



Case Study

AYURVEDIC UNDERSTANDING AND MANAGEMENT OF PLAQUE-INDUCED GINGIVITIS

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Article info

Article History:

Received: 26-02-2026

Accepted: 16-03-2026

Published: 06-05-2026

KEYWORDS:

Plaque-induced gingivitis (PG),
Kshara taila (KT).

ABSTRACT

This article presents a case of plaque-induced gingivitis (PG), a prevalent and reversible inflammatory condition of the gingiva caused by microbial plaque accumulation. PG affects a significant proportion of the adult Indian population and is characterised by erythema, oedema, and bleeding without loss of attachment. Conventional treatments, including scaling and chlorhexidine, are effective but may produce undesirable effects. The case study explores an Ayurvedic approach in PG using *Kshara taila* (KT) oil-pulling. A 22-year-old male who underwent conventional treatment for halitosis and bleeding while brushing several times without satisfactory outcomes was treated with daily KT oil-pulling. Observable symptoms and clinical signs resolved within two weeks of treatment, without any adverse effects. This case suggests KT as a potentially safe and effective alternative in PG management. However, further scientific research with larger sample sizes is essential to validate the efficacy and safety of this approach.

INTRODUCTION

PG is reportedly found in 46.6% of the adult Indian population.^[1] It is the most common form of gingival inflammation and results from the accumulation of dental plaque at the gingival margin. Plaque is a microbial biofilm composed of bacteria, salivary glycoproteins and extracellular products, which adheres tenaciously to the tooth surface. In the absence of effective oral hygiene, this biofilm matures and increases in complexity, leading to a local inflammatory response within the gingival tissues.^[2]

The process begins with the colonisation of the tooth surface by gram-positive organisms, and by gram-negative anaerobes as the plaque matures. These organisms release substances that irritate the gingival epithelium and underlying connective tissue. The host responses with localised vascular dilation, increased permeability, and migration of inflammatory cells, chiefly neutrophils in the early stages, with lymphocytes and plasma cells appearing as the lesion

becomes more established. The ecological plaque hypothesis holds that PG reflects a change in the local environment rather than plaque mass alone.^[3,4] Increased gingival crevicular fluid, reduced oxygen tension, altered pH and the presence of inflammatory products favour the growth of anaerobic, more pathogenic species, shifting the balance of the biofilm. Clinically, the gingiva becomes erythematous, oedematous, and prone to bleeding on gentle provocation. The normal stippling is lost, and the tissues appear smooth and shiny. Despite these changes, the epithelial attachment to the tooth remains intact and there is no loss of alveolar bone, which distinguishes gingivitis from more advanced periodontal disease. Pain is usually absent, and the condition may go unnoticed unless bleeding or halitosis becomes evident. These changes remain confined to the gingiva and are reversible.

Conventional management includes removal of plaque and maintenance of oral hygiene. Brushing, interdental cleaning, professional scaling and antiseptic mouthwash containing chlorhexidine are commonly administered. With adequate care, the gingiva returns to health without permanent damage. Ayurvedic options to manage this condition remain underappreciated, even within Ayurvedic community. The closest Ayurvedic analogue of plaque-induced

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<https://doi.org/10.47070/ayushdhara.v13i2.2629>

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gingivitis is *Dantasharkara* which is described as a firm accumulation of *Mala* on teeth due to lack of dental hygiene. Caused *Vata* and *Kapha*, *Dantasharkara* deteriorates the normal properties of teeth and presents with halitosis. [5,6] Since spontaneous bleeding is not specified in this condition, unlike other conditions of gum and tooth specified in Ayurveda corpus, the clinical picture here is that of stage 2 or 3 gingivitis. *Dantasharkara* is managed by *Lekhana* (scaling) and *Avasechana* (oil-pulling) with KT.[7] *Lekhana karma* for *Dantasharkara* has not been standardised and the KT is not routinely administered. This article discusses a case where PG was successfully treated through the administration of KT alone.

Patient case

A 22 years old male patient presented to the OPD in January 2026 with intermittent bleeding while brushing and eating very hard food which started two years ago. He also reported feeling bad smell while talking. His medical and surgical histories were insignificant. He had been to dentist several times, where he was informed of having swelling of gums from waste accumulation on teeth, underwent scaling, and was given chlorhexidine mouthwash. But he had severe sensitivity following scaling and the mouthwash caused altered taste and dryness of mouth, and stained her teeth. This, in his experience, felt worse than his main complaint itself.

Oral examination of the patient showed generalised mild-moderate gingival erythema and moderate gingival oedema. Marginal gingiva appeared thickened and rolled with loss of sharp, knife-edge contour, with loss of surface stippling. Interdental papilla appeared blunted and slightly bulbous. Faint deposits of plaque were visible along lingual areas of upper incisors. There was no visible ulceration or necrosis. Visible yellowish deposits along cervical margins and staining were observed. No clinical attachment loss or alveolar bone loss was found in radiograph. Bleeding on probing (BOP) was present at 40% of sites. Based on these, his condition was diagnosed as PG.

Therapeutic intervention

The patient was prescribed KT for oil-pulling at home, and instructed to maintain good oral hygiene. He rinsed 10ml KT in 10ml lukewarm water for 10 minutes daily after brushing in the morning. In the follow-up visit after two weeks, he reported disappearance of bad smell while talking and of occasional bleeding. No tooth staining, burning of mouth, oral dryness or taste alteration was reported. The medicine itself felt distasteful but improved his overall taste perception. Oral examination revealed a seemingly healthy gingiva with no macroscopic plaque

deposit. BOP was observed at no tooth. The patient was advised to continue oil-pulling for another week. In the next follow-up, he was advised to discontinue oil-pulling while continuing his oral hygiene practises.

Outcome

The patient was completely relieved of PG in two weeks of treatment. He has not experienced any adverse effect during the treatment. Image.1 shows the condition of teeth and gums before and after Ayurvedic treatment.

Image.1 Before and After *Kshara Taila* treatment



DISCUSSION

Conventional treatment of PG is not without consequences. Interdental cleaning and scaling often result in dentinal hypersensitivity, gingival tenderness, gingival bleeding, perceived transient tooth mobility, apparent increase in interproximal spacing, gingival recession (post-inflammatory resolution), minor soft tissue trauma, localised infection or ulceration (rare), and temporomandibular discomfort from prolonged mouth opening. [8] Chlorhexidine, may result in extrinsic tooth staining, tongue staining, dysgeusia, oral mucosal irritation or burning sensation, parotid gland swelling (rare) and hypersensitivity reactions, including rash or anaphylaxis (very rare). Ironically, chlorhexidine is also known to cause increased supragingival calculus formation. [9,10]

Comparatively, KT doesn't seem to produce any adverse reaction. Yet, it is not routinely administered to PG patients, perhaps because it is mentioned in the context of ear infections and hearing loss. However, Ayurvedic texts clarified that KT is the best medicine in oro-dental disorders. It is made by processing the ingredients listed in Table.1 in sesame oil as per *Taila paka* procedure.

Considering the effect of KT, it can be proposed that KT could act on PG through three main pathways: effects on the microbial biofilm, modification of the local oral environment, and reduction of gingival inflammation. The known biological activities of the ingredients of KT [11-25] are summarised in Table.1

Table 1: Ingredients of *Kshara Taila* and their reported biological effects

Ingredient	Reported medicinal / biological effects
Radish (<i>Raphanus sativus</i>)	Antioxidant, anti-inflammatory, antidiabetic, lipid-lowering, mild laxative
<i>Svarjika Kshara</i>	Alkaline, caustic, cleansing, tissue-debriding ("scraping") action
<i>Yava Kshara</i> (alkali of <i>Hordeum vulgare</i>)	Anti-inflammatory, urinary alkalising, litholytic tendency
<i>Vida Lavana</i>	Digestive stimulant, osmotic effect
<i>Samudra Lavana</i> (common salt)	Osmotic, antimicrobial (local), reduces oral bacterial load
<i>Romaka Lavana</i>	Digestive, mild laxative
<i>Saindhava Lavana</i> (rock salt)	Mild digestive stimulant, electrolyte balance, less irritant than other salts
<i>Sauvarchala Lavana</i>	Carminative, digestive stimulant
<i>Hingu</i> (<i>Ferula Narthax</i>)	Carminative, antispasmodic, antimicrobial, antioxidant
<i>Shigru</i> (<i>Moringa oleifera</i>)	Anti-inflammatory, antioxidant, wound healing, antidiabetic
<i>Ardraka</i> (<i>Zingiber officinale</i>)	Anti-inflammatory, antiemetic, antioxidant, analgesic
<i>Devadaru</i> (<i>Cedrus deodara</i>)	Anti-inflammatory, antimicrobial, analgesic, antifungal
<i>Vacha</i> (<i>Acorus calamus</i>)	CNS-active, anticonvulsant, antimicrobial, anti-inflammatory
<i>Kushta</i> (<i>Saussurea lappa</i>)	Anti-inflammatory, antimicrobial, antioxidant
<i>Rasanjana</i> (<i>Berberis aristata</i> extract)	Antimicrobial, anti-inflammatory, antidiabetic, hepatoprotective
<i>Shatapushpa</i> (<i>Anethum sowa</i>)	Carminative, antispasmodic, antioxidant
<i>Granthika</i> (<i>Piper longum</i> root)	Digestive stimulant, bronchodilator, anti-inflammatory, antimicrobial
<i>Musta</i> (<i>Cyperus rotundus</i>)	Anti-inflammatory, analgesic, antidiarrhoeal, antioxidant
<i>Kadali</i> (<i>Musa paradisiaca</i> stem juice)	Antidiabetic, anti-inflammatory, wound healing, hepatoprotective
<i>Beejapoor</i> (<i>Swarasa</i> (lemon juice)	Antioxidant (vitamin C), antimicrobial

At the microbial level, several components have reported antimicrobial activity, including *Berberis aristata*, *Moringa oleifera*, *Zingiber officinale*, *Cedrus deodara*, *Acorus calamus*, *Saussurea lappa*, and *Piper longum*. These may inhibit growth of plaque-associated bacteria and interfere with biofilm stability. Salts and alkaline *Ksharas* may further disrupt the plaque matrix through osmotic and caustic effects, reducing bacterial adhesion and facilitating mechanical removal. Together, this could lower the overall microbial load and shift the biofilm towards a less pathogenic composition.

In terms of the oral environment, the presence of multiple salts and alkaline preparations may alter local pH and ionic balance. A more alkaline environment can be less favourable for acidogenic and anaerobic species associated with plaque maturation. The osmotic action of salts may reduce bacterial viability and influence gingival crevicular fluid dynamics. At the same time, acidic components such as lemon juice may provide transient antimicrobial effects. Overall, these changes may modify the

ecological conditions that support pathogenic biofilm shifts.

With respect to gingival inflammation, many ingredients such as *Zingiber officinale*, *Moringa oleifera*, *Cyperus rotundus*, *Saussurea lappa*, and berberine-containing extracts have reported anti-inflammatory and antioxidant properties. These may reduce vascular permeability, inflammatory mediator release, and oxidative stress within gingival tissues. This could translate clinically into reduced erythema, oedema, and bleeding tendency. Some components, including *Ferula narthex* and *Cyperus rotundus*, may also have mild effects on local circulation and tissue response, while others may support tissue repair or epithelial integrity. The combined effect would be a reduction in inflammatory signs and improved gingival tone.

Overall, KT could theoretically act by reducing plaque viability, altering the ecological conditions that favour pathogenic bacteria, and dampening the host inflammatory response, thereby limiting the development and progression of plaque-induced gingivitis.

Nevertheless, irrespective of any intervention, the long-term recurrence of PG depends on oral hygiene. That doesn't diminish the usefulness of treatments which support restoring oral health. KT in particular is promising in that it has been observed to act quickly and without any adverse effects.

CONCLUSION

The Ayurveda treatment adopted here benefitted the patient without causing any adverse reaction. Even so, it needs scientific scrutiny involving a large sample before concluding the actual efficacy of this treatment.

Patient perspective

I felt so difficult with this problem. Not those others told me anything, but I kept feeling it myself. I tried every treatment I knew, before trying Ayurveda. Only this treatment completely helped me.

Declaration of patient consent

The authors hereby certify that they have obtained all necessary patient consent forms in accordance with applicable ethical guidelines. In these forms, the patient has explicitly provided consent for the publication of his images and related clinical information. The patient has been informed and acknowledges that while his name and initials will not be disclosed, and reasonable efforts will be made to protect his identity, complete anonymity cannot be guaranteed.

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Cite this article as:

Vishnu Govind. M, Vimal Panchani. Ayurvedic Understanding and Management of Plaque-Induced Gingivitis. *AYUSHDHARA*, 2026;13(2):467-471.

<https://doi.org/10.47070/ayushdhara.v13i2.2629>

Source of support: Nil, Conflict of interest: None Declared

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