

GENGIGEL[®]

Hyaluronic Acid



ORAL HEALTH &
PARODONTITIS

FACT FILE

HOW CAN ORAL DISEASES AFFECT HUMAN HEALTH?

Oral health is the state of the teeth, gums, and orofacial structures that enables people to smile, swallow, smell, speak, eat, taste and show emotions through facial expressions without pain, discomfort or embarrassment (Bojovic et al., 2021). Oral health can be weakened by a variety of diseases that affect

**around
45%
of the world's
population
is affected by
oral diseases**

45% of the people worldwide (almost 3.5 billion individuals) and span their lifetime from childhood to old age (WHO, 2022). The most common diseases that affect oral health in humans

are dental caries and periodontal diseases (Bessa et al., 2022). Periodontal diseases are triggered by the patient's inflammatory response to the presence of a dysbiotic bacterial plaque, characterized by an imbalanced biofilm composition that causes microbial dysbiosis and inflammation. Periodontal diseases can be divided into two groups: gingivitis and periodontitis (Mark Ide et al., 2022; Bessa et al., 2022). Gingivitis is a superficial inflammation of the periodontium in which there is no loss of at-

tachment (Costa et al., 2023). Periodontitis is a more serious disease that affects soft tissue and bone in the periodontium and teeth; it can lead to ulcerated epithelium and enamel loss resulting in the formation of periodontal pockets through which oral pathogens and their products can enter the bloodstream (How et al., 2021).

Oral diseases have also been associated with the insurgence of several systemic diseases such as cardiovascular disease, infective endocarditis, pneumonia, and diabetes mellitus (How et al., 2021).

**severe
periodontitis
affects
c. 11%
of the world's
population**

HOW DOES PERIODONTITIS AFFECT ORAL HEALTH?

Periodontitis is a multifactorial inflammatory disease of the tooth-supporting apparatus (known as periodontium and including gingiva, cementum, periodontal ligament and alveolar bone) associated with the accumulation of dental plaque. If left untreated, it leads to progressive destruction of the periodontium and eventual tooth loss, compromising masticatory function and esthetics (Hajishengallis, 2022; Kwon et al., 2021).

Periodontitis is the sixth-most common disease worldwide and the leading cause of tooth loss in adults (Balta et al., 2021). Approximately **11% of the world population suffers from severe periodontitis**, affecting 743 million people (Kwon et al., 2021).

Common clinical signs of periodontitis include **gingivitis, clinical attachment loss (CAL), radiographic resorption of the alveolar bone, presence of periodontal pockets, gingival bleeding, tooth mobility**, and **halitosis** (Di Stefano et al., 2022; Izidoro et al., 2021).

The main **risk factors** for the occurrence of periodontitis are **smoking** and **diabetes**, but also factors such as **dental overhang** or **poorly con-**

toured restorations that promote biofilm retention, **open interproximal contacts and occlusal trauma, mucogingival deformity** (Kwon et al., 2021).

Periodontitis has also been associated with the occurrence of other chronic inflammation-related diseases, including cancer, cardio-metabolic, neurodegenerative and autoimmune diseases; this association appears to be caused by the low-grade systemic inflammation that occurs in patients with this oral disease (Hajishengallis et al., 2021).

Adequate oral hygiene, aimed at the removal of dental plaque, is essential for the prevention of periodontitis and represents the first step of therapy. In patients who have a loss of periodontal support and/or periodontal pocket formation, standard therapy includes scaling and root planing often in conjunction with the administration of antimicrobial agents; however, this approach is not always effective, especially in highly susceptible patients in whom periodontal surgery may be indicated (Di Stefano et al., 2022; Hajishengallis, 2022).

WHY RESORT TO NON-DRUG TREATMENTS?

Treatment of moderate to severe periodontitis includes the use of antibiotics administered systemically (*i.e.*, metronidazole, amoxicillin) or locally (*i.e.*, minocycline) as adjunctive therapy to improve the outcome of scaling and root planing. However, antimicrobial resistance is one of the most important public health problems today, so clinicians should carefully plan the use of these agents based on the most current evidence (Kwon et al., 2021).

Limiting the use of systemic antibiotics is also important to avoid adverse drug interactions. In addition, the use of oral chlorhexidine products, such as mouthwash and gel, may cause taste changes, numbness of the mouth and tongue,

pain in the mouth and tongue, xerostomia, tongue discoloration, calculus, and tooth discoloration with long-term use because of their anti-inflammatory and anti-plaque effects on the gums and teeth (Poppo Deus et al., 2022).

The use of hyaluronic acid is an effective therapeutic approach for patients with gingivitis and chronic periodontitis, as it helps prevent tissue destruction and promote healing (Bhati et al., 2022).

Moreover, **HA is a safe substance** and no adverse effects were observed in the studies conducted to evaluate its safety (Mehta et al., 2022).



WHY HIGH MOLECULAR WEIGHT HYALURONIC ACID?

Hyaluronic acid (HA) is a natural glycosaminoglycan ubiquitously distributed, especially in tissues undergoing rapid growth and repair (Valachová et al., 2021). It is a major component of the extracellular matrix in many tissues, including the periodontium (Mehta et al., 2022). HA has different biological functions depending on its molecular weight. High molecular weight HA has **anti-inflammatory, anti-proliferative, anti-angiogenic and immunosuppressive** properties.

These biological functions range from basic structural roles in the extracellular matrix to the

regulation of development through effects on cell behavior by controlling the tissue environment (Bhati et al., 2022).

HA has the potential to regulate periodontal tissue regeneration and alleviate symptoms in both marginal gingiva and deeper periodontal tissues in the treatment of periodontal disease. Thanks to its ability to act as a stable barrier against the penetration of viruses and bacteria, by retaining water in an aqueous solution, HA is successfully used for the treatment of periodontal pockets due to its anti-inflammatory and antibacterial effects (Bhati et al., 2022).



Why Gengigel®?

Gengigel® is a specific and innovative treatment for gingivitis and periodontitis based on the action of its main component, HMW-HA (High Molecular Weight Hyaluronic Acid), which **protects the gingival mucosa by promoting the natural healing and recovery process of the tissue.**

Thanks to its bioadhesive and film-forming properties, it forms a stable barrier that preserves the microenvironment of the mucosal surface and accelerates the healing of the mucosa by maintaining the action of HMW-HA for a long period and delaying the absorption and excretion of HMW-HA. The ability of HMW-HA to retain large amounts of water helps **Gengigel®** maintain extracellular fluid balance and promote oedema resorption in inflammatory conditions, rapidly relieving inflamed oral tissues. Importantly, hyaluronic acid has no local or systemic pharmacological effects on the mucosa. A recent systematic review of 38 randomized clinical trials reported that concomitant use of HA for gingivitis, nonsurgical, and surgical periodontal therapy improved patients' clinical parameters, including periodontal probing depth, periodontal inflammation, and

clinical attachment level (gingival recession) while reducing the prescription of nonsteroidal anti-inflammatory drugs (Karakostas et al., 2022). In most studies, HA was used as a gel, in some studies as a mouthwash or spray, and in one study as fibers. In all cases, HA was found to be extremely safe, and no contraindications or side effects were reported.

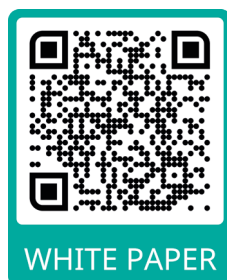
The evidence on Gengigel® includes clinical data from high-quality prospective, comparative studies (Polepalle et al., 2015; Gupta, 2017; Al-Shammari et al., 2018; Ibraheem et al., 2022). **The studies covered various indications for Gengigel®, including the treatment of clinical symptoms associated with periodontal disease and gingivitis after surgical periodontal therapy or the healing of extraction wounds.**

Patients were treated with the gel or spray formulation, either with a single application at the time of surgery, or with multiple applications following periodontal surgery/treatment. **Gengigel® was shown to be an effective treatment for restoring healthy gums and controlling the inflammatory process at various stages of periodontal disease and had a beneficial effect on early postoperative healing after extraction.**



REFERENCES

- Al-Shammari NM, Shafshak SM, Ali MS. Effect of 0.8% Hyaluronic Acid in Conventional Treatment of Moderate to Severe Chronic Periodontitis. *J Contemp Dent Pract* 2018;19:527–534.
- Balta MG, Papathanasiou E, Blix IJ, Van Dyke TE. Host Modulation and Treatment of Periodontal Disease. *J Dent Res*. 2021 Jul;100(8):798-809.
- Bessa LJ, Botelho J, Machado V, Alves R, Mendes JJ. Managing Oral Health in the Context of Antimicrobial Resistance. *Int J Environ Res Public Health*. 2022 Dec 8;19(24):16448.
- Bhati A, Fageeh H, Ibraheem W, Fageeh H, Chopra H, Panda S. Role of hyaluronic acid in periodontal therapy (Review). *Biomed Rep*. 2022 Sep 28;17(5):91.
- Bojović MD, Kesić LG, Mitić AN, Kocić B, Obradović RR, Ignjatović A, Burić N, Jovanović M, Petrović MS. Oral Health-Related Risk Factors Among Students in Southeast Serbia. *Med Sci Monit*. 2021 Feb 17;27:e929375.
- Costa R, Ríos-Carrasco B, Monteiro L, López-Jarana P, Carneiro F, Relvas M. Association between Type 1 Diabetes Mellitus and Periodontal Diseases. *JCM*. 1 2023;12(3):1147.
- Di Stefano M, Polizzi A, Santonocito S, Romano A, Lombardi T, Isola G. Impact of Oral Microbiome in Periodontal Health and Periodontitis: A Critical Review on Prevention and Treatment. *Int J Mol Sci*. 2022 May 5;23(9):5142.
- Gupta S, Kediege SD, Gupta A, Jain K. Evaluation of Gengigel® Application in the Management of Furcation with Coronally Advanced Flap through Surgical Re-Entry-A Split Mouth Clinical Study. *J Clin Diagn Res* 2017;11:ZC27-ZC32.
- Hajishengallis G. Interconnection of periodontal disease and comorbidities: Evidence, mechanisms, and implications. *Periodontol* 2000. 2022 Jun;89(1):9-18.
- Hajishengallis G, Chavakis T. Local and systemic mechanisms linking periodontal disease and inflammatory comorbidities. *Nat Rev Immunol*. 2021 Jul;21(7):426-440.
- How YH, Yeo SK. Oral probiotic and its delivery carriers to improve oral health: A review. *Microbiology (Reading)*. 2021 Aug;167(8).
- Ibraheem W, Jedaiba WH, Alnami AM, Hussain Baiti LA, Ali Manqari SM, Bhati A, Almarghlani A, Assaggaf M. Efficacy of hyaluronic acid gel and spray in healing of extraction wound: a randomized controlled study. *Eur Rev Med Pharmacol Sci*. 2022 May;26(10):3444-3449.
- Ide M, Karimova M, Setterfield J. Oral Health, Antimicrobials and Care for Patients With Chronic Oral Diseases - A Review of Knowledge and Treatment Strategies. *Front Oral Health*. 2022 Jun 7;3:866695.
- Izidoro C, Botelho J, Machado V, Reis AM, Proença L, Alves R, Mendes JJ. Periodontitis, Halitosis and Oral-Health-Related Quality of Life-A Cross-Sectional Study. *J Clin Med*. 2021 Sep 26;10(19):4415.
- Karakostas P, Davidopoulou S, Kalfas S. Use of Hyaluronic Acid in Periodontal Disease Treatment: A Systematic Review. *The Journal of Contemporary Dental Practice*. 2022;23(3):355–70.
- Kwon T, Lamster IB, Levin L. Current Concepts in the Management of Periodontitis. *Int Dent J*. 2021 Dec;71(6):462-476.
- Mehta V, Kaçani G, Moaleem MMA, Almohammadi AA, Alwafi MM, Mulla AK, Alharbi SO, Aljayyar AW, Qeli E, Toti Ç, Meto A, Fiorillo L. Hyaluronic Acid: A New Approach for the Treatment of Gingival Recession-A Systematic Review. *Int J Environ Res Public Health*. 2022 Nov 2;19(21):14330.
- Polepalle T, Srinivas M, Swamy N, et al. Local delivery of hyaluronan 0.8% as an adjunct to scaling and root planing in the treatment of chronic periodontitis: A clinical and microbiological study. *J Indian Soc Periodontol* 2015;19:37.
- Poppolo Deus F, Ouanounou A. Chlorhexidine in Dentistry: Pharmacology, Uses, and Adverse Effects. *Int Dent J*. 2022 Jun;72(3):269-277.
- Valachová K, Šoltés L. Hyaluronan as a Prominent Biomolecule with Numerous Applications in Medicine. *Int J Mol Sci*. 2021 Jun 30;22(13):7077.
- World Health Organization (WHO). Global oral health status report: towards universal health coverage for oral health by 2030. 2020. Available at: <https://www.who.int/team/noncommunicable-diseases/global-status-report-on-oral-health-2022>. Last access: 06/28/2023



FOR FURTHER INFORMATION
ABOUT GENGIGEL® AND ITS
TECHNICAL AND SCIENTIFIC
BACKGROUND USE THIS
QR-CODE TO DOWNLOAD
THE DEDICATED
WHITE PAPER



RICERFARMA S.R.L.
www.ricerfarma.com

Via Egadi, 7 - 20144 Milano – Italy
info@ricerfarma.com