacterial biofilm residues and calculus from the affected root surfaces and eliminate niches through respective or regenerative measures in order to establish the prerequisites for successful long-term maintenance by the patient. Depending on the situation, surgical therapy may consist of conventional surgical procedures, resective surgical treatment, or regenerative surgical procedures.⁽¹⁶⁾

In the case of gingivitis, dental plaque and tartar must be removed. This treatment, called professional prophylaxis, is performed by dentists. In addition, it is essential to explain how to brush the teeth and gums to keep them clean and prevent the disorder from recurring.⁽¹⁷⁾

In the case of periodontitis, if it is not advanced, treatment may consist of less invasive procedures, including:⁽¹⁸⁾

- Scaling. Scaling removes tartar and bacteria from the surface of the teeth and below the gums. It can be performed with instruments, a laser, or an ultrasonic device.
- Root planning. Root planing smooths the roots' surfaces, discouraging further tartar and bacteria buildup, and removes bacterial byproducts that contribute to inflammation and delay healing or reattachment of the gum to the tooth surfaces.
- Antibiotics. Topical or oral antibiotics can help control bacterial infections. Topical antibiotics may consist of mouthwashes or gels applied to the space between the teeth and gums or inside the pockets after a thorough cleaning. However, oral antibiotics may be necessary to eliminate the bacteria causing the infection completely.

If periodontitis is advanced, treatment may require dental surgery:⁽¹⁹⁾

- Flap surgery (pocket reduction surgery). The periodontist makes small incisions in the gum to lift a section of gum tissue, exposing the roots for more effective scaling and planing. Because periodontitis causes bone loss, the hidden bone can be reshaped before the gum tissue is sutured back into place. This will make cleaning these areas easier and keep the gum tissue healthy.
- Soft tissue grafts: The gum line recedes when gum tissue is lost. Reinforcement of some of the damaged soft tissue may be necessary. This is usually done by removing a small amount of tissue from the roof of the mouth (palate) or using tissue from another donor source and attaching it to the affected site. This can help reduce gum recession, cover exposed roots, and give the teeth a more pleasing appearance.
- Bone graft: This procedure is performed when periodontitis has destroyed the bone surrounding the tooth root. The graft may comprise small bone fragments from the patient's body, or the bone may be synthetic or donated. A bone graft helps prevent tooth loss by holding the tooth in place. It also serves as a platform for new natural bone growth.
- Guided tissue regeneration: This allows bone destroyed by bacteria to grow back. One technique involves the dentist placing a special biocompatible fabric between the existing bone and the tooth. The material prevents unwanted tissue from entering the healing area, allowing the bone to grow back.
- Tissue-stimulating proteins: This technique involves applying a special gel to the affected tooth's root. This gel contains the same proteins found in the enamel of developing teeth and stimulates the growth of healthy bone and tissue.

Oral hygiene is a set of practices a person performs regularly to maintain and improve their oral health. These include brushing your teeth, hygiene, and diet. Practicing these habits daily helps control the proliferation of bacteria in the mouth and the formation of tartar, which causes tooth decay and gum disease, such as gingivitis, which is simple inflammation, or periodontitis, which can lead to tooth loss, tooth support loss, or bleeding.⁽²⁰⁾

There are many methods of brushing your teeth, but thoroughness, not technique, determines how effective brushing is. There are essential things to keep in mind when brushing:⁽²¹⁾

- Frequency: after meals and before bedtime, which is the most important.
- Duration: it takes about three minutes to cover all four quadrants.
- Start: Baby teeth should be cleaned from the moment they appear, first by parents or family

members and then by children under their guidance. This should be done throughout life.

- Apparatus: Removable or fixed appliances must be considered when practicing oral hygiene, such as removing them for brushing and brushing them.
- Fixed prostheses: These should be brushed like teeth, following the same principles.
- Removable prostheses: These should be cleaned with a toothbrush and toothpaste as often as possible and stored overnight in a container with clean water after being cleaned.

Primary prevention

Primary prevention aims to prevent the disease from developing. In the case of periodontal disease, primary prevention aims to inhibit the development of gingival inflammation or its recurrence and to maintain good oral health. In this case, primary prevention mainly involves teaching patients good oral hygiene practices. Therefore, oral hygiene instructions from a professional are the basis of primary prevention. To maximize its effectiveness, education on periodontal health should begin in preschool and be repeated at regular intervals throughout life. In addition, professional mechanical removal of dental plaque can have significant beneficial effects, as can dental floss.⁽²¹⁾

Secondary prevention

Secondary prevention occurs in the early stages of a disease. Its goal is to reduce the impact of periodontal diseases as early as possible. It is achieved through early detection and early care to halt, slow, or reverse disease progression, promoting personal strategies that prevent deterioration or recurrence, taking measures to restore original health and function, and preventing the development of new lesions. The role of secondary prevention in periodontal disease is to avoid the recurrence of disease in patients who have been successfully treated. Secondary prevention measures include the same measures as primary prevention, plus an assessment of oral hygiene and, if necessary, a repeat of oral hygiene instructions. It also contains subgingival debridement to the full depth of the periodontal pocket. Primary and secondary prevention measures also include disseminating messages about a healthy lifestyle and support for smoking cessation.⁽²¹⁾

CONCLUSIONS

Periodontal diseases are among the most common diseases of the stomatognathic system, affecting more than half of the world's population. However, they can be prevented and treated if acted upon promptly and appropriately. It is necessary to promote the prevention, treatment, and control of diseases in their early stages and define the role and responsibilities of oral health professionals, particularly periodontists and stomatologists, as well as other healthcare professionals.

BIBLIOGRAPHICAL REFERENCES

1. Vélez-Sánchez MV, Astudillo-Campos P, Armijos-Fernández F, Wilmer-Antonio C. Protocolo clínico y tratamiento a paciente con periodontitis: Reporte de Caso. 2017; 3 (3): 967-989.
2. Domínguez L. Comportamiento epidemiológico de la enfermedad periodontal en la comunidad, área de salud Moncada. [Trabajo para optar por el título de Especialista de Primer Grado en Estomatología General Integral]. Ciudad de La Habana: Facultad de Estomatología; 2003. p. 27
3. Instituto Nacional de Investigación Dental y Craneofacial. 2019. <https://www.nicdr.nih.gov/espanol/temas-de-salud/la-enfermedad-de-las-encías>.
4. García-San-Juan C, García-Núñez R, San-Juan-Bosch M. Clasificación de las condiciones y enfermedades periodontales y periimplantares desde una perspectiva evolutiva. Medisur. 2021.
5. Castro-Rodríguez Y. Enfermedad periodontal en niños y adolescentes. A propósito de un caso clínico. 2018.
6. Botero JE, Bedoya E. Determinantes del Diagnóstico Periodontal. Revisión Bibliográfica. 2019.
7. Instituto Nacional de Estadística. Definición: factores de riesgo.
8. Serrano-Cuenca V, Noguero-Rodríguez B. Prevención y mantenimiento en la patología periodontal y periimplantaria. Prevención y mantenimiento en periodoncia e implantes. 2004.
9. Global Periodontal Health Project. Salud y enfermedades periodontales: Guía práctica para reducir la carga mundial de morbilidad para las enfermedades periodontales. World Dental Federation.

10. Erazo-Vaca G, Tutasi-Benítez RV, Sumoy-Cadena G, Granizo M. Factores de riesgo en pacientes con enfermedades sistémicas para las enfermedades periodontales. Reciamuc 2020: 82-93.
11. Cardaropoli D. Cirugía periodontal plástica y regenerativa. Edra 2023.
12. Franco-Mejía AJ, Balseca-Ibarra MC. Enfermedad periodontal, prevalencia y factores de riesgo en niños y adolescentes. Revisión de la literatura. 2021.
13. Pérez-Hernández LY, De-Armas-Cándano A, Fuentes-Ayala E, Rossel-Puentes F, Urrutia-Díaz D. Prevalencia de las enfermedades periodontales y factores de riesgo asociados. Policlínico Pedro Borrás, Pinar del Río. Revista Ciencias Médicas Pinar del Río 2018; 15(2).
14. Sánchez-Artigas CR, Sánchez-Sánchez RJ. Factores de riesgo de enfermedad periodontal. Correo Científico Médico 2021.
15. Bueno L, Andrade E, Villarnobo F, García J. Manual de iniciación en la Clínica de Periodoncia. 2012.
16. Ayrton-de-Toledo O, Coelho-Leal S, Paesleme-Azevedo TD. Periodoncia aplicada a la odontopediatría. En: Massara A, de-Lourdes M, Rédua B, Cesar P. Manual de referencia para Procedimientos Clínicos en Odontopediatría. Sao Pablo; Livraria Santos 2014; 16.
17. Guía de atención en periodoncia. Bogotá: Facultad de odontología; 2013.
18. Paneque-Escalona T, Piquera-Palomino Y, Infante-Tamayo M, Merino-Noguera Y. Intervención educativa para disminuir la enfermedad gingival en niños de 8 y 9 años pertenecientes a una escuela del municipio Manzanillo, Cuba. 2018.
19. De-Moraes-Grisi MF, Corrêa-Grisi D. Atlas de periodoncia. Técnicas mínimamente invasivas y microquirúrgicas. En: Pires-De-Carvalho J, compiladora. Cirugías de Abordaje Mínimamente Invasivas Asociadas al Uso de Matriz Derivada del Esmalte. Mayo Clinic 2023. <http://www.mayoclinic.org/es-es/diseases-conditions/periodontitis/diagnosis-treatment-drc-20354479>.
20. Barranca-Enríquez A. Manual de Técnicas de Higiene Oral. Universidad Veracruzana: Salud Bucal; 2011.
21. Valdés G. Estrategia de intervención periodontal en adolescentes. [Trabajo para optar por el título de Especialista de Primer Grado en Estomatología General Integral]. Ciudad de la Habana: Facultad de Estomatología; 2003. p. 39.

FINANCING

None.

CONFLICT OF INTERESTS

None.

AUTHOR CONTRIBUTION

Conceptualization: Alejandra-Figueredo-Rigores, Lays Blanco-Romero, Daniela Llevat-Romero.

Research: Alejandra-Figueredo-Rigores, Lays Blanco-Romero, Daniela Llevat-Romero.

Data curation: Alejandra-Figueredo-Rigores, Lays Blanco-Romero, Daniela Llevat-Romero.

Formal analysis: Alejandra-Figueredo-Rigores, Lays Blanco-Romero, Daniela Llevat-Romero.

Methodology: Alejandra-Figueredo-Rigores, Lays Blanco-Romero, Daniela Llevat-Romero.

Writing - original draft: Alejandra-Figueredo-Rigores, Lays Blanco-Romero, Daniela Llevat-Romero.

Writing - proofreading and editing: Alejandra-Figueredo-Rigores, Lays Blanco-Romero, Daniela Llevat-Romero.