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AN AYURVEDIC APPROACH TO DENTAL CARIES (KRIMIDANTA): A COMPREHENSIVE REVIEW

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ABSTRACT
A chronic microbial disease that affects a significant portion of the population in all age groups, dental caries is a global public health concern. Today, it is thought to be caused by demineralization brought on by oral bacteria's production of acid. Similar conditions are known in Ayurveda as Krimidanta, a Dantagata Vyadhi that is mainly brought on by vitiated Vata and Kapha doshas that result in microbial infestation (Krimi). The pathogenesis (samprapti), multi-stage management techniques, and Ayurvedic understanding of Krimidanta are all examined in this review. Correcting doshic imbalance, maintaining good oral hygiene, and using herbal formulations and procedures like Nasya, Gandusha, Kavala, and Danta Dhupana are all emphasized in Ayurvedic principles. Krimighna herbs, restorative fillings made with herbal pastes or jaggery, and, if required, Agnikarma and Danta Nirghatana (extraction) are all part of the treatment. A step-by-step approach—from early plaque buildup to irreversible decay—as well as conservative and surgical management strategies are covered. Ayurveda's applicability in dental care is demonstrated by the successful preventive and curative results of the integrative use of traditional therapies. This review offers a comprehensive, long-term strategy for managing oral health and validates Krimidanta as an Ayurvedic correlate of dental caries.

KEYWORDS: Ayurveda, Gandusha, Kavala, Danta Dhupana, Dantagata Vyadhi, dental caries, and Krimidanta.

INTRODUCTION
People of all ages worldwide suffer from dental caries, a persistent, multifactorial, and progressive microbial disease of the tooth's hard tissues. The acidic byproducts of bacterial fermentation of dietary carbohydrates, especially sucrose, cause enamel, dentin, and pulp to be destroyed. In addition to being a leading cause of toothaches and tooth loss, the condition also raises the risk of infections, malnutrition, and a lower standard of living. Untreated dental caries in permanent teeth is the most prevalent health condition globally, affecting roughly 2.5 billion people, according to the Global Burden of Disease (GBD) Study. The importance of dental decay for public health is highlighted by the fact that it is estimated that 60–90% of school-aged individuals have it.

According to Ayurveda, the condition that is comparable to dental caries is called Krimidanta, and it falls under Dantagata Rogas, which are diseases of the teeth. Krimidanta is described in ancient Ayurvedic texts like Sushruta Samhita, Ashtanga Sangraha, and Madhava Nidana as a condition brought on by vitiated Vata and Kapha doshas, which provide an ideal environment for Krimi (microorganisms) to infest and destroy the dental structures. Poor diet and oral hygiene are the first steps in the process, which leads to dosha imbalance, black cavity formation, pain, foul discharge, and eventually tooth mobility and loss. Ayurveda emphasizes a holistic approach to managing this condition—focusing not only on symptomatic relief but also on correcting the underlying doshic imbalance, preventing microbial growth, strengthening the dental tissues, and restoring oral health.

In Ayurvedic dentistry, preventive and therapeutic techniques like Nasya (nasal administration), Gandusha and Kavala (oil-holding and gargling), Danta Dhupana (medicated fumigation), and herbal applications are essential. In order to preserve danta swasthya (dental

wellness) and avoid recurrence, these interventions are bolstered by dietary and lifestyle changes.

Traditional systems like Ayurveda are receiving more attention as a result of the growing interest in integrative approaches to oral health, the rise in antibiotic resistance, and the limitations of purely mechanical dental treatments. By analyzing Krimidanta as a correlate of dental caries and providing a thorough Ayurvedic strategy for its management and prevention, this review aims to connect traditional Ayurvedic knowledge with modern dental knowledge.

The Detailed Anatomy of the Tooth

An in-depth knowledge of the anatomy of the tooth is necessary to comprehend the etiology and development of dental conditions such as dental caries (Krimidanta in Ayurveda). The tooth, a specialized calcified structure anchored in the alveolar bone of the jaw, is essential for mastication, phonetics, aesthetics, and general oral health. The crown, neck, and root are the three primary parts of each tooth, which is composed of both soft and hard components.

1.1. The hard tissues of tooth

1. Enamel

- Enamel is the outermost layer of protection for the tooth crown.
- It is the hardest substance in the human body, consisting of 96% inorganic material (mostly hydroxyapatite crystals), 3% water, and 1% organic matrix composed of proteins such as enamelin and amelogenin.
- Enamel is non-living and cannot be replaced since the ameloblasts, which are cells that make enamel, are killed once the tooth erupts.
- Its thickness varies, being thickest (up to 2.5 mm) at the cusp tips and thinner toward the cervical region.
- The functional function of enamel is to protect the inner layers of the tooth from mechanical, chemical, and thermal harm.

2. Dentin

- Directly beneath the enamel is the dentin, which makes up the majority of the tooth structure.
- It is softer, yellower, and less mineralized (approximately 70% inorganic) than enamel.
- Dentin has small canals called dentinal tubules that connect with the pulp, making it responsive to stimuli like pressure, temperature, and bacterial invasion.
- Odontoblasts, the cells lining the inner dentin, continue to deposit secondary and tertiary dentin in response to stimuli or injuries.

3. Cement

- Cementum is the bone-like substance that envelops the tooth root and holds it to the periodontal ligament.
- It is softer than dentin and enamel and can be either cellular or acellular.
- Its main function is support and attachment, which keeps the tooth securely fixed in the mandible.

1.2 The Soft Tissues of the Dental

1. Pulp

- The pulp chamber, located in the center of the tooth, contains the pulp tissue, a rich supply of connective tissue, blood vessels, and nerves.
- It is necessary for nutrition, sensation, and tooth defense processes (such as the synthesis of reparative dentin).
- Pulp moves from the crown to the apical foramen at the root's tip via thin channels.

2. The periodontal ligament, or PDL

- The PDL is a fibrous connective tissue that connects the cementum of the tooth to the surrounding alveolar bone.
- It serves as a shock absorber, allowing for some mobility and cushioning the tooth while it is being chewed.

3. Gingiva, or gums

- Gingiva is the soft tissue that surrounds the tooth's cervical region and alveolar bone.
- Healthy gums must provide a barrier around the teeth to safeguard periodontal integrity.

4. Alveolar Bone

- The alveolar process of the maxilla or mandible contains the tooth sockets, or alveoli.
- The bone remodels in response to mechanical pressures and periodontal health.

1.3 The System of Root Canals

- The root canal contains the pulp from the root section.
- It is made up of the main canal, the lateral canals, and the apical foramen, which permits arteries and nerves to enter the tooth.
- Infected or necrotic pulp tissue is the primary source of endodontic infections in this canal system, requiring therapeutic intervention.

Relevance to Krimidanta

These anatomical structures are gradually invaded and destroyed by Krimidanta, according to Ayurveda. Krishna chidra, a deposit in the dentin and enamel that progresses to the pulp (dantamajja) if treatment is not received, is the hallmark of the first stage. This results in tooth loosening (Chala), discharge (Sravi), and agonizing pain (Maharuja). Upadhatu (danta) and Srotas (danta-kha mala) destruction are at the heart of Ayurvedic disease.

Because it links modern pathology with Ayurvedic samprapti, anatomical knowledge is crucial for therapeutic planning, from preventive care (Danta

Dhavana) to more involved operations like Danta Nirghatana (tooth extraction).

Pathophysiology and Etiology of Dental Caries: Krimidanta

The demineralization of the tooth's inorganic components and the dissolution of its organic components are hallmarks of dental caries, a complicated and multifactorial disease process. Both contemporary and Ayurvedic systems shed light on the disease's underlying causes and mechanisms, which, when combined, provide a more comprehensive and comprehensive understanding of the condition.

Nidana Etiology from a Contemporary Angle

Often known as the caries tetrahedron, the four key elements that contribute to the etiology of dental caries are as follows.

1. Host (saliva and tooth surface)

Susceptibility is influenced by tooth alignment, shape, and composition. Both the amount and quality of saliva are essential for remineralization and acid neutralization.

2. Microbes

The two most common cariogenic bacteria are Streptococcus mutans and Lactobacilli.

A biofilm or dental plaque is created when these microorganisms stick to the surface of the tooth.

3. Fermentable carbohydrates serve as the substrate.

Regular ingestion of sugars such as fructose, glucose, and sucrose supplies the substrate for fermentation by bacteria. Acid production causes the pH to drop below 5.5, which demineralizes enamel.

4. Duration

When bacteria and fermentable carbohydrates interact for an extended period of time without proper oral hygiene, damage increases over time.

Other Risk Elements

- Inadequate dental care
- Ineffective brushing methods
- Regular snacking or consumption of sugary drinks
- Genetic susceptibility
- Lack of access to care and low socioeconomic status

Ayurvedic Viewpoint

Classical Ayurvedic texts state that internal and external factors that vitiate the Vata and Kapha doshas and permit Krimi (microorganisms) to multiply within the dental tissues are the cause of Krimidanta.

Important Sushruta and Astanga Sangraha Nidanas

Dietary Causes of Aharaja

- Overconsumption of heavy, decadent foods, meat (Matsya, Varaha), curd, jaggery (Phanita), and sugarcane juice (Ikshurasa).
- Stale or fermented food.

Viharaja (Causes of Lifestyle)

- Avoiding cleaning your teeth (Danta Dhavana Abhava).
- Bad habits like blowing your nose, overexerting yourself, or avoiding gargling (Kavala, Gandusha).
- Sedentary behavior and sleep during the day.

Manasika (Causes in Psychology)

Anger and emotional strain exacerbate the Vata dosha, making decay and pain worse.

Local Elements

- Food waste buildup (Anna-mala sangraha).
- Putrefaction and microbial growth result from poor oral hygiene (Krimi janana).

Pathogenesis (Samprapti) Current Perspective

First Stage-Demineralization

- Lactic acid is one of the organic acids produced by oral bacteria as they break down sugars.
- White spot lesions result from the demineralization of the enamel caused by these acids.

Decay that occurs gradually

- Acids enter the dentin, which is softer and more vulnerable, after the enamel is broken.
- As the lesion moves closer to the pulp, it causes pulpitis, which is followed by infection or necrosis.

Advanced Stage

- Bacteria infiltrate the pulp chamber and periapical tissues in untreated cases, resulting in the development of an abscess and systemic complications.

Ayurveda Perspective: Krimidanta's Samprapti Ghataka.

Table 1.

Element	Description
Dosha	Predominantly Vata- Kapha vitiation
Dushya	Asthi, Majja, Rakta (tooth, pulp, and surrounding structures)
Srotas	Danta-moola (tooth root channels) Rakta Vaha Srotas
Adhisthana	Danta, Danta Moola, Mukhapradesha
Srotodusti	Sanga (obstruction) and Sira granthi (channel blockage)
Vyadhi Swabhava	Krimija, Raktaja, and other painful and progressive conditions.

Pathological Sequence, or Samprapti

Dosha vitiation, particularly Vata and Kapha, as a result of poor diet and hygiene.

⬇

These doshas disrupt the integrity of dental tissues by localizing in the tooth and its root.

⬇

Putrefaction is encouraged when the tooth's interior spaces (Danta-majja) become porous and dry.

⬇

Decomposed organic matter produces krimi, or microbes, which create blackish cavities (Krishna chidra).

⬇

As the infection worsens, pus forms, teeth become loose (Chala), and there is pain (Maharuja).

⬇

If left untreated, the illness progresses to Asadhya, which is difficult to treat, and can result in the tooth's total destruction.

A feature of the Comparative Pathogenesis

Table 2.

Features	Modern Dentistry	Ayurveda (krimidanta)
Primary cause	Acidogenic Bacteria	Vitiated vata, kapha and krimi
Site of origin	Enamel and dentin	Danta, Danta majja, Danta moola
Triggering factors	Sugars and poor hygiene	Sweet, unctuous food and neglect of danta dhawana
Pathology	Demineralization and decay	Tissue decay due to Dosha-krimi involvement
Progression	Enamel → Dentin → Pulp → Periapical	Superficial → Cavitation → Discharge→ Mobility
Symptoms	Sensitivity, pain, pus	Krishna chidra, Maharuja, Srava, Chala

In conclusion, both Ayurveda and contemporary science concur that a tooth's destructive process is started by both local and systemic factors. However, under the auspices of Krimidanta, Ayurveda offers a multifaceted approach to dental caries prevention and treatment by incorporating a holistic framework that links the disease to diet, lifestyle, habits, and doshic imbalance.

Modern Classification

GV Black's division

Class	Anatomical Description
Class I	Pits and fissures
Class II	Contact area; posterior teeth
Class III	Contact area; anterior teeth
Class IV	Incisal edge
Class V	Cervical third

Ayurveda

Organized according to progression.

- tooth instability (Chala),
- pus formation (Sravi),
- discoloration (Krishna chidra),
- Danta mala sangraha.

Dental Caries Diagnosis / Krimidanta

In order to treat dental caries and its Ayurvedic counterpart, Krimidanta, early and precise diagnosis is essential. Early detection helps to prevent irreversible damage to tooth structure by allowing conservative and preventive treatment. Clinical techniques, radiographic instruments, and conventional Ayurvedic signs and symptoms (Lakshanas) are all used in the diagnosis process.

Contemporary Methods of Diagnosis

A. Clinical Assessment

The first step is visual inspection in well-lit conditions.

Among the indicators are.

- Lesions with white spots (early demineralization of enamel)
- Discoloration that is either brown or black
- Cavities or structural disintegration
- Impaction of food
- Pain or tenderness in the teeth
- Finding softening or stickiness in the pits and fissures can be aided by using a dental explorer or probe.

B. Evaluation of Radiography

- The best way to find proximal caries between posterior teeth is with bitewing radiographs.
- Periapical radiographs: Evaluate how the surrounding bone and deeper tooth structures are involved.
- When there is multiple tooth involvement, extensive caries, or an abscess, panoramic X-rays (OPG) can be helpful.
- Cone beam CT (CBCT): Advanced imaging for surgical or endodontic planning in deep lesions.

C. FOTI, or transillumination

- Without radiation exposure, fiber-optic transillumination aids in the early detection of lesions in proximal surfaces and anterior teeth.

D. Measuring Electrical Conductance

- determines the conductivity of teeth; demineralization causes carious enamel to have a higher conductivity.

E. Using fluorescence values, laser fluorescence devices (like DIAGNOdent) identify early demineralization and caries activity.

F. Vitality Testing of Pulp Electric and thermal (hot/cold) tests assess pulp tissue health, particularly when irreversible pulpitis or necrosis is suspected.

An Ayurvedic diagnostic criterion
supports Trividha Pariksha, or the three-fold examination, which emphasizes clinical symptomatology:
1. Darshana (Examination)
2. Palpation, or Sparshana
3. Prashna (Taking History)

Unique Diagnostic Perspectives from Classical Literature

- Dosha-Dushya Sammurchana is evaluated, and the disease is staged according to Krimi invasion and Danta Majja involvement in a Samprapti-based diagnosis.
- The Shotha Pariksha, or Inflammation Assessment, aids in locating any underlying swelling or abscess.
- Rakta Dusti Lakshana: Determining whether Rakta Visravana (bloodletting) is necessary requires an understanding of the vitiation of Rakta and the presence of pus.
- Understanding susceptibility based on body constitution, cause, site, pathology, and prognosis is made easier with the aid of Prakriti and Nidan Panchaka analysis.

Stage-wise diagnostic features

Stages	Modern Diagnosis	Ayurvedic Diagnostics
I	White spot lesion, Plaque, No cavitation	Discoloration, food accumulation, mild Vata vitiation
II	Enamel breach, visible black/brown lesion	Krishna chidra, slight pain, bad breath
III	Dentin and pulp involvement, tenderness	Sravi,Maharuja ,Chala, Sasamrambh
IV	Deep infection, periapical radiolucency, abscess	Pus discharge, severe pain, systemic signs, *Asadhya* stage

Krimidanta: Dental Caries Management
The goals of managing Krimidanta, the Ayurvedic correlate of dental caries, are to stop the decay from progressing, get rid of the microbial infestation (Krimi), relieve pain, keep the tooth's structure intact when possible, and restore Danta Swasthya (oral health). A stage-wise and customized approach is used, drawing from traditional Ayurvedic texts and current knowledge of caries pathology.

Ayurvedic Management Principles
The following guidelines govern how Krimidanta is treated, per Sushruta, Ashtanga Hridaya, and other classical treatises.

- Dosha Shamana: Redressing the imbalance between Vata and Kapha .Utilizing antimicrobial herbs and treatments. is known as Krimighna Chikitsa.
- Shodhana: Bloodletting, debridement, and local cleansing.
- Ropana: Tissue repair and fortification.
- Rasayana: Gum and tooth renewal.

Local treatments like Gandusha, Kavala, and Lepa are part of Sthanik Chikitsa.
In severe, irreversible cases, Samshodhana—Extraction (Danta Nirghatana)

Stage wise Ayurvedic Management

Stage	Clinical Condition	Management Modalities
I. Accumulation Stage (*Danta Mala Sangraha*)	Plaque buildup, no cavity	- Daily *Danta Dhavana* with herbal twigs (e.g., *Nimba*, *Khadira*) - *Kavala* (gargling with medicated decoctions)- *Gandusha* (oil holding) - Use of herbal tooth powders (e.g., *Triphala*, *Haridra*)
II. Early Decay / Discoloration (*Krishna Chidra*)	Black spots, enamel erosion	- *Sneha Gandusha* with *Tila taila* processed with *Eranda*, *Brihati*, *Kantakari* - *Avapidan Nasya* (nasal drops) to pacify *Vata* - *Rakta Visravana* (bloodletting) in case of swelling/inflammation
III. Painful Stage / Pulp Involvement (*Sravi*, *Maharuja*)	Severe pain, pus, sensitivity	- Internal *Krimighna Chikitsa* using herbs like *Hing*, *Kataka*, *Vidanga* - *Danta Puranam* (herbal cavity filling): hot jaggery, melted ghee, wax - *Lepa* with herbs like *Bhadradaru*, *Sharapunkha* - *Danta Dhupana* with *Viśālā phala*, *Karanja*, *Nirgundi* to eliminate *Krimi*
IV. Advanced	Tooth mobility, abscess,	- *Danta Nirghatana* (tooth extraction using *Samdamsa Yantra* or

Destruction / Irreversible Stage (*Chala Danta*)	systemic symptoms	Mudgara) - *Agnikarma* (cauterization of socket) to arrest bleeding and pain - Post-operative *Nasya* with *Vidari*, *Yashtimadhu*-processed oil-*Kavala* with warm *Madhu-Yashtimadhu* decoction

DISCUSSION

Despite major advancements in modern dentistry, dental caries, one of the most common chronic diseases worldwide, still poses a challenge to public health systems. Recurrent infections and increasing antibiotic resistance indicate the need for preventive and holistic care, an area where Ayurveda offers distinct benefits, even though the etiology has been thoroughly studied from a microbial and biochemical perspective. Sushruta Samhita, Astanga Sangraha, and other classical texts describe Krimidanta, a concept that reflects the pathological processes of dental caries, especially its progressive nature, microbial causation (Krimi), and involvement of deeper dental tissues. The stage-by-stage classification and treatment method offered by Ayurveda incorporates both systemic and local interventions. Poor oral hygiene and food particle accumulation (Anna mala Sangraha) are the first signs of the disease. These factors cause a doshic imbalance, mainly between Vata and Kapha, and the development of Krimi (microorganisms). This is consistent with our current knowledge of demineralization of enamel, acidogenic bacterial activity (particularly Streptococcus mutans), and bio film formation.

Pathophysiological Ayurvedic Perspectives

Systemic and lifestyle factors are included in the Ayurvedic pathology (Samprapti), which goes beyond simple infection. In contrast to contemporary caries development, the series of events from dosha vitiation, danta majja shoshana (drying of tooth pulp), Krimi janana (generation of microbes), and eventual chidrata (cavity formation) and danta chalana (mobility) provides a deeper but parallel viewpoint. The accompanying symptoms, Krishna chidra (black cavities), Sravi (discharge), and Maharuja (severe pain), correspond with the clinically observed pulpitis, abscess formation, and advanced decay.

Comprehensive Clinical Use

Instead of only focusing on removal or mechanical restoration, Ayurvedic management emphasizes tissue restoration, strengthening of dental and gingival structures, and causative factors. Local remedies such as Danta Dhupana (herbal fumigation), Kavala (gargling), and Gandusha (oil holding) have anti-inflammatory, antimicrobial, and tissue-rejuvenating properties that work on the disease site as well as its underlying cause.

Additionally, Ayurveda presents the idea of Nasya karma, which balances Vata dosha, a crucial component in managing pain and inflammation, in addition to promoting local healing. In contemporary dentistry, where pain management is primarily symptomatic, this is rarely addressed.

The Krimighna herbs that are applied externally (Haridra, Khadira, Nimba) and taken internally (Hingu, Vidanga, Katphala) have been shown to have antimicrobial qualities. Their inclusion in treatment protocols for oral infections is validated by recent pharmacological studies that support their role in reducing inflammation and oral pathogens.

Significance in Preventive and Early Care

Ayurveda's preventive vision in oral care is highlighted by its emphasis on regular Gandusha practices, dietary control (avoidance of sticky, sugary, and stale foods), and daily Danta Dhavana using herbal twigs. Oil pulling and the use of natural tooth-cleaning agents are two practices that have been advocated by Ayurveda for centuries but have only recently gained support from modern science.

Ayurvedic Surgical Relevance

Ayurveda recommends Agnikarma (cauterization of the socket) and Danta Nirghatana (extraction) for advanced stages of Krimidanta, when the tooth becomes painful, mobile, and severely decayed. Despite their apparent traditionalism, these techniques are founded on good surgical principles and are intended to relieve pain, control infection, and stop bleeding. Medicated Nasya, Gandusha, and Madhu-Yashtimadhu rinses used as part of post-operative care encourage quicker healing and guard against reinfection.

Enhancing Contemporary Dental Care

By addressing systemic inflammation, lowering recurrence after fillings, and managing early caries without drilling, Ayurvedic therapies can fill in the gaps left by contemporary dental interventions. Ayurvedic principles provide affordable, sustainable, and culturally acceptable solutions, particularly in populations with limited access to dental care or growing resistance to synthetic medications.

CONCLUSIONS

Tooth decay, also known as dental caries, is still one of the most common and enduring oral health problems that affect people of all ages worldwide. Its prevalence is still rising despite advancements in restorative dentistry and preventive dentistry, especially in underserved populations with limited access to care. In this regard, Ayurveda provides a tried-and-true, economical, and comprehensive framework for comprehending, preventing, and treating dental caries—known as Krimidanta in classical texts.

Ayurvedic classics like the Sushruta Samhita and Astanga Sangraha provide detailed descriptions of Krimidanta, describing it as a Dantagata Vyadhi that

arises from the vitiation of the Vata and Kapha doshas, which causes Krimi (microorganisms) to form within the tooth structure. Through dosha shodhana (correction of doshic imbalance), Krimighna chikitsa (anti-microbial treatment), and rasayana (tissue rejuvenation), the traditional Ayurvedic method goes beyond symptomatic relief to address the underlying cause of disease.

In addition to strengthening the teeth and surrounding tissues, therapies like Nasya, Gandusha, Kavala, and Danta Dhupana are essential for preventing and controlling oral microbial activity. In addition to preserving Danta Swasthya, or dental wellness, these therapies also lessen disease recurrence and enhance the patient's quality of life. The anti-inflammatory, analgesic, and antimicrobial properties of herbal formulations and localized therapies found in Ayurveda make them extremely relevant for both curative and preventive uses.

Additionally, Ayurveda offers a step-by-step treatment plan that starts with conservative measures for early decay and progresses to restorative fillings and surgery (Danta Nirghatana) for more severe cases. The system promotes daily oral hygiene habits, dietary control, and personalized medicine that are not only supported by science but also by culture and are realistically achievable.

In summary, Krimidanta, the Ayurvedic treatment for dental caries, is a complete model that is restorative, curative, preventive, and promotive. It provides a useful supplement or substitute for contemporary dental care, particularly in cases that are early-stage, chronic, or recurrent. By combining traditional knowledge with contemporary science, Ayurvedic dentistry has the potential to greatly improve oral health worldwide with additional clinical research and integrative application.

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