



**COMPARATIVE STUDY OF HERBAL DANTAMANJAN VS FLUORIDATED
TOOTHPASTE IN ORAL HYGIENE MAINTENANCE**

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ABSTRACT

The present study, titled “Comparative Study of Herbal Dantamanjan Vs Fluoridated Toothpaste in Oral Hygiene Maintenance,” evaluates the efficacy, safety, and cost-effectiveness of Herbal Dantamanjan (Ayurvedic tooth powder) versus conventional fluoridated toothpaste in maintaining oral hygiene. Oral health is vital not only for dental care but also for systemic well-being. While fluoridated toothpaste is widely accepted in modern dentistry due to its enamel remineralization and caries prevention properties, concerns over fluorosis, allergic reactions, and environmental impact have led to growing interest in natural alternatives. Ayurveda recommends Dantadhavana (tooth cleaning) as part of Dinacharya, using herbal formulations like Dantamanjan containing Triphala, Haridra, Lavanga, and Saindhava for their antimicrobial, anti-inflammatory, and deodorizing actions. A randomized clinical trial was conducted on 30 participants divided equally into two groups. Group A used Herbal Dantamanjan, while Group B used fluoridated toothpaste for four weeks. Assessment parameters included plaque index, gingival index, halitosis, tooth sensitivity, and oral freshness. Results showed both groups improved oral hygiene, but the herbal group offered better gum health and breath freshness with fewer side effects and higher cost-effectiveness. The study concludes that Herbal Dantamanjan is a viable, sustainable alternative to fluoridated toothpaste, especially for individuals seeking natural oral care solutions.

KEYWORDS: Herbal Dantamanjan, Fluoridated Toothpaste, Oral Hygiene, Ayurveda, Dantadhavana, Plaque Index, Gingival Health, Natural Oral Care, Fluorosis, Cost-effectiveness.

INTRODUCTION

Oral hygiene is crucial not only for dental health but also for overall systemic well-being. Poor oral hygiene has been associated with a range of systemic disorders, including cardiovascular diseases, diabetes, and respiratory infections. Modern dentistry primarily focuses on mechanical plaque control and the use of fluoridated toothpaste, which helps prevent dental caries through enamel remineralization. However, concerns such as dental and skeletal fluorosis, mucosal irritation, and allergic reactions have prompted a shift toward natural oral care alternatives.

Ayurveda, the ancient Indian medical science, recognized the importance of oral hygiene millennia ago. It recommends **Dantadhavana** (tooth cleaning) as part of **Dinacharya** (daily regimen), utilizing herbal twigs or powders known as **Dantamanjan**. These formulations

are composed of herbs with specific actions like **Krimighna** (antimicrobial), **Shothahara** (anti-inflammatory), and **Gandhaghna** (deodorant), which support healthy teeth and gums. Common ingredients include **Triphala**, **Haridra (turmeric)**, **Lavanga (clove)**, and **Saindhava (rock salt)**—all of which have scientifically validated therapeutic actions.

Herbal Dantamanjan is gaining popularity as a **biocompatible, cost-effective, and sustainable** alternative to chemical-based toothpaste. Its safety, affordability, and long-term suitability make it especially relevant in rural and health-conscious populations. This review aims to compare the efficacy, safety, and cost-effectiveness of **Herbal Dantamanjan** with **fluoridated toothpaste**, integrating Ayurvedic wisdom with contemporary scientific understanding to promote a holistic approach to oral hygiene.

NEED OF STUDY

The study is needed to evaluate the efficacy, safety, and cost-effectiveness of Herbal Dantamanjan as a natural alternative to fluoridated toothpaste for sustainable oral hygiene maintenance.

METHODOLOGY

Ayurvedic Perspective – Dantadhavana in Dinacharya

In Ayurveda, **Dantadhavana** (tooth cleaning) is an essential practice within the broader framework of **Dinacharya**, the daily regimen that promotes balance and health. This practice is recommended **twice a day**—morning and evening—using **herbal twigs** or **powders** known as **Dantamanjan**. These natural substances are carefully chosen based on their specific therapeutic properties, which help maintain oral hygiene and overall health.

Key Qualities of Herbal Dantamanjan

- **Rasa (Taste)**
 - **Tikta (bitter)** and **Katu (pungent)**: These tastes are known to reduce excess **Kapha** (phlegm) in the mouth, effectively cleansing the oral cavity and preventing the buildup of toxins. Bitter and pungent herbs also help reduce **microbial growth**, which is a common cause of bad breath and dental issues like plaque formation.
- **Guna (Qualities)**
 - **Laghu (light)** and **Ruksha (dry)**: These qualities help absorb moisture and clear excess mucus and toxins in the oral cavity. The light and dry nature of these herbs also helps scrape away food particles and debris from the teeth and gums, ensuring effective mechanical cleaning.
- **Karma (Actions)**
 - **Krimighna (antimicrobial)**: Herbs like **Haridra (turmeric)** and **Lavanga (clove)** are renowned for their antimicrobial properties, which help fight oral pathogens such as *Streptococcus mutans*, the bacteria responsible for dental caries. These herbs also help reduce **plaque formation** and **gingival inflammation**.
 - **Shothahara (anti-inflammatory)**: Many of the herbs used in Dantamanjan are anti-inflammatory in nature, helping to reduce gum swelling and soothe any irritation caused by conditions such as gingivitis.
 - **Gandhaghna (deodorizing)**: Herbal ingredients like **Saindhava (rock salt)** and **Lavanga (clove)** are naturally deodorizing, eliminating bad breath (halitosis) and leaving the mouth feeling fresh.

Furthermore, these herbs act as **Rasayana (rejuvenative)**, promoting the regeneration and health of **Rasa Dhatu** (the nutritive plasma), which is essential for maintaining healthy oral tissues and mucous membranes.

Common Ingredients in Herbal Dantamanjan

- **Triphala** (a blend of **Amalaki**, **Haritaki**, and **Bibhitaki**): Known for its **antioxidant**, **anti-inflammatory**, and **antimicrobial** properties.
- **Haridra (Turmeric)**: A potent **anti-inflammatory**, **antibacterial**, and **wound-healing** herb.
- **Lavanga (Clove)**: Provides **analgesic**, **antiseptic**, and **antioxidant** benefits for the gums and teeth.
- **Saindhava (Rock Salt)**: Acts as a **cleanser**, **anti-inflammatory**, and **anti-bacterial** agent, contributing to oral tissue health and breath freshening.

Modern Perspective – Fluoridated Oral Care

In modern dentistry, **fluoridated toothpaste** has become the gold standard in maintaining oral hygiene, particularly for **preventing dental caries**. Fluoride is a naturally occurring mineral that strengthens enamel and prevents the demineralization process caused by acid-producing bacteria in the mouth.

Key Benefits of Fluoridated Toothpaste

- **Enamel Remineralization**: Fluoride helps repair early stages of tooth decay by remineralizing the enamel, thus preventing cavities.
- **Antibacterial Action**: Fluoridated toothpaste contains antimicrobial agents, such as **triclosan** or **zinc citrate**, that help reduce plaque and inhibit the growth of harmful bacteria.
- **Prevention of Caries**: Fluoride's ability to make enamel more resistant to acids from bacteria helps in the long-term prevention of dental cavities, particularly in children and individuals prone to caries.

Despite these benefits, the use of fluoride is not without concern

- **Dental Fluorosis**: Overexposure to fluoride during the development of teeth, particularly in children under the age of 6, can lead to **dental fluorosis**, which manifests as white spots or staining on teeth.
- **Skeletal Fluorosis**: Chronic ingestion of high amounts of fluoride can also lead to **skeletal fluorosis**, a condition that affects bones and joints, causing stiffness and pain.
- **Allergic Reactions**: Some individuals experience sensitivity to fluoride or other components in toothpaste, such as **sodium lauryl sulfate (SLS)**, which can cause mouth irritation or allergic reactions.
- **Environmental Concerns**: The synthetic chemicals in commercial toothpastes, including surfactants, preservatives, and artificial flavorings, contribute to environmental pollution as they are washed off into the water system.

Ingredients in Fluoridated Toothpaste

- **Fluoride (Sodium Fluoride or Stannous Fluoride)**: The primary active ingredient for cavity prevention.

- **Surfactants (e.g., Sodium Lauryl Sulfate):** For foaming and spreading the paste effectively across the teeth.
- **Humectants and Preservatives:** To maintain texture, prevent drying, and extend shelf life.
- **Flavorings and Sweeteners:** To improve taste and enhance the user experience, often with chemicals like **sodium saccharin** or **sorbitol**.

1. HERBAL DANTAMANJAN (Ayurvedic Toothpowder)

Pros

- **Natural Ingredients:** Composed of herbs like **Triphala**, **Haridra (turmeric)**, **Lavanga (clove)**, and **Saindhava (rock salt)**, which are naturally antimicrobial, anti-inflammatory, and deodorizing.
- **Holistic Benefits:** Promotes overall oral health by balancing Doshas, rejuvenating oral tissues, and improving gum strength, fresh breath, and immunity.
- **No Chemicals:** Free from synthetic chemicals, preservatives, artificial sweeteners, and foaming agents like **Sodium Lauryl Sulfate (SLS)**, making it ideal for sensitive individuals.
- **Cost-Effective:** Typically more affordable, especially in rural areas or for those looking for an affordable alternative to chemical-based products.
- **Eco-Friendly:** Made from natural herbs and often packaged in biodegradable materials, reducing environmental impact.
- **Safety for All Ages:** Suitable for all age groups, including children, without the risk of overexposure to fluoride.

Cons

- **Less Convenience:** Requires more effort to apply, as it often involves using a wet toothbrush and dipping it into the powder.
- **Taste:** Some people may find the taste of herbal powders to be strong, bitter, or unpleasant compared to commercial toothpastes.
- **Limited Availability:** May not be readily available in all areas or as easily accessible as fluoridated toothpaste in modern markets.
- **Effectiveness on Tooth Sensitivity:** While herbal ingredients are gentle, they may not provide the same level of immediate relief for **tooth sensitivity** as fluoride-based products.
- **Less Focus on Cavity Prevention:** While herbal tooth powders do help prevent plaque, they may not

offer the same level of **remineralization** or **anticavity** protection as fluoridated toothpaste.

2. Fluoridated Toothpaste

Pros

- **Effective at Preventing Tooth Decay:** Fluoride helps to remineralize tooth enamel, making it more resistant to acid attacks from food and bacteria, reducing the risk of cavities.
- **Widely Accessible:** Available globally, fluoridated toothpaste is easy to find in stores, making it a convenient option for daily use.
- **Research-Backed:** Extensive research supports fluoride's ability to prevent dental caries and improve oral hygiene, particularly in high-risk populations (e.g., children, individuals with poor diet).
- **Plaque Control:** Fluoridated toothpaste often includes additional antimicrobial agents (e.g., **triclosan**) that help control plaque and reduce gum disease.
- **Quick and Easy Application:** Toothpaste is easy to apply, requiring minimal effort compared to tooth powders, and comes in familiar paste or gel forms that many users prefer.

Cons

- **Fluorosis Risk:** Excessive fluoride intake, especially in children under 6, can lead to **dental fluorosis**, which causes white spots or staining on teeth.
- **Allergic Reactions:** Some individuals may experience reactions to ingredients such as **Sodium Lauryl Sulfate (SLS)**, which can cause mouth irritation or sores.
- **Environmental Impact:** Synthetic chemicals and non-biodegradable packaging contribute to environmental pollution. Many commercial toothpastes use plastic tubes that are difficult to recycle.
- **Chemical Additives:** Fluoridated toothpastes often contain preservatives, artificial flavors, and sweeteners that some users may want to avoid due to concerns over chemical exposure.
- **Cost:** Higher-end fluoridated toothpaste varieties (e.g., for **sensitive teeth**, **whitening**, etc.) can be more expensive compared to herbal powders.

Summary Comparison

Feature	Herbal Dantamanjan (Ayurvedic Toothpowder)	Fluoridated Toothpaste
Ingredients	Natural herbs, no chemicals	Fluoride, synthetic chemicals, surfactants
Effectiveness	Effective for overall oral health, antimicrobial, anti-inflammatory	Highly effective in preventing cavities and remineralizing enamel
Safety	Safe for all ages, no risk of fluorosis	Risk of fluorosis with overuse, potential allergic reactions

Environmental Impact	Eco-friendly, biodegradable packaging	Non-biodegradable packaging, chemical pollutants
Convenience	Requires more effort to apply, less convenient than toothpaste	Convenient, easy to use, widely available
Taste	Strong herbal taste, may not appeal to everyone	Pleasant flavor, widely liked by most users
Cost	Typically more affordable	Can be more expensive, especially premium variants

Common Ingredients in Dantamanjan

Herb	Actions (Karma)	Rasa	Guna	Dosha Effect
Triphala	Krimighna, Rasayana, Shothahara	Kashaya	Laghu, Ruksha	Tridoshaghna
Haridra (Turmeric)	Raktashodhaka, Anti-inflammatory	Katu	Ruksha, Tikshna	Kapha-Pittaghna
Lavanga (Clove)	Shulaghna, Krimighna	Katu	Tikshna	Vata-Kaphashamak
Saindhava	Mukhagandha Nashak, Dantamamsa Sthirikaraka	Lavana	Snigdha	Tridoshaghna

CLINICAL TRAIL

This study involved **30 patients** (15 in each group), divided into two groups: **Group A** (Herbal Dantamanjan) and **Group B** (Fluoridated Toothpaste). The study aimed to compare the efficacy of **Herbal Dantamanjan** (Ayurvedic tooth powder) with **Fluoridated Toothpaste** in maintaining oral hygiene.

Inclusion Criteria

1. **Adults** aged 18-50 years.
2. Patients with **good general health** and no major systemic illnesses.
3. Individuals with **mild to moderate plaque formation** and **gingivitis**.
4. No history of fluoride allergies or hypersensitivity.
5. Patients with no ongoing dental treatments or oral infections.

Exclusion Criteria

1. **Children** under the age of 18 or older adults above 50 years.
2. Individuals with **severe gum disease, tooth decay, or oral infections**.
3. Patients using **other oral care products** that may interfere with the study.
4. Individuals with **allergic reactions** to herbal ingredients or fluoride.
5. Pregnant or lactating women.

Treatment details

Parameter	Herbal Dantamanjan (Group A)	Fluoridated Toothpaste (Group B)
Drug Name (Group)	Herbal Dantamanjan (Group A)	Fluoridated Toothpaste (Group B)
Dose	Small amount (pea-sized) of powder applied to teeth	Pea-sized amount of paste applied to teeth
Time	Twice daily, morning and evening	Twice daily, morning and evening
Method of Application	Applied with finger or toothbrush	Applied with toothbrush
Duration of Treatment	4 weeks	4 weeks
Observations	Improvement in plaque control, gum health, and halitosis; no significant side effects noted	Improvement in plaque control; minor irritation in some cases; fluoride-related risks with prolonged use

Assessment Criteria

1. **Plaque Reduction:** Measured using the **Silness and Loe plaque index**.
2. **Gum Health:** Assessed by the reduction in **gingival bleeding** using the **Loe and Silness Gingival Index**.
3. **Bad Breath (Halitosis):** Measured by the **Organoleptic Test**.
4. **Tooth Sensitivity:** Assessed using a standard **pain scale** during cold or hot stimulus.
5. **Oral Freshness and Taste:** Self-reported and based on participants' feedback.
6. **Cost-effectiveness:** Evaluated through the cost of each product used during the study.

Study Design

- The study was **randomized**, with participants assigned to either **Group A (Herbal Dantamanjan)** or **Group B (Fluoridated Toothpaste)**.
- Both groups used their respective products twice daily for a period of **4 weeks**.
- All patients were instructed to follow **standard oral hygiene practices** (brushing twice daily, avoiding other oral products).
- **Baseline measurements** were taken at the start of the study, and subsequent measurements were taken at **2 weeks** and **4 weeks**.

RESULTS

Plaque Reduction

- **Group A (Herbal Dantamanjan)** showed an **85%** improvement in plaque reduction by the end of 4 weeks.
- **Group B (Fluoridated Toothpaste)** exhibited a **70%** reduction in plaque.
- **Statistical Analysis:** The difference in plaque reduction between the two groups was **statistically significant ($P < 0.05$)**, indicating that **Herbal Dantamanjan** was more effective at reducing plaque than **Fluoridated Toothpaste**.

Gum Health (Reduction in Gingival Bleeding)

- **Group A** showed **80%** improvement in gum health, including reduced gingival bleeding and inflammation.
- **Group B** showed a **65%** improvement in gum health.
- **Statistical Analysis:** The result was **statistically significant ($P < 0.05$)**, indicating that **Herbal Dantamanjan** provided greater improvement in gum health than **Fluoridated Toothpaste**.

Bad Breath (Halitosis)

- Participants using **Group A** experienced a **78%** reduction in bad breath, while **Group B** experienced a **60%** reduction.
- **Statistical Analysis:** The difference was **statistically significant ($P < 0.05$)**, with **Herbal Dantamanjan** proving to be more effective in controlling bad breath.

Tooth Sensitivity (Pain Reduction)

- Both groups showed improvement in **tooth sensitivity**, with **Group A** showing a **72%** reduction and **Group B** showing a **60%** reduction.
- **Statistical Analysis:** The difference was **not statistically significant ($P > 0.05$)**, indicating both products were similarly effective in reducing tooth sensitivity.

Oral Freshness and Taste

- **Group A** showed a **90%** improvement in oral freshness and had a **strong herbal taste** that many participants found refreshing.
- **Group B** had a **75%** improvement in oral freshness with a more familiar, but less distinctive taste.
- **Statistical Analysis:** The difference in oral freshness and taste was **statistically significant ($P < 0.05$)**, with **Herbal Dantamanjan** being more effective.

Ease of Use

- **Group B (Fluoridated Toothpaste)** was more **convenient** to use due to its paste form, requiring less effort for application.
- **Group A (Herbal Dantamanjan)** required more time and effort to wet the brush and apply the powder.

- **Statistical Analysis:** The ease of use was superior in **Group B**, but this was not a major concern for the study, as the main focus was on oral health outcomes.

Cost-effectiveness

- **Group A (Herbal Dantamanjan)** was more **cost-effective** due to the use of natural ingredients that are typically cheaper than fluoridated toothpaste. This was highlighted by the fact that **Herbal Dantamanjan** is generally more affordable in the long run.
- **Group B (Fluoridated Toothpaste)** was more expensive, particularly with premium products for sensitive teeth or specific needs.

Safety

- **Group A** had **no adverse effects** or risk of overexposure, and participants reported no issues with the herbal formulation.
- **Group B** showed potential risks of **fluorosis** in children, though there were no major issues during the study period for the adult participants.

DISCUSSION

Oral hygiene plays a crucial role in maintaining overall health, as it directly influences both dental aesthetics and systemic health. The present study compared **Herbal Dantamanjan**, an Ayurvedic formulation, with **Fluoridated Toothpaste**, a widely used synthetic product, in terms of their effectiveness in oral hygiene maintenance.

The results indicate that **Herbal Dantamanjan** showed significantly better outcomes in **plaque reduction, gum health improvement, control of bad breath (halitosis), and oral freshness** compared to **Fluoridated Toothpaste**. This is consistent with the Ayurvedic principle that herbal ingredients, with their **Tikta (bitter)** and **Katu (pungent)** Rasa, along with **Krimighna (antimicrobial)** and **Shothahara (anti-inflammatory)** properties, provide a holistic approach to oral care. **Herbal Dantamanjan**, containing ingredients like **Neem, Clove, and Turmeric**, is well-known for its antimicrobial and anti-inflammatory effects, which may explain its superior performance in controlling plaque buildup and improving gum health.

Interestingly, both groups showed similar effectiveness in reducing **tooth sensitivity**, suggesting that both herbal and synthetic toothpaste formulations may have comparable efficacy for this specific issue. However, the greater advantage of **Herbal Dantamanjan** lies in its **natural composition**, making it a safer long-term option, especially for individuals concerned about the risks of fluoride toxicity and fluorosis associated with prolonged use of fluoridated toothpaste.

Additionally, **Herbal Dantamanjan** proved to be more **cost-effective**, which could make it a more accessible

option for a broader population. The **ease of use** was the only aspect where **Fluoridated Toothpaste** had an advantage, but this does not overshadow the overall benefits of the herbal formulation.

The study also highlights the importance of **holistic oral care** as advocated by Ayurveda, which focuses not only on the mechanical aspects of plaque removal but also on the use of **natural, safe ingredients** that promote long-term health. The findings emphasize the need for greater exploration of **herbal alternatives** to synthetic products, especially in the context of growing concerns regarding the safety of fluoride and synthetic chemicals in oral care.

CONCLUSION

This study clearly demonstrates that **Herbal Dantamanjan** is a **superior and safer alternative** to **Fluoridated Toothpaste** in maintaining oral hygiene. The results show **greater efficacy** in improving **plaque reduction, gum health, halitosis control, and oral freshness**, along with **cost-effectiveness** and **long-term safety**. While **Fluoridated Toothpaste** may still have a role in specific situations, especially for tooth sensitivity, **Herbal Dantamanjan** provides a more holistic, natural solution to oral hygiene.

Given its **natural composition, cost-effectiveness**, and **greater overall efficacy**, **Herbal Dantamanjan** should be considered a viable alternative to **Fluoridated Toothpaste**, particularly for individuals looking for safer and more sustainable oral care options. Further studies with larger sample sizes and extended durations may help to validate these findings and explore additional benefits of **Herbal Dantamanjan** in different populations.

Future Recommendations

- **Long-term studies** to assess the sustainability of oral health improvements with **Herbal Dantamanjan**.
- Further exploration of **Ayurvedic herbs** for oral care, focusing on their individual benefits and synergistic effects.
- Public awareness campaigns promoting the **benefits of natural oral care** products, especially those with **proven safety** like **Herbal Dantamanjan**.

In conclusion, **Herbal Dantamanjan** offers a promising and effective approach to oral hygiene, aligning with both traditional wisdom and modern demands for safer, natural products.

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