

GENGIGEL[®]

Hyaluronic Acid



POOR ORAL HYGIENE &
PERIODONTAL DISEASES

FACT FILE

HOW ORAL HYGIENE CAN AFFECT ORAL HEALTH?

Oral hygiene is a critical aspect of [maintaining good oral health and preventing associated health complications](#) (Duangthip & Chu, 2020).

The regular and proper mechanical cleaning of the teeth prevents the accumulation of bacteria and debris on teeth and gums, particularly at and below the gingival margin, also known as dental plaque (Duangthip & Chu, 2020; Jepsen et al., 2017).

Dental plaque biofilm is a major biological determinant common to the development of the two primary infectious dental pathologies: periodontal diseases and dental caries (Jepsen et al., 2017).

Thus, [limiting](#) the formation of [dental plaque biofilm](#) is the cornerstone of prevention and control of both diseases (Jepsen et al., 2017).

ARE PERIODONTAL DISEASES FAVOURED BY POOR ORAL HYGIENE?

Periodontal diseases are common inflammatory diseases of microbial origin that affect the periodontium (*i.e.*, the supportive apparatus surrounding the tooth, which includes the gingival tissue, alveolar bone, cementum, and periodontal ligament) (Kinane et al., 2017).

Experts traditionally subdivide them into gingivitis and periodontitis (Kinane et al., 2017).

Gingivitis, the mildest form of periodontal disease, is characterized by inflammation that is restricted to the soft-tissue area of the gingival epithelium and connective tissue, without affecting the deeper compartments of the periodontium (Kinane et al., 2017).

If left untreated, this superficial and reversible condition can develop into periodontitis thereby becoming chronic, destructive, and irreversible (Kinane et al., 2017).

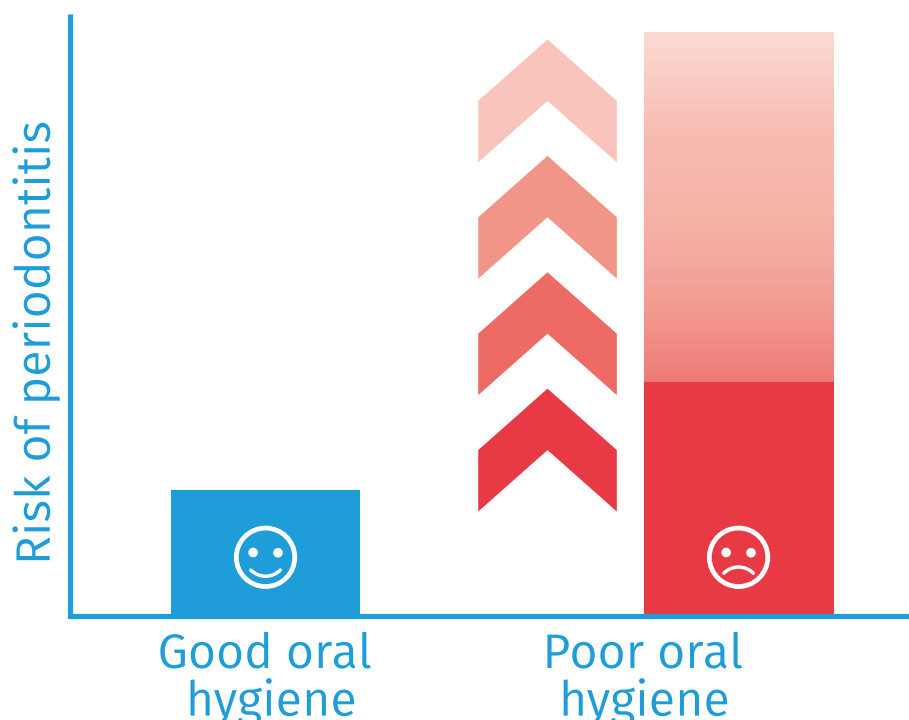
Periodontitis affects the deeper gum tissues and bone. As it progresses, it leads to the loss of the periodontal ligament and destruction of the surrounding alveolar bone, causing the formation of deep periodontal 'pockets' between the tooth and gum tissue. The loss

of attachment can ultimately result in increased mobility and tooth loss (Kwon et al., 2021; Kinane et al., 2017). The insufficient removal of dental plaque caused by [poor oral hygiene can contribute to the development of](#) infectious dental pathologies, as previously discussed (Duangthip & Chu, 2020; Jepsen et al., 2017).

The microorganisms present in dental plaque initiate and sustain [periodontal diseases](#) (Kwon et al., 2021; Kinane et al., 2017).

In this context, it is commonly acknowledged that disease occurs when the balance between the microbial biofilm and the host is lost, owing to dysbiosis or immune overreaction of the host to microbial presence. Overall, this imbalance results in a heightened inflammatory state that leads to tissue damage (Kwon et al., 2021; Kinane et al., 2017).

Interestingly, according to a recent review and meta-analysis of 50 studies, poor oral hygiene is [the leading risk factor for periodontal diseases](#), and it raises the risk of periodontitis by approximately 2 to 5 times when compared to good oral hygiene (Lertpimonchai et al., 2017).



GOOD ORAL HYGIENE PRACTICES

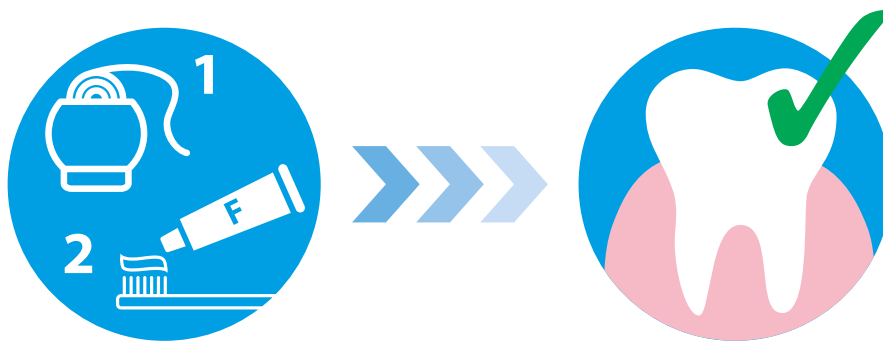
There are two essential elements of a good oral hygiene routine: [brushing and interdental cleaning](#).

Brushing allows for effective removal of plaque from the exposed surfaces of teeth but cannot adequately eliminate it from the interdental surfaces because access to these areas is difficult, particularly in posterior ones. This is why interdental cleaning is also important (Worthington et al., 2019; Wilder & Bray, 2016).

The World Health Organization (WHO), other public health agencies, and healthcare associations recommend to brush teeth twice a day for at least 2 minutes using a fluoride toothpaste and clean the

interproximal surfaces once a day, using suitable tools such as traditional floss, floss picks, powered air or water flossers, or interdental brushes (WHO, 2022; Kinane et al., 2017).

The order in which brushing and interdental cleaning are performed seems to be relevant. Specifically, A recent randomized controlled trial has highlighted that performing flossing before brushing is more effective than brushing before flossing in reducing interdental plaque and increasing fluoride concentration in interdental plaque (Mazhari et al., 2018).



Key points for good interdental cleaning

- Before brushing, it is recommended to clean interdentally.
- Use interdental tools to clean your teeth once a day.
- Depending on your personal preference, you can effectively use traditional floss, floss picks, powered air or water flossers, or interdental brushes.
- For the most suitable tool and proper usage technique, seek advice from your dentist or dental assistant.

Key points for good brushing

- Brush your teeth a minimum of two times a day.
- When deciding when to brush, consider your diet, and wait to brush if you've had an acidic food or drink.
- Use a toothpaste containing fluoride.
- Opt for a toothbrush with soft bristles.
- Either manual or powered toothbrushes can be used effectively, depending on your preference.
- Use any toothbrushing method that is comfortable: either manual or powered toothbrushes can be used effectively.
- Angle the bristles toward the gumline, so they clean between the gums and teeth.
- Brush gently using small, circular motions; do not scrub hard back and forth.
- Ensure that you brush all sides of your teeth, including the inner, outer, and chewing surfaces.
- Don't forget to brush your tongue.
Replace your toothbrush every three to four months or more frequently if the bristles appear matted or frayed.

HOW CAN NON-DRUG TREATMENTS BE OF HELP?

Despite dentists emphasizing to their patients the importance of maintaining good oral hygiene to prevent periodontal diseases, ensure effective periodontal treatment, and retain their teeth in the long-term, patients often struggle to comply with oral self-care regimens (Ramsay, 2000).

As already seen, this inevitably results in increased plaque accumulation and gingival inflammation, which, in turn, can lead to periodontal diseases (Duangthip & Chu, 2020; Jepsen et al., 2017).

During the initial phase of periodontal diseases, dental healthcare professionals usually employ scaling and root planing techniques to eliminate plaque biofilm and tartar build-up from the teeth and the area beneath the gum line (Kwon et al., 2021).

In this context, **topical products with a protect-**



ing action have recently gained interest from the scientific community as potential **adjuvants** to the abovementioned procedures and practices.

Recently, such topical products have gained significant popularity in the field of oral care.

In particular, research studies have demonstrated that hyaluronic acid based formulations are effective in **soothing the inflamed gingival mucosa and reducing the symptoms of periodontal diseases** when applied locally (Sánchez-Fernández et al., 2021; Casale et al., 2016).

Anticipated as a growing trend, hyaluronic acid-based formulations are poised to assume a more prominent role in enhancing oral care and advancing the treatment of periodontal diseases, ultimately benefiting a vast number of patients globally.

WHY HIGH MOLECULAR WEIGHT HYALURONIC ACID?

Hyaluronic acid (HA) is a linear polymer composed of repeating units of glucuronic acid and N-acetylglucosamine. It is found naturally in vertebrates, where represents a major component of the extracellular matrix of connective tissues (Kobayashi et al., 2020).

HA plays a paramount role in physiology in the oral cavity, as contributes to providing mechanical support, maintaining, and restoring tissue integrity (Casale et al., 2016).

HA has many different functions, including maintenance of tissue homeostasis and cell surface protection, but is involved also in many physiological processes, such as cell attachment, migration and proliferation, wound healing and regulation of immune response and inflammation (Kavasi et al., 2017).

High molecular weight HA (HMW-HA) is deposited in normal tissues and interacts with other compo-



nents of the ECM to control the ECM structural organization and signalling. In addition, endogenous HMW-HA possesses enhanced anti-angiogenic, anti-inflammatory and immunosuppressive properties (Kavasi et al., 2017). The amphiphilic nature of HMW-HA allows this molecule to trap large amounts of water while binding to hydrophobic molecules such as cell membrane lipids. The aforementioned characteristic plays a crucial role in regulating hydration levels and delaying the passage of viruses and bacteria across the hyaluronan-rich pericellular zone, as well as in situations of inflammation (Chen & Abatangelo, 1999).

Clinical studies have shown that HA accelerates the healing of various types of wounds, including burns, epithelial surgical wounds, and chronic wounds (Shaharudin & Aziz, 2016).

Why Gengigel®?

Gengigel® is a specific and innovative treatment for gingivitis and periodontitis that relies on the action of its main component, HMW-HA to make the product strongly bioadhesive, an effect that can be enhanced by using a calibrated mixture of additional glycopolymers. Because of its adhesive properties, Gengigel® sticks to the oral mucosa long enough to promote the activation of physiological tissue repair processes which improve the healing response and reduce healing time. In addition, the presence of high molecular weight hyaluronic acid helps Gengigel® maintain the balance of extracellular fluids and promotes the resorption of oedema in inflammatory conditions, rapidly reducing the associated pain.



Last but not least, it protects the oral mucosa by preserving the micro-environment of the mucosal surface and by regularizing the growth of bacterial flora. The evidence on Gengigel® includes clinical

data from prospective, comparative studies and can thus be considered of high quality (Al-Shammari et al., 2018; Gupta, 2017; Polepalle et al., 2015). The studies covered various Gengigel® indications, including treatment of clinical signs associated with periodontal disease or gingival inflammation following surgical periodontal therapy. In all cases, patients were treated with the gel formulation, either in a single application at the time of surgery, or with multiple applications following periodontal surgery/treatment. Gengigel® proved to be an effective treatment in controlling

the inflammatory process and gingival bleeding at various stages of periodontal disease.



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