



DANTAROGANASHINI CHURNA IN ORAL HEALTH: A CRITICAL ANALYSIS OF ITS AYURVEDIC PHARMACOLOGICAL RATIONALE AND CONTEMPORARY BIOLOGICAL PLAUSIBILITY

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ABSTRACT

Dantaroganashini Churna is a classical polyherbal formulation described under Mukharoga Adhikara of Bhaishajya Ratnavali and indicated for disorders affecting the teeth and supporting oral tissues. The formulation contains 10 herbal drugs administered locally as Pratisarana, providing a distinctive therapeutic model that combines local drug contact with the pharmacological attributes of multiple medicinal substances. The present review critically examines the classical therapeutic rationale of Dantaroganashini Churna and evaluates its contemporary biological plausibility using available phytopharmacological and oral-health literature. Classical Ayurvedic pharmacological attributes, therapeutic actions and traditional indications of the constituent drugs were analysed and subsequently compared with evidence concerning antimicrobial, antibiofilm, anti-inflammatory, analgesic, antioxidant and oral-health-related activities. Particular emphasis was placed on distinguishing evidence obtained from individual plants or related herbal oral-care preparations from evidence directly applicable to the complete formulation. Contemporary studies provide oral-health-related evidence for selected constituents, particularly *Jasminum grandiflorum*, *Barleria prionitis*, *Cyperus rotundus*, *Terminalia chebula* and *Zingiber officinale*. Clinical and systematic-review literature also indicates potential utility of selected herbal oral-care preparations in plaque and gingival inflammation control, although heterogeneity and methodological limitations remain. The available evidence therefore supports biological plausibility of several constituent-level actions but does not establish the clinical efficacy of the complete Dantaroganashini Churna. Its formulation-specific pharmacological activity, interaction among constituents and clinical effectiveness require systematic investigation.

KEYWORDS: Dantaroganashini Churna; Danta Roga; Mukha Roga; Pratisarana; Ayurvedic pharmacology; Oral health.

INTRODUCTION

Oral diseases constitute an important component of the global burden of non-communicable disease. Dental caries, periodontal diseases, tooth loss and other oral disorders affect populations across the lifespan, while inadequate plaque control remains an important modifiable determinant of several common oral conditions.¹ Dental plaque is now understood as a structured microbial biofilm whose composition, ecological interactions and host response contribute to the initiation and progression of gingival and periodontal disease.^{2,3} Consequently, contemporary oral care increasingly considers not only direct antimicrobial activity but also biofilm control, modulation of inflammation and maintenance of the local oral environment.

Ayurveda approaches disorders of the oral cavity within the broader framework of Mukha Roga, with Danta Roga constituting an important group of dental disorders. Classical texts describe local therapeutic procedures including Pratisarana, in which a medicinal powder or other preparation is applied and gently rubbed over the teeth and gingiva. The therapeutic logic of such local administration is particularly relevant to dental disorders because it allows direct contact of the medicament with the affected tissues.

Dantaroganashini Churna is described in Bhaishajya Ratnavali, Mukharoga Adhikara, with a combination of 10 medicinal substances: Jatipatra, Punarnava, Tila, Kana, Kouranta, Musta, Vacha, Shunthi, Dipya and Haritaki.⁴ The classical description of Dantaroganashini Churna indicates its use in conditions such as Dantashula (toothache), Krimidanta, and Vataja Dantaroga, with the formulation also described as promoting Danta Dridhata (strengthening of the teeth). The classical verse further attributes Vataghna, Krimidanta-shula-dahana, and Daurgandhya-hara actions to the formulation, thereby indicating its application in dental disorders, dental pain and oral malodour.

The therapeutic rationale of Dantaroganashini Churna can be understood from the collective Ayurvedic properties and actions attributed to its individual constituents. The formulation comprises ten drugs having diverse Rasa, Guna, Virya and Vipaka, with different Karma described for their therapeutic application. Collectively, these properties are relevant to the management of conditions involving Dantashula, Krimidanta, Vataja Dantaroga and other oral disorders described in the classical context. The formulation is administered locally by Pratisarana, thereby bringing the powdered drugs into direct contact with the teeth and surrounding oral tissues.

The individual ingredients of the formulation have been described in Ayurvedic literature with properties such as Vataghna, Krimighna, Shothahara, Shoolahara, Kledaghna, Vranashodhana, Vranaropana and Dantya actions, depending upon the drug. These properties provide the Ayurvedic basis for understanding the inclusion of different drugs within the formulation. The classical description, therefore, should be considered primarily within the framework of Danta Roga and Mukha Roga management rather than by attributing a single pharmacological action to the entire formulation.

Contemporary studies on some of the individual ingredients have reported biological activities relevant to oral health, particularly antimicrobial activity against selected oral microorganisms and other pharmacological effects. Such findings may provide preliminary support for further investigation of the constituent drugs; however, they should not be equated directly with the therapeutic efficacy of Dantaroganashini Churna as a complete formulation. Evidence generated from individual extracts, laboratory models or non-oral experimental systems has its own limitations and cannot substitute for formulation-specific clinical evidence.

Accordingly, the present review considers Dantaroganashini Churna from two complementary perspectives: its classical Ayurvedic pharmacological basis and the contemporary evidence available for its individual constituents, with particular attention to evidence relevant to oral health. This approach also helps to identify the areas where the classical therapeutic rationale is supported by contemporary observations and where further formulation-specific research is required.

MATERIALS AND METHODS

Methodology

A critical integrative literature review was conducted using classical Ayurvedic texts, pharmacopoeial references and contemporary peer-reviewed literature. Classical sources were reviewed for the composition, indications, Rasa Panchaka, therapeutic actions and mode of administration of Dantaroganashini Churna and its constituents. Contemporary literature was searched using relevant terms related to Dantaroganashini Churna, Danta Roga, Mukha Roga, Pratisarana, oral microorganisms, dental plaque, gingivitis, periodontal disease and antimicrobial activity. Evidence from individual constituents was considered separately and was not interpreted as direct evidence for the complete formulation.

TABLE NO 01: Name of the Ingredients, Latin name and Part Used

Sr. No	Ingredients	Latin name	Parts used
1	Jatipatra	<i>Jasminum grandiflorum</i> Linn	Leaves
2	Punarnava	<i>Boerhavia diffusa</i> Linn	Root
3	Tila	<i>Sesamum indicum</i> Linn	Seeds
4	Kana	<i>Piper longum</i> Linn	Fruit
5	Kouranta	<i>Barleria prionitis</i> Linn	Whole plant
6	Musta	<i>Cyperus rotundus</i> Linn	Rhizome
7	Vacha	<i>Acorus calamus</i> Linn	Rhizome
8	Shunthi	<i>Zingiber officinale</i> Roscoe	Rhizome
9	Dipya	<i>Apium graveolens</i> Linn	Fruit
10	Haritaki	<i>Terminalia chebula</i> Retz	Fruit

CLASSICAL IDENTITY AND THERAPEUTIC BASIS OF DANTAROGANASHINI CHURNA

The formulation is described in Bhaishajya Ratnavali, Mukharoga Adhikara, where the constituent drugs are prescribed in powdered form and administered locally in the oral cavity.⁴ The classical verse describes the formulation as being used in the mouth and associates it with actions against dental disorders, dental pain and oral malodour.

The therapeutic significance of the formulation becomes clearer when its constituent pharmacological attributes are considered collectively. The ingredients include aromatic, pungent, bitter and astringent drugs, together with substances traditionally described as possessing cleansing, wound-healing, anti-inflammatory and Vata-modulating properties.

The classical mode of administration, Pratisarana, is itself pharmacologically relevant. Local rubbing may facilitate physical removal of adherent debris while simultaneously increasing contact between the powdered medicament and oral tissues. Thus, the therapeutic effect of the formulation can conceptually be viewed as arising from the interaction of **local mechanical cleansing, prolonged local exposure and constituent pharmacological activity**.

This interpretation does not imply equivalence between classical Krimidanta and a specific modern microbial disease entity. Rather, Krimi, Kleda, Shotha, Shula and related Ayurvedic descriptions provide a different pathological and therapeutic vocabulary that may partially overlap with contemporary observations concerning microbial biofilm, inflammation, local tissue injury and pain.

AYURVEDIC PHARMACOLOGICAL ARCHITECTURE OF THE FORMULATION

Jatipatra

Jatipatra (*Jasminum grandiflorum* Linn.) is traditionally characterised by predominantly bitter and astringent taste with properties considered useful in disorders involving local inflammation and tissue disturbance. Its classical therapeutic relevance in oral disorders can be interpreted through its Shothahara, Vranashodhana and local tissue-supportive attributes.

Importantly, contemporary evidence provides a direct oral-health connection for this plant. Nagarajappa et al. evaluated *J. grandiflorum* leaf extracts against pathogenic oral microorganisms and reported antimicrobial activity against organisms including *Streptococcus mutans* and *Lactobacillus acidophilus*.⁵ This provides biological plausibility for the classical inclusion of Jatipatra, although the study involved plant extracts rather than Dantaroganashini Churna itself.

Punarnava

Punarnava is traditionally described with Shothahara, Mutrala and Rasayana properties and is recognised for its therapeutic relevance in conditions associated with inflammation and tissue imbalance. In the context of Dantaroganashini Churna, these properties support its inclusion in a formulation intended for disorders of the teeth and oral tissues. Its Ayurvedic pharmacological profile complements the actions of other constituent drugs and contributes to the overall therapeutic rationale of the formulation.

Contemporary studies on *B. diffusa* have also reported pharmacological activities relevant to its traditional use. Although evidence specific to oral health remains comparatively limited, the available findings support further evaluation of Punarnava as a constituent of Dantaroganashini Churna.

Tila

Tila (*Sesamum indicum* Linn.) is traditionally recognised for Snigdha and Guru qualities and is widely used in Ayurvedic local therapies. Within an oral formulation, sesame may provide a contrasting Snigdha component to the predominantly pungent, bitter and astringent drugs.

Its inclusion may therefore contribute to the overall balance of the formulation and local acceptability rather than representing a single-target antimicrobial component. Sesame oil and sesame-derived constituents have been investigated for several biological activities; however, direct extrapolation to the present powdered formulation should be avoided.

Kana/Pippali

Kana or Pippali (*Piper longum* Linn.) is characterised by predominantly Katu Rasa, Laghu and Tikshna properties and Ushna Virya. Its classical actions are closely associated with Kapha-Vata modulation, stimulation and facilitation of therapeutic activity.

In the context of local dental application, its pungency and penetrating characteristics may contribute to local stimulation and interaction with the oral environment. Piper-derived phytochemicals also possess antimicrobial and anti-inflammatory potential in experimental studies, although formulation-specific dental evidence remains limited.

Kouranta/Vajradanti

Kouranta or Vajradanti (*Barleria prionitis* Linn.) is particularly relevant to the dental context. The plant has a long history of traditional use in oral disorders and is described as useful in conditions affecting teeth and gingival tissues.

Contemporary clinical evidence provides one of the stronger oral-health links among the constituents. Gupta et al. evaluated *B. prionitis* mouthwash in comparison with chlorhexidine in 30 subjects and reported a reduction in dental plaque, with the herbal preparation showing statistically comparable plaque-related effects within the limitations of the short trial.⁶ The study supports the plausibility of an oral-health role for *B. prionitis*, but the intervention was a mouthwash and not Dantaroganashini Churna.

Musta

Musta (*Cyperus rotundus* Linn.) possesses predominantly bitter and astringent characteristics and is traditionally associated with Kledaghna, Deepana and Grahi actions. The Kledaghna concept is particularly relevant when considering the classical emphasis on local moisture, secretions and pathological accumulation.

Direct experimental oral evidence is also available. Haghighi et al. investigated *C. rotundus* extract against *S. mutans* and *L. acidophilus* and demonstrated bacteriostatic and bactericidal activity, although the activity was lower than that of chlorhexidine under the study conditions.⁷ This represents supportive biological evidence but should not be interpreted as proof of clinical effectiveness of the constituent in the present formulation.

Vacha

Vacha (*Acorus calamus* Linn.) is an aromatic rhizome characterised by Katu and Tikta attributes, Laghu, Tikshna and Sara properties, and Ushna Virya. Its aromatic and penetrating nature is consistent with the local sensory characteristics expected of an oral medicinal preparation.

Experimental studies have demonstrated antibacterial activity of *A. calamus* essential oil and its constituents against multiple microorganisms.⁸ More recent mechanistic work has also suggested membrane-permeability changes and interference with bacterial fatty-acid composition as possible contributors to antibacterial activity. Such findings provide a mechanistic basis for further investigation, but they remain primarily non-oral experimental evidence.

Shunthi

Shunthi (*Zingiber officinale* Roscoe) is a classical Katu, Ushna and Kapha-Vata-shamaka drug. Its inclusion can be interpreted in relation to local circulation, inflammation, microbial modulation and its characteristic pungency.

Contemporary investigation has demonstrated antimicrobial activity of ginger extracts against selected oral microorganisms, including *S. mutans*, *Enterococcus faecalis*, *Staphylococcus* species and *Lactobacillus* species.⁹ The evidence supports biological plausibility for antimicrobial activity, although differences in extraction solvent and experimental conditions limit direct comparison with the classical formulation.

Dipya

Dipya, identified in the present formulation as *Apium graveolens* Linn., is an aromatic botanical with traditionally described digestive and stimulant properties. Its inclusion contributes to the aromatic and pungent pharmacological profile of the formulation.

For oral-health interpretation, the evidence base for *A. graveolens* is considerably less developed than that for Jatipatra, Kouranta, Musta, Shunthi and Haritaki. Therefore, its contribution should presently be regarded as a hypothesis-generating component requiring constituent-specific and formulation-specific investigation rather than as an established oral therapeutic action.

Haritaki

Haritaki (*Terminalia chebula* Retz.) represents one of the most pharmacologically relevant constituents from the perspective of oral health. It possesses Kashaya as the dominant taste along with other Rasa attributes and is traditionally associated with Rasayana, Kledaghna, Shothahara and tissue-supportive actions.

Its contemporary oral-health evidence is comparatively substantial. Jagtap and Karkera demonstrated inhibition of *S. mutans* growth, sucrose-induced adherence and glucan-induced aggregation with aqueous *T. chebula* extract.¹⁰ A clinical study subsequently reported changes in salivary pH, buffering capacity and microbial counts following a 10% aqueous extract mouth rinse in individuals at high risk for caries.¹¹

Randomised clinical studies have also investigated *T. chebula* mouthwash for plaque and gingival inflammation, reporting reductions in periodontal indices and microbial plaque.^{12,13} These findings make Haritaki one of the strongest individual constituents for supporting a contemporary oral-health rationale, while still not establishing efficacy of the complete Dantaroganashini Churna.

INTEGRATIVE INTERPRETATION OF THE FORMULATION

Dantaroganashini Churna is a classical polyherbal formulation comprising ten medicinal ingredients described with different Rasa, Guna, Virya, Vipaka and therapeutic actions. The formulation is traditionally indicated for conditions such as Dantashula, Krimidanta and Vataja Dantaroga, and the classical description also mentions actions related to dental disorders and oral malodour. The combination of drugs therefore represents a comprehensive Ayurvedic approach to the management of dental and oral conditions.

The individual constituents contribute different therapeutic attributes to the formulation. Jatipatra, Kouranta, Musta, Shunthi, Haritaki and other ingredients have been described in Ayurvedic literature with properties relevant to oral and inflammatory conditions. Contemporary studies have also reported biological activities for several of these individual drugs, including antimicrobial and other pharmacological effects. Such findings provide scientific interest in the constituent drugs and support further investigation of the formulation.

However, the therapeutic rationale of Dantaroganashini Churna should primarily be understood within its classical context. The presence of multiple drugs with different properties does not necessarily imply that each constituent acts through an independent modern pharmacological pathway. Similarly, findings obtained from isolated extracts or individual ingredients cannot be directly applied to the complete formulation.

The available evidence therefore provides a basis for considering Dantaroganashini Churna as a pharmacologically interesting classical formulation for oral health, while formulation-specific evidence remains necessary to establish its biological activity and therapeutic efficacy. Further studies involving the complete formulation would be useful for understanding its antimicrobial activity, safety, pharmacological effects and clinical applicability.

CONTEMPORARY EVIDENCE FOR HERBAL ORAL-CARE PREPARATIONS

The evidence for herbal oral-care products provides useful contextual support for examining Dantaroganashini Churna, although it does not substitute for formulation-specific research.

A randomised double-blind trial involving a polyherbal toothpaste containing *Terminalia chebula* and *Zingiber officinale* among several other medicinal plants reported improvements in plaque index, gingival bleeding and salivary anaerobic bacterial counts over 12 weeks.¹⁵ Another randomised placebo-controlled trial of an Ayurvedic toothpaste containing several medicinal plants, including *T. chebula* and *Z. officinale*, reported reductions in plaque score, bleeding on probing, probing pocket depth and total salivary anaerobic counts among participants with chronic gingivitis.¹⁶

At the evidence-synthesis level, Janakiram et al. reviewed 24 randomised controlled trials involving 1597 adults and found that herbal oral-care products could provide short-term plaque-control effects, although the quality of evidence was low and results varied according to the comparator.¹⁷ A separate systematic review and meta-analysis of herbal mouthwashes found significant effects against placebo for plaque and gingival inflammation, but emphasised the need for higher-quality trials.¹⁸

An Ayurvedic and herbal plaque-control meta-analysis included 41 randomised clinical trials and reported potential reductions in plaque, gingival inflammation and bacterial colony counts, while also highlighting

variation between interventions.¹⁹ A systematic review specifically examining herbal oral-care products in periodontitis reported potentially beneficial adjunctive effects, but again emphasised the need for well-designed studies.²⁰

More recently, an umbrella review of systematic reviews concluded that findings concerning herbal oral-care products remain variable and that short trial durations and publication bias require cautious interpretation.²¹ These findings are important for the present formulation because they demonstrate that the field of herbal oral care has progressed beyond purely in-vitro investigation, but they also demonstrate why evidence must remain intervention-specific.

FORMULATION-LEVEL EVIDENCE GAP

A critical distinction must be maintained between **constituent evidence, preparation evidence and formulation evidence**.

For example, evidence that *T. chebula* inhibits *S. mutans* does not establish that Dantaroganashini Churna inhibits *S. mutans*. Similarly, clinical efficacy of a polyherbal toothpaste containing *T. chebula* and *Z. officinale* cannot be directly transferred to a formulation containing ten different ingredients administered according to a different classical procedure.

Three major evidence gaps therefore emerge.

First, there is limited direct pharmacological research on the complete Dantaroganashini Churna. The formulation requires evaluation as an independent intervention rather than simply as the sum of its ingredients.

Second, the interaction between constituent drugs remains undefined. Polyherbal combinations may demonstrate additive, synergistic, antagonistic or neutral interactions. Such relationships cannot be predicted reliably from single-drug studies.

Third, the classical dosage form itself may influence pharmacological behaviour. Powdered local application differs from a mouthwash, hydroalcoholic extract or toothpaste in terms of particle size, contact time, extraction, retention and exposure of oral tissues.

These limitations establish the scientific rationale for pharmaceutical development and subsequent analytical and biological evaluation of the formulation.

DISCUSSION

The classical rationale of Dantaroganashini Churna demonstrates a coherent therapeutic orientation toward disorders of the teeth and surrounding oral tissues. The formulation combines drugs with predominantly Katu, Tikta and Kashaya characteristics with aromatic and tissue-supportive substances. From the Ayurvedic perspective, these attributes can collectively address pathological domains involving Kapha, Kleda, Shotha, Shula, Krimi and local tissue impairment.⁴

The contemporary literature provides partial biological support for this conceptual architecture. Direct oral-health evidence exists for *J. grandiflorum*, *B. prionitis*, *C. rotundus*, *Z. officinale* and *T. chebula*.^{5-7,9-13} Among these, *T. chebula* has particularly notable evidence extending from in-vitro anticaries observations to clinical studies of plaque and gingival inflammation.¹⁰⁻¹³ The evidence for *A. calamus* supports antibacterial plausibility but is less specific to oral disease.⁸

The presence of several potentially antimicrobial constituents should not, however, lead to the conclusion that the formulation is simply an herbal antibiotic. Oral health is influenced by microbial ecology, biofilm structure, host inflammatory responses, salivary factors, mechanical plaque removal and behavioural determinants.^{1,2,14} The contemporary literature therefore provides a more appropriate conceptual framework in which antimicrobial activity is only one component of oral therapeutic action.

The classical use of Pratisarana is also noteworthy. Mechanical disruption of plaque is a fundamental component of oral hygiene, and the application of a powdered preparation provides an opportunity for simultaneous mechanical and pharmacological action. However, the extent to which this mechanical effect contributes to the therapeutic response of Dantaroganashini Churna has not been independently quantified.

The evidence also indicates that herbal oral-care preparations can demonstrate clinically measurable effects, but these effects vary according to formulation, comparator, duration and study design.¹⁷⁻²¹ Consequently, the existence of positive trials involving other herbal dentifrices should be viewed as contextual support for investigating Dantaroganashini Churna, rather than as indirect evidence of its efficacy.

From a research perspective, this distinction is important. A scientifically meaningful evaluation of the formulation should progress through a sequence of authentication and standardisation, pharmaceutical characterisation, phytochemical profiling, antimicrobial and biological testing, followed where justified by appropriately designed clinical studies. The present conceptual analysis therefore provides the rationale for subsequent pharmaceutical and analytical investigations without prematurely assigning efficacy to the formulation.

The strongest scientific proposition emerging from the review is that Dantaroganashini Churna can be considered a multicomponent local oral therapeutic system with plausible antimicrobial, anti-inflammatory, tissue-supportive and oral-environment-modulating actions. This proposition is supported by convergent classical rationale and constituent-level contemporary evidence, but remains a hypothesis at the complete-formulation level.

CONCLUSION

Dantaroganashini Churna represents a classical polyherbal oral formulation whose therapeutic rationale extends beyond a single antimicrobial action. Its ten constituents collectively provide an Ayurvedic pharmacological architecture involving Krimighna, Shothahara, Shula-hara, Kledaghna, Vranashodhana, Dantya and oral deodorising domains. Contemporary evidence provides biological plausibility for several of these domains, particularly through studies involving *Jasminum grandiflorum*, *Barleria prionitis*, *Cyperus rotundus*, *Zingiber officinale* and *Terminalia chebula*.

The contemporary literature provides biological plausibility for selected components of Dantaroganashini Churna, but formulation-specific evidence remains insufficient to establish the efficacy of the complete classical formulation. Evidence from individual drugs, extracts or unrelated herbal dentifrices should therefore not be considered equivalent to evidence for Dantaroganashini Churna.

The formulation warrants systematic investigation as an independent therapeutic entity, with particular emphasis on standardised pharmaceutical development, phytochemical characterisation, antimicrobial and antibiofilm studies, safety evaluation and appropriately designed clinical research. Such investigations may provide a scientifically rigorous bridge between the classical therapeutic rationale of Dantaroganashini Churna and contemporary oral-health research.

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