REVIEW ARTICLE

REVIEWING DANTA GATA (DENTAL) VISHA CHIKITSA IN PRESENT DAY ORO-DENTAL DISEASES - AN AYURVEDA CONCEPT

RAVI DHALIYA¹ KSHAMA MUTALIK² SWATHI SHARMA³

ABSTRACT

The oral cavity is prone for a countless of changes with the exposure to several kinds of factors like alcohol, tobacco and betel nut consumption, environmental and lifestyle related factors in our day to day life. Oral mucosal lesions, Gingivitis and Periodontitis occur as a result of infections, local trauma or irritation, systemic diseases and excessive consumption of tobacco, betel nut and alcohol. Other etiologies like contact allergic stomatitis are with aromas and preservatives present in dental preparations and food items according to the various study results. Inflammation is a local reactive change that involves the release of antibacterial agents from nearby cells that defend the host against infection. It also facilitates early tissue healing and repair. The Inflammatory process significantly affects the periodontium. Agada tantra is one branch of Ayurveda which deals with the management of various ill effects of visha (poison) ranging from Sthavar visha (plant poison) to jangama visha (animal poison). Visha (poisoning) in any form to the oral cavity can be understood under the topic Danta gata visha. In present day these chemicals can be considered as Gara Visha (poison) and visha chikitsa can be applied to these entities. Hence, this article is an attempt to appraise the drugs and procedures explained for Danta Gata Visha (toxins induced oro-dental diseases).

KEYWORDS – Chikitsa, Danta Gata Visha, Gara visha, Gingivitis, Oral Health, Tobacco.

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INTRODUCTION
Dental diseases are a significant public health burden in India, with dental caries affecting 60 to 65 percent and periodontal diseases affecting an estimated 50 to 90 percent of the general population, depending on age, with research suggesting that higher rates of dental diseases occur in rural areas.\(^1\) Dental diseases in rural India are primarily due to socio-cultural factors, such as the inadequate or improper use of fluoride products and a lack of knowledge about oral health and hygiene.\(^2\) Other causes like Bleach and peroxide are commonly used as whitening agents in commercial toothpaste. Both bleach and peroxide can be an irritant to the mouth and skin in small doses. The major components of the whitening toothpaste include surfactants, polyphosphates, and enzymes. Abrasive agents are the primary stain removal ingredient present in these toothpaste.\(^3\) A number of chemicals used by dental surgeons can cause burns of the oral mucosa i.e trichloroacetic acid used in the treatment of pericoronitis, others are hydrogen peroxide, aspirin, potassium chloride tablets, tetracyclines, toothaches solutions containing menthol, phenol, and chloroform.\(^4\) Another harmful agent which effecting on oral health care is tobacco products and alcohol are well documented. These include both common and rare conditions and diseases such as staining or discoloration of teeth, halitosis, mouth ulcer, periodontal disease, caries, candidosis, oral mucosal disease including smoker’s melanosis, smoker’s palate, potentially malignant lesions and oral cancer.\(^5\) Nowadays many mortalities are happening due to oral cancer, which during the initial stage starts with oral pathologies like Gingivitis caused by poisoning response to nicotine (a toxic substance in tobacco) and N-nitroprusemide.\(^6\)

Oral pathology:
Inflammation represents a protective response designed to rid the body of the initial cause of cell injury. The inflammatory process extensively affects the periodontium. Plaque biofilm releases a variety of biologically active products as gram-positive and gram-negative bacteria colonize the tooth surface around the gingival margin and interproximal areas.\(^7\) These molecules break in the gingival epithelium and initiate a host response that eventually results in gingivitis. Evidence of this can be seen clinically with changes in tissue color from pink to red, swelling, and bleeding upon probing.\(^8\)

As the biofilm continues to proliferate, soluble compounds penetrate the sulcular epithelium. This, in turn signals the gingival epithelium to produce chemical mediators including interleukin–1 beta (IL-1\(\beta\)), prostaglandins, tumor necrosis factor alpha (TNF-\(\alpha\)), and matrix metalloproteinases.\(^9\)
These products recruit neutrophils to the area and influence chemotaxis. As the inflammatory process progresses, additional mediators are produced, and more cell types are recruited to the area including neutrophils, T-cells, and monocytes. The process of gingivitis is represented in Figure 1.

**Figure 1:** Mediators and cells present in established gingivitis

![Established Gingivitis](image)

**Current significance of Gara visha in oral dental pathology:**

According to Ayurveda, Visha is classified into two *Akratrima visha* (Natural poisons) and *kritrima visha* (Artificial), while *kritrima visha* are nothing but Man-made by combining toxic or non-toxic substances to yield a harmful substance. These substances are called as *Gara Visha*\(^{[11]}\). In Ayurveda, the specific drugs and procedures which are described for the management of *Visha* are called as *Visha Chikitsa*. *Gara visha* is nothing but the purposely planned poisoning in olden days to kill the enemies. The *Gara visha* a type of poisoning usually given through food which may be intentional\(^{[12]}\) but, it is also clearly mentioned that other than *anna* (food) and *pâna* (drinks), a variety of medium such as, *abhyanga taila* (massaging oils), *danta kashta* (toothbrushes), *vastra* (cloth), *abharana* (ornaments), *paduka* (footwear) etc. are mode of poisoning and are capable of producing many diseases.\(^{[12]}\) All the drugs and therapies explained under the heading of *garavisha & dushivisha chikitsa* aim to remove *visha* (toxins/poison) from the body and detoxifies the body.

Present lifestyle and addictions has landed us in exposure to chemicals which are harmful locally and systematically. The oral cavity is one which mostly suffers from the above factors. To overcome such...
consequences conventional methods also proving harmful. *Acharyas of Ayurveda* have told Management for the diseases caused due to chemicals under the heading of *GARA VISHA* which have lesser complication and easily accessible.

**DANTA KASTHA GATA VISHA LAKSHANA –**

When *Danta kastha* (tooth brush), *jihva nirlekhana* (tongue cleaner), *kaval* (mouth gargles) are get poisoned, it gives rise symptoms like swelling of the tongue, gums, lips and muscular tissue. These symptoms can be correlated with present day chemical induced oral allergic reactions like contact allergic stomatitis are with aromas and preservatives present in dental preparations and food items, mouth ulcer, periodontal disease, Gingivitis caused by poisoning response to nicotine smoker’s melanosis, smoker’s palate etc.

**Danta Kastha Gata (oro-dental) Visha Chikitsa In Ayurveda –**

Its Special Management explained are:

विशीर्यते कूर्यकस्तु दन्तकाष्ठगते विषे ||

जिश्वादन्तोष्ठमांसानां श्वयशुश्शोपजायते ||

अथाक्य धातकीपुष्पपथ्र्णबृषाजस्थभः ||

सक्षीद्रिः प्रजिते शोषे कर्त्तयं प्रतिसारणम् ||

अथवाद्वेक्कवस्तुमूलां त्वच: सप्तवेणुद्व वा ||

शिरीषमाण्डका वालयं सक्षीद्राः प्रतिसारणम् || [13]

If poison applied over tooth stick, then it loses its bristles. If this poisoned tooth stick being used then it produces selling of the tongue, teeth, gums & lips. Then the swelling should be *Prachana* (incision) & the paste of *Dhataki Pushpa, Pathya, Jambuphala* added with honey or paste of *Ankotha, Satpachada* or seeds of *Sirish* with honey should be *Pratisarna* (rubbing) over the affected gums.

1. **First step – “Prachana”** – It is one of the methods of Bloodletting- Multiple superficial incisional lines are done over the inflamed gums.

2. **Second step- “Pratisarna”** – After prachana, the drugs told below are made into choorna (powder) and is massaged (rubbed) along with honey over the inflamed gums. The drugs can be used in combination or as a single drug along with honey.

**DOSHAGHNATA & KARMUKTA OF THE DRUGS:**

The six Specific drugs have been told for **Danta Gata Visha Chikitsa** (Management) are *Dhataki, Pathya, Jambu, Ankotha, Saptacchada & Shirisha along with Honey.*

According to various *Ayurvedic* texts, *Doshaghnata & Karmukta* of these drugs are listed in below table.
Table Showing the pharmacological & therapeutic properties of herbs according to various Ayurvedic text.\(^{[15],[16],[17],[18],[19],[20]}\)

<table>
<thead>
<tr>
<th>S no.</th>
<th>Sanskrit name (Latin name)</th>
<th>Official part to be used</th>
<th>Doshaghnata (pharmacological properties)</th>
<th>Karmukta (therapeutic properties)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dhataki (Woodfordia fruticosa)</td>
<td>Pushpa (flowers)</td>
<td>Kapha – pitta shamaka</td>
<td>Vrana ropana (wound healing), Stambhana, Vishagha, Krimighna</td>
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<td>2.</td>
<td>Pathya (Terminalia chebula)</td>
<td>Phala (fruits)</td>
<td>Tridosha shamaka</td>
<td>Vrana Shodhana (wound cleanser), Vrana ropana (wound healer), Rasayana (antioxidant)</td>
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<td>3.</td>
<td>Jambu (Syzygium cumini linn)</td>
<td>Phala (fruit nuts)</td>
<td>Kapha–pitta shamaka</td>
<td>Krimighna (raaj nightu)</td>
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<td>5.</td>
<td>Saptacchada (Alastonia scholaris)</td>
<td>Twak (bark)</td>
<td>Kapha–pitta shamaka</td>
<td>Krimighna, Vrana Shodhana (wound healing)</td>
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<td>6.</td>
<td>Shirisha (Albizia lebbeck)</td>
<td>Beeja (seed)</td>
<td>Tridosha shamaka</td>
<td>Vishagha, Stambhana, Dantadarhyakara (tooth strengthener), Shotha hara (anti inflammatory), Vedanasthapana (analgesic), Raktastambhaka</td>
</tr>
</tbody>
</table>

**Efficacy of Danta Gata Visha Chikitsa in oral diseases -**

**A.PRACCHANA (Rakta-Mokshana- Blood Letting)**

Pracchana is multiple superficial incisional lines over the infected area. Bloodletting therapy is one of the typical Shodhana procedures in Ayurveda. Rakta-mokshana means to let out the Dooshitharaka (vitiated
blood). When there is localized disease (eka desha) vitiation of rakta, Siravyadha or Pracchanna are to be adopted for letting out the blood\textsuperscript{[22]}. Pracchana is also indicated when there is stasis or clotted blood\textsuperscript{[21]}. The symptoms of samyk siravedha are Laghavam (lightness), Vedanashanti (pain reduction) & bleeding stops by itself. It means the pain arising from a disease condition get subsided followed by decrease in the symptoms of the disease. Hence bloodletting should be used in swelling & pain predominant diseases.

**Probable Mode Of Action Of Blood Letting -**

Bloodletting therapy is clinically applied by pricking over pathological response points or superficial veins on the human body with an aseptic surgical needle in Chinese traditional therapy (CTH). This causes bleeding and helpful in alleviating pain, activating blood flow, eliminating blood stasis and diminishing the inflammation. Mechanism can be summed up as follows\textsuperscript{[23]}:

a.) Bloodletting therapy can accelerate the metabolism & stimulate the medullary hematopoiesis via neurohumoral regulation. This improves the microcirculation and vascular functions. By improving the microcirculation, it can inhibit excessive inflammatory reactions and promote the recovery.

b.) Good analgesia. While pricking, algogenic substances such as prostaglandin E\textsubscript{2} (PGE\textsubscript{2}) may be discharged and the pain will be eased.

c.) Improvement of human immunity and activation of immune defense functions in the body.

**Probable Mode of Action Of These Drugs –**

A. **Anti-Bacterial & Anticaries Properties :**
   A. The flower of *Dhataki* (*Woodfordia fruticosa*) was evaluated for the potential antibacterial property. The flowers of this plant possess high content of tannins and they have astringent, styptic, antihelmintic, antibacterial properties.\textsuperscript{[24]}
   
   B. The aqueous extract of *Pathya* (*Terminalia chebula*) is proved as an anticaries agent. *Terminalia chebula* of 10% concentration of the extract in the form of a mouthwash was an effective anticaries agent\textsuperscript{[25]}. In another study, the acetonic extract of *Pathya* (*T. chebula*) exhibited growth inhibitory activity against two dental caries *S. mutans* and *S. aureus* compared to other tested extracts\textsuperscript{[26]}
   
   C. In an open placebo-controlled study *Saptacchada* (*Alstonia scholaris*) showed satisfactory results in dental caries. The latex treatment proved effective compared to the placebo group.\textsuperscript{[27]}

D. The antibacterial properties of Honey were assessed by comparing the zones of inhibition resulting from the culture of *S.*
mutans, P. gingivalis, and L. acidophilus in the presence of either honey or various antibiotics. Honey draws moisture out of the environment and thus dehydrates bacteria. Second, the pH of honey is between 3.2 and 4.5, and this acidity is low enough to inhibit the growth of most microorganisms. Data suggested that topical application/chewing of honey might help prevent Gingivitis and caries in patients undergoing orthodontic treatment[^28].

B. Analgesic & Anti-Inflammatory -
1. The higher dose of Dhataki (Woodfordia fruticosa flowers) i.e. WFM-600, showed maximum anti-inflammatory activity at late phase (42%) but this activity was less than that of Woodfordia fruticosa flowers (WFM-400) at both early and late phase. The standard Diclofenac-10 showed maximum activity at early phase (59%, p < 0.01)[^29].

2. Jambu (S. cumini) seed extract, possessing significant anti-inflammatory activity. This may be due to the presence of triterpenoids, saponins, and tannins which deserve further studies to establish its therapeutic value as well as its mechanism of action[^30].

3. Ankotha (Alangium salviifolium) root has good anti-inflammatory actions when compared with Diclofenac sodium Alangium salviifolium root gave significant percent inhibition of the maximal paw edema and very highly significant percent inhibition of total paw edema during 6 h.[^31].

4. Saptacchada (Alstonia scholaris) contains alkaloids like, picrinine, vallesamine, and scholaricine which produce anti-inflammatory and analgesic action[^32].

5. The flowers of Shirisha (Albizia lebbeck) showed reasonable antipyretic, analgesic and anti-inflammatory activities. The best extract which showed anti-inflammatory activity was the dichloromethane extract with 71.6% followed by the ethyl acetate extract with 60.3% inhibitors.[^33]

6. Honey may possess anti-inflammatory activity and stimulate immune responses within a wound[^34],[^35]. Honey reduces the activities of cyclooxygenase-1 and cyclooxygenase-2, thus showing anti-inflammatory effects[^36].

C. Antiulcer -
1. Chloroform and methanolic extract of root of Woodfordia fruticosa were investigated by Mihira and co-worker in diclofenac sodium-induced gastric ulcer and compared with ranitidine in female wistar albino rats at concentrations of 150 mg/kg. methanolic extract was found the most potent anti-ulcer drug in comparison to chloroform extract and standard[^37].

2. Shirisha (Albizia lebbeck) Was Found To Having Good Antiulcer Property. The Effect Of The Alcoholic Extract Of The Albizia Lebbeck
Bark Doses 200 Mg/Kg, 400 Mg/Kg Showed Significant Effect, When Compared With The Control May Be The Presence Of Saponin Contents In The Bark Extract.\textsuperscript{[38]}

3. \textit{Saptacchada} (Alstonia scholaris) was evaluated for anti-ulcer activity (34) by pyloric ligation method. The animals treated with the extract did not show ulcer, whereas the ulcer score was found to be significantly high ($p<0.01$) in rats administered diclofenac sodium\textsuperscript{[39]}.

D. Anti-Allergic –

1. Anti-Allergic activity of the \textit{Jambu} (\textit{Syzygium cumini} Linn) extract was observed by the inhibition of edema formation, mast cell degranulation, and histamine release as well as the inhibition of eosinophil accumulation and IL-5 production\textsuperscript{[40]}.

E. Anticancer

1. \textit{Ankotha} (\textit{Alangium Salvifolium}) proved Antitumor effect in Ehrlich ascites carcinoma bearing swiss mice. And significantly reduced tumor growth, viability of tumor cells, normalized the hematological iles, raising life span as compared with those EAC control mice\textsuperscript{[41]}.

2. Honey has also been used in the palliative care of various cancers like in radiation-induced mucositis, radiotherapy, and chemotherapy-induced skin reactions and wounds\textsuperscript{[42]}. Tualang honey has a promising antiproliferative and apoptotic effect on OSCC and HOS cell lines. Early apoptosis could be attributed, in part, to its ability to inhibit proliferation\textsuperscript{[43]}.

F. Antioxidant-

1. Natural \textit{Honey} contains many flavonoids (such as apigenin, pinocembrin, kaempferol, quercetin, galangin, chrysin, and hesperetin), phenolic acids (such as ellagic, caffeic, p-coumaric and ferulic acids), ascorbic acid, tocopherols, catalase, superoxide dismutase, reduced glutathione, Maillard reaction products and peptides. Most of the above compounds work together to provide a synergistic antioxidant effect\textsuperscript{[44]}.

G. Immune-Modulating Activity -

1. \textit{Shirish} (\textit{A. lebbeck}) treated mice developed higher serum antibody titers compared to the vehicle treated group. Delayed type hypersensitivity response was suppressed in SRBC immunized mice treated with \textit{A. lebbeck} extract. The macrophage migration index remained unaltered in both mice and rats. These results are discussed in the light of possible immunopotentiating effects of \textit{A. lebbeck}\textsuperscript{[45]}.

2. The immunostimulating effect of \textit{Saptacchada} (Alstonia scholaris) bark extracts was studied in BALB/c mouse by Iwo et al (28). The aqueous extract at 100 mg/kg b.w. increased lytic activity of peritoneal exudate cells against Escherichia coli. The aqueous extract at 50 mg/kg b.w. induced the cellular
immune response while at 100 mg/kg b.w. inhibited the delayed type of hypersensitivity reaction [46].

**DISCUSSION**

Herbal medicines have been used for many years. Due to various acute and chronic exposure to tooth whitening chemicals & oral use of tobacco, bettle nut etc, leads to inflammation and secondary infection of gums, hence the line of treatment to such entities According to Ayurveda is *shodhana* (expelling) of *visha* (poison) and *shamana* (neutralize) of the *visha* with *vishaghna* drugs. In Ayurvedic *Samhita*’s, the general management of *Mukha roga* (oral diseases), *Pracchana* (*Raktamokshana*- blood letting) with multiple superficial incision lines and *Pratisarana* (rubbing with herbal coarse powder) procedure are explained for the removal of vitiates *doshas* from the *rakta* (blood). Therefore *Dushita* (vitiates) *Rakta* from the related *Siras* (veins) should be let out to remove the disease. From modern studies bloodletting therapy has been studied in many inflammatory conditions. During the inflammatory process, multiple systems such as nervous, endocrine and immune systems participate in healing. The nervous system and endocrine system transmit a message to the immune system via transmitters and hormones, and the immune system regulates the nervous and endocrine system. Hence, theses three nervous-endocrine-immune system together participates in the regulatory mechanism of bloodletting therapy.

Drugs which are explained in *visha* condition are having high potency and fast acting to fight the state. When we analyze the above drugs, all are *kapha & pitta hara*, & having properties like - *Vrana ropana* (wound healing), *Shothahara* (anti inflammatory), *sthambana, krimighna* (anti helminthic) and *Vishaghna* (anti poisonous) properties. These drugs are even proved as Anticaries, Anti-Allergic, Anti-inflammatory, Antitumor effect, as antimicrobial plaque agents, for preventing the release of histamine, as antioxidants, antifungals, and analgesics properties because of the Phytochemicals present in it. They also aid in healing and are effective in improving immunity. These all highlights the potential of *Danta Gata Visha Chikitsa* in Present Day Oral Diseases.

**CONCLUSION**

A vast number of plants which are explained in *Ayurveda* in the management of *visha* (poisoning condition) have not been studied for clinical validation. Understanding the etiology of any disease is of prime importance to start specific treatment. *Visha chikitsa* as per Ayurvedic text should be studied in present era where diseases related to toxins are increasing. Thus the Procedures & the drugs which are explained in *Visha* induced
**Danta** diseases (dental diseases due to chemical toxins) should be potentially tried in toxins/chemical induced dental problems as well as an oral mucosal lesion.

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