

GENGIGEL[®]*

Hyaluronic Acid



ORAL HEALTH
& COFFEE
CONSUMPTION

FACT FILE

* Gengigel and Hyalugel are the same product, with only different brand names

HOW CAN COFFEE INTAKE AFFECT ORAL HEALTH?

Coffee is the second most consumed beverage in the world after water (Butt and Sultan 2011). Several of its components may have an impact on human health and the most studied of them is caffeine, a xanthine alkaloid that causes cardiac and neuronal stimulation, the best-known property of coffee (Mary et al. 2019).

Coffee is also rich in polyphenols – i.e. flavonoids, phenolic acids, lignans and stilbenes - whose significant antioxidant potential has been shown to have beneficial effects on various diseases associated with oxidative stress, such as

cancer, cardiovascular disease and aging (Cano-Marquina et al. 2013).

A better understanding of the ingredients in coffee and their potentially positive effects led to a change in the view that coffee is a drink to be avoided or limited. However, [studies on coffee consumption have highlighted its negative consequences on oral health, in particular as a risk factor for periodontitis](#) (Mary et al. 2019). In addition, caffeine consumption is known to cause xerostomia - a subjective feeling of dry mouth that can increase the risk of dental caries and oral infections such

as candidiasis (Hopcraft and Tan 2010)– which is related to plaque accumulation and consequently gingivitis, the earliest indicators of periodontal disease (Mizutani et al. 2015). Less serious effects of coffee consumption include bad breath and tooth discoloration, which affect social interactions and personal satisfaction and contribute to a lower quality of life for people. Since coffee is widely consumed worldwide, it is important to be aware of these effects in order to promote and maintain adequate oral health.



HOW DOES COFFEE CONSUMPTION FAVOUR PERIODONTITIS?

Saliva is a hypo-osmotic fluid secreted by the salivary glands in the oral cavity. It is composed of a variety of organic and inorganic substances (i.e. electrolytes, immunoglobulins, proteins, enzymes, mucins, urea, ammonia) involved in its

protective function against bacteria and fungi, lubrication of the oral cavity, remineralization of the teeth, and assistance in chewing, swallowing and speaking (Hopcraft and Tan 2010). When salivary flow is impaired, some

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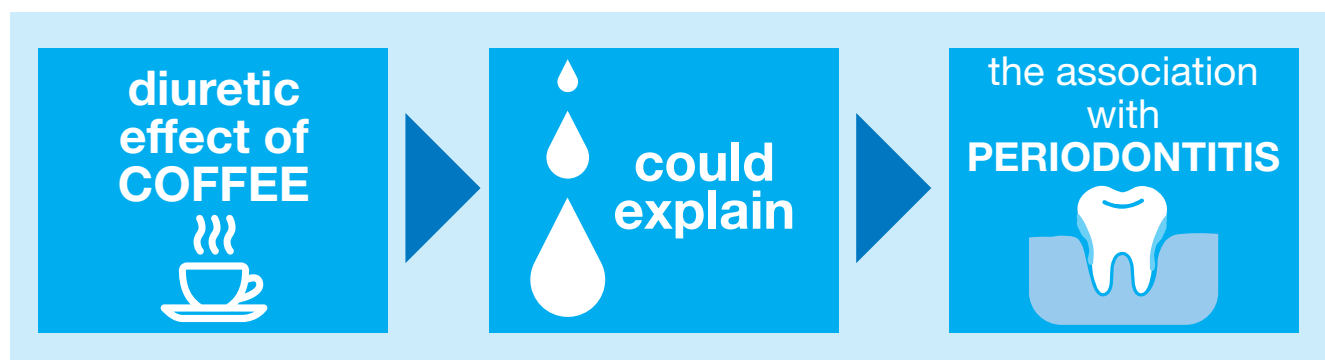
>>> HOW DOES COFFEE CONSUMPTION FAVOUR PERIODONTITIS?

functions, such as antibacterial activity, may be compromised, leading to a deterioration in oral health.

As mentioned earlier, **coffee consumption is associated with xerostomia, a subjective feeling of dry mouth accompanied by diminished salivary output** (Mizutani et al. 2015). In fact, patients with dry mouth are advised to avoid coffee and caffeinated beverages, as caffeine appears to be the main cause of oral dehydration. Symptoms of xerostomia include pain and burning in the mouth, difficulty swallowing and speaking, and taste alteration (Hopcraft and Tan 2010). There is also an increased susceptibility to developing common dental problems, such

as caries, gingivitis, periodontitis, halitosis (Gil-Montoya et al. 2016). This is probably because **patients with lower salivary flow have reduced bacterial clearance, leading to greater bacterial colonization of the oral tissues** (Mizutani et al. 2015).

Seal et al. studied fluid balance in habitual coffee drinkers and the results suggested that caffeinated coffee in **high doses** (6 mg kg^{-1}) **has an acute diuretic effect** (Seal et al. 2017). **This negative consequence on the restoration of body fluids could explain the association between coffee consumption and xerostomia and consequently an increase in the severity of gingivitis and periodontitis.**



WHY RESORTING TO NON-DRUG TREATMENTS?

In recent years, it has become clear that oral health has a major impact on overall health.

Initial treatment of oral disease includes non-pharmacological measures such as effective daily oral hygiene with mouth rinses, fluoride toothpastes, and even removal of plaque biofilm and tartar deposits by scaling and root planing (Wilder and Bray 2016).

Topical treatment of non-keratinized sulcular epithelium has been found to deliver high concentrations of pharmacological agents to periodontal tissue, gingiva, periodontal ligament, alveolar bone, and cementum

(Casale et al. 2016). Recently, Sánchez-Fernández et al. showed that **topical application of high molecular weight hyaluronic acid (HMWHA) in patients with periodontitis reduced inflammation and levels of proinflammatory cytokine IL- 1β in the peri-implant crevicular fluid, suggesting that HMWHA could be an effective therapeutic option to control the progression of this disease** (Sánchez-Fernández et al. 2021). Therefore, **resorting to non-drug treatments could also be a first line of protection for oral damage induced by coffee consumption.**



WHY HIGH MOLECULAR WEIGHT HYALURONIC ACID?

HA is a natural and unbranched polymer belonging to a group of heteropolysaccharides called glycosaminoglycans (GAGs) diffused in the epithelial, connective and nervous tissues of vertebrates (Fraser et al. 1997). HA is a major component of the ECM, particularly abundant during embryogenesis, in tissues undergoing rapid growth and development, during repair and regeneration, and in association with aggressive malignancies (Erickson and Stern 2012). **HA has many different functions, including maintenance of tissue homeostasis and cell surface protection, but it is also involved 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 hyaluronic acid is deposited in normal tissues



and interacts with other components of the ECM to control its structural organization and signaling. In addition, endogenous HMWHA possesses enhanced anti-angiogenic, anti-inflammatory and immunosuppressive properties (Kavasi et al. 2017). The amphophilic nature of HMWHA allows this molecule to trap large amounts of water while binding to hydrophobic molecules such as cell membrane lipids. This property is relevant to the control of hydration and helps to delay the passage of viruses and bacteria through the hyaluronan-rich pericellular zone, as well as during inflammatory processes (Chen and 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 and Aziz 2016).

Why Gengigel®?

Gengigel® is a specific and innovative treatment for gingivitis and periodontitis. It is based on the action of its main ingredient HMWHA, which makes the product strongly bioadhesive, an action that can be enhanced by using a calibrated mixture of additional glycopolymers. Due to its adhesive properties, Gengigel® attaches to the oral mucosa long enough to promote the activation of physiological tissue repair processes that 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, Gengigel® protects the oral mucosa by preserving the micro-environment of the mucosal surface

and by regulating the growth of bacterial flora. The evidence on Gengigel® includes clinical data from high-quality prospective comparative studies (Polepalle et al. 2015; Gupta 2017; Al-Shammari et al. 2018). The studies covered various Gengigel® indications, including the treatment of clinical signs associated with periodontal disease or gingivitis following surgical periodontal therapy. In all cases, patients were treated with the gel formulation, either with a single application at the time of surgery, or with multiple applications following periodontal surgery/treatment. Gengigel® proved to be an effective treatment for controlling the inflammatory process and gingival bleeding at various stages of periodontal disease.



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