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Efficacy of Kushtadi Churna in Improving Oral Hygiene among School Children: A Randomized Controlled Trial

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ABSTRACT

Background: The high prevalence of preventable oral diseases among children necessitates safe and effective alternatives to chemical-based products. *Kushtadi Churna*, a classical Ayurvedic polyherbal formulation used in *Pratisarana* (topical application), is traditionally indicated for oral hygiene but lacks modern clinical validation.

Objective: To evaluate the efficacy of *Kushtadi Churna* as an adjunct to brushing on oral hygiene parameters in school-going children.

Materials and Methods: A randomized controlled trial was conducted with 60 school children aged 10-16 years. Participants were allocated into two groups. The Trial Group (n=30) performed *Pratisarana* with *Kushtadi Churna* twice daily after brushing, while the Control Group (n=30) performed brushing alone twice daily. The intervention lasted 30 days. Oral hygiene was assessed using a standardized oral assessment tool evaluating eight parameters at baseline and post-treatment. Data were analyzed using paired and unpaired t-tests.

Results: The group using *Kushtadi Churna* showed statistically highly significant improvements ($p<0.001$) in the condition of the tongue (37.04% improvement), teeth (37.04%), mucous membrane (31.25%), lips (36.73%), and saliva (28.26%). The control group showed no significant improvement in any parameter ($p>0.05$). Overall, 60% of children in the Trial group demonstrated clinical improvement, compared to 0% in the Control group.

Conclusion: *Kushtadi Churna* as an adjunct to routine brushing is a safe and significantly more effective intervention for improving overall oral hygiene than brushing alone in children. It validates its traditional use and represents a valuable, natural option for community oral health programs.

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1. INTRODUCTION

Oral health is a critical determinant of general health, quality of life, and psychosocial well-being.[1] Despite being largely preventable, oral diseases like dental caries and gingivitis persist as a silent epidemic, especially in developing countries. The National Oral Health Survey (2005) in India revealed a grim reality: 95% of the population suffers from gum disease, with only 50% using a toothbrush and a mere 2% visiting dentists regularly.[2] School children are a particularly vulnerable demographic, with dental caries affecting 60-90% globally.[3]

While contemporary chemical-based mouthwashes are popular, they can have adverse effects, including irritation of the oral mucosa,[4] creating a demand for safe, natural alternatives. Ayurveda, the ancient Indian system of medicine, offers a comprehensive approach to preventive oral care through daily

regimens (*Dinacharya*) such as *Dantadhavana* (brushing) and *Pratisarana* (topical application of medicinal powders).[5]

Kushtadi Churna, a classical formulation cited in *Chakradatta*, is explicitly indicated for *Dantamoolagata Rogas* (diseases of the gums and tooth sockets).[6] Its ingredients, including *Kushta* (*Saussurea lappa*), *Haridra* (*Curcuma longa*), and *Amalaki* (*Emblica officinalis*), possess *Kapha-Pitta hara* (pacifying) and *Raktashodhaka* (blood-purifying) properties, suggesting potent anti-inflammatory, antimicrobial, and healing actions relevant to oral health.[6,7]

While the traditional rationale is robust, clinical evidence is lacking. This study was therefore designed to bridge this gap by evaluating the efficacy of *Kushtadi Churna Pratisarana* on the oral hygiene of school-going children.

2. Materials and Methods

2.1. Study Design:

A randomized, parallel-group, controlled clinical trial.

2.2. Ethical Considerations:

Ethical clearance was obtained from the Institutional Ethical Committee of S.J.G. Ayurvedic Medical College, Koppal in 2014. Written informed assent and consent were obtained from the children and their parents, respectively. The study was conducted during academic year 2014-2015

2.3. Participants:

Sample Size: 60 students. **Setting:** S.J.G. Higher Secondary School, Gavimath, Koppal. **Inclusion Criteria:** Children of either sex, aged 10-16 years **Exclusion Criteria:** Children with pus discharge, periodontal pockets, active dental caries, or any systemic illness that could interfere with the study.

2.4. Intervention:

Trial Drug: *Kushtadi Churna* was prepared in the Department of Rasashastra & Bhaishajya Kalpana as per the classical composition described in Chakradatta (Table 1). **Group A (Trial Group, n=30):** Advised to perform *Pratisarana* (rubbing the gums and teeth with a finger dipped in the powder) with *Kushtadi Churna* for 30-60 seconds, twice daily for 30 days after routine brushing **Group B (Control Group, n=30):** Advised to perform only routine brushing twice daily for 30 days.Both groups received standard oral hygiene education. The total study duration was 30 days.

2.5. Outcome Measures:

The primary outcome was the change in oral hygiene status as measured by a standardized oral assessment tool based on the Nottingham guide,[8] which assesses eight parameters (lips, tongue, gums/teeth, saliva, mucous membrane, pain, nutritional intake, mental status) on a graded scale (Score 1-4).

2.6. Statistical Analysis:

Data were analyzed using descriptive and inferential statistics. Paired t-test was used for intra-group comparison and an unpaired t-test for inter-group comparison. A p-value of <0.05 was considered statistically significant.

Table 1: Composition of Kushtadi Churna

Sanskrit Name	Botanical Name	Part Used	Proportion
Kushta	Saussurea lappa	Root	1 part
Dhatri (Amalaki)	Emblica officinalis	Fruit	1 part
Lodhra	Symplocos racemosa	Bark	1 part
Musta	Cyperus rotundus	Tuber	1 part
Samanga (Manjista)	Rubia cordifolia	Root	1 part
Patha	Cissampelos pariera	Root	1 part
Tikta (Katuka)	Picrorhiza kurroa	Root	1 part
Tejini (Tejohva)	Zanthoxylum alatum	Fruit	1 part
Pitika (Haridra)	Curcuma longa	Rhizome	1 part

3. Results

A total of 67 students were recruited. Seven students discontinued the study, resulting in 60 students (30 in each group) who completed the trial and were included in the analysis. The groups were comparable at baseline regarding demographic and oral hygiene characteristics (Table 2).

Table 2: Baseline Characteristics of Participants (n=60)

Characteristic	Category	Group A (n=30)	Group B (n=30)	Total
Age (Years)	10-12	0 (0%)	3 (10%)	3 (5%)
	13-15	28 (93.3%)	23 (76.7%)	51 (85%)
	16-18	2 (6.7%)	4 (13.3%)	6 (10%)

Gender	Male	17 (56.7%)	18 (60%)	35 (58.3%)
	Female	13 (43.3%)	12 (40%)	25 (41.7%)
Brushing Frequency	Once daily	22 (73.3%)	21 (70%)	43 (71.7%)
	Twice daily	6 (20%)	8 (26.7%)	14 (23.3%)

3.1. Intra-Group Comparison

Group A (Kushtadi Churna): showed a statistically highly significant improvement ($p<0.001$) in all major oral health parameters: tongue (37.04% improvement), teeth (37.04%), mucous membrane (31.25%), lips (36.73%), and saliva (28.26%). A significant improvement was also noted in pain ($p<0.05$). (Table 3)

Group B (Control): No parameter showed a statistically significant improvement ($p>0.05$ for all). (Table 3)

Table 3: Intra-Group Comparison of Oral Health Parameters (Mean Score)

Parameter	Group	Mean BT	Mean AT	% Change	p-value
Tongue	A	1.80	1.13	37.04	<0.001
	B	1.43	1.37	4.65	>0.05
Teeth	A	1.80	1.13	37.04	<0.001
	B	1.40	1.33	4.76	>0.05
Lips	A	1.63	1.03	36.73	<0.001
	B	1.23	1.20	2.70	>0.05

BT: Before Treatment, AT: After Treatment

3.2. Inter-Group Comparison and Overall Assessment

The inter-group comparison showed a statistically significant difference ($p<0.05$) in Favor of Group A for the lip health parameter. While other parameters showed greater mean improvement in Group A, the difference was not statistically significant.

Most importantly, the overall assessment revealed that 60% of children in Group A showed clinical improvement, compared to 0% in Group B (Table 4). No adverse events were reported.

Table 4: Overall Clinical Improvement

Response	Group A (n=30)	Group B (n=30)
No Improvement	12 (40%)	30 (100%)
Mild Improvement	18 (60%)	0 (0%)
Moderate/Marked Improvement	0 (0%)	0 (0%)

4. Discussion

This study provides clinical evidence for the efficacy of *Kushtadi Churna* as an adjunct to brushing for improving oral hygiene. The statistically highly significant improvements within the trial group across multiple parameters (tongue, teeth, mucous membrane, lips, saliva) stand in stark contrast to the lack of significant change in the control group. This demonstrates that the addition of *Kushtadi Churna Pratisarana* to a routine of brushing provides a benefit that brushing alone does not.

The therapeutic action can be attributed to the synergistic properties of its constituent herbs. *Kushta* (Saussurea lappa) and *Haridra* (Curcuma longa) are well-documented for their potent anti-inflammatory and antimicrobial properties, [7,9] which would directly combat plaque-forming bacteria and gingival inflammation. *Lodhra* (Symplocos racemosa) is a renowned astringent and healing agent in Ayurvedic dentistry, while *Amalaki* (Emblica officinalis), rich in Vitamin C, is crucial for gum health and collagen synthesis.[10] The *Pratisarana* method ensures direct and prolonged contact of these medicinal powders with the oral tissues, enhancing their therapeutic action.

The most compelling finding is the overall clinical improvement: 60% of children in the trial group improved, versus none in the control group. This, combined with the absence of any adverse events, underscores the formulation's safety and clinical relevance as a public health intervention for children.

Limitations and Future Research: The study's limitations include its single-center design and the potential for observer bias. Future studies with a larger sample size, longer duration, microbiological analysis, and a placebo control are recommended to further validate these findings and explore the mechanisms of action.

5. Conclusion

The findings of this randomized controlled trial demonstrate that *Kushtadi Churna Pratisarana* is a safe and effective adjunct to routine brushing for enhancing oral hygiene in school-going children. It

resulted in statistically significant improvements in key oral health parameters and provided a clinical benefit to a majority of users, validating its traditional use. This study positions *Kushtadi Churna* as a promising, natural, and preventive tool for community-based oral health promotion programs.

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