INPLASY

INPLASY2023120020

doi: 10.37766/inplasy2023.12.0020

Received: 05 December 2023

Published: 05 December 2023

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# Efficacy of desiccant as an adjunct to non-surgical treatment in the management of periodontitis: A Systematic Review and Meta-analysis

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**ADMINISTRATIVE INFORMATION**

**Support -** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Review Stage at time of this submission -** Completed but not published.

**Conflicts of interest -** None declared.

**INPLASY registration number:** INPLASY2023120020

**Amendments -** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 05 December 2023 and was last updated on 05 December 2023.

## INTRODUCTION

**Review question / Objective** What is the clinical efficacy of topical application of desiccant agent as an adjunct to scaling and root planing (SRP) as compared to SRP alone or SRP+ placebo in treating periodontitis?

**Rationale** The adjunctive use of desiccants has been proposed to augment the clinical outcome of SRP in patients with periodontitis. Its versatility, ease of administration, and unique mechanism of action could serve as a potential adjunct to non-surgical treatment in the management of periodontitis.

**Condition being studied** Periodontitis is an infectious disease affecting teeth and the tissue surrounding the teeth, caused by bacterial plaque organized in a biofilm.Bacteria living in the biofilm can actively adjust their metabolism to work properly within the matrix. Sometimes, they go into a type of hibernation, a "persistent state," in which they become resistant to many antimicrobials. In fact, the bacteria's metabolic pathways must be active for antimicrobials to have an effect on them. Periodontal disease treatment is commonly based on oral hygiene and root debridement approaches.

## METHODS

**Search strategy** Two reviewers conducted an independent search of three databases, including PubMed, EMBASE, and the Cochrane Collaboration Library, from the earliest records through October 2023 for articles addressing the focused question. Furthermore, a search of the Open Grey database was performed, and a hand search was performed by checking bibliographic references of included articles and related review

articles. The following strategy was used in search using Boolean Operators and asterisk symbol(*) as truncation, was employed to identify papers using MesH, keywords and other free terms.
("hygroscopic agents"[MeSH Terms] OR "hybenx"[Text Word] OR "desiccant"[Text Word] OR ((("mouth"[MeSH Terms] OR "mouth"[All Fields] OR "oral"[All Fields]) AND ("biofilm s"[All Fields] OR "biofilmed"[All Fields] OR "biofilms"[MeSH Terms] OR "biofilms"[All Fields] OR "biofilm"[All Fields])) AND "decontaminant"[Text Word]) OR "sulfates"[Text Word]) AND ("periodontitis"[Text Word] OR "chronic periodontits"[Text Word]).

**Participant or population** Subjects with periodontitis.

**Intervention** Desiccant (HYBENX® Oral Tissue Decontaminant, EPIEN Medical, Inc.) as an adjunct to SRP.

**Comparator** SRP alone or SRP + placebo.

**Study designs to be included** RCTs with follow-up greater than 3 months.

**Eligibility criteria** Inclusion criteria are: 1. RCTs 2. subjects with periodontitis 3. Comparing both treatment groups (SRP + desiccant group and SRP + placebo or SRP alone) 4. Reporting clinical outcomes regarding PPD and CAL changes. The exclusion criteria are: 1. not RCTs 2. follow up less than three months 3. desiccant employed concomitantly in periodontal surgery 4. periimplantitis or periodontal abscesses conditions 5. desiccant employed as monotherapy 6. Articles not in English.

**Information sources** From the initial search, a total of 77 studies were identified: 36 from PubMed, 25 from Embase, and 16 from the Cochrane Library database. 11 papers were found through the Open Grey search. After removing duplicates (n = 20), 68 papers were included in the selection phase of titles and abstracts. A total of 51 articles were excluded, and 17 papers were selected for full-text reading. In this phase, 10 studies were excluded, and 2 reports were not retrieved. 5 papers were finally included in the qualitative review and meta-analysis.

**Main outcome(s)** The primary outcomes were probing pocket depth (PPD) reduction and clinical attachment level (CAL) changes.The meta-analysis estimated PPD reduction, CAL gain, and reduction of the percentage of sites with BOP, expressed in terms of the average difference between baseline and follow-up. To be as inclusive as possible, the meta-analysis included data available for the closest time point up to 3 months.

**Additional outcome(s)** The secondary outcomes of interest were BOP, plaque index (PI), gingival index (GI), and patient-reported outcomes (level of pain, subjective post-operative dentinal hypersensitivity).

**Data management** Two reviewers independently screened the titles and abstracts of the selected publications based on the pre-established criteria. Complete reports of the eligible publications that met the inclusion criteria were extracted and reviewed independently. Disagreements between the authors were resolved after discussion.
Pre-defined data collection spreadsheets were employed for the assessment of each publication. Evaluations were conducted independently by one author and confirmed by another author.

**Quality assessment / Risk of bias analysis** The Cochrane Collaboration's tool was used to assess the risk of bias and quality assessment of the included RCTs.

**Strategy of data synthesis** The meta-analysis was performed using mean differences (MD) with 95% confidence intervals (95% CI), which were used for continuous data. The I2 value was used to assess the statistical heterogeneity of the studies, and data was considered heterogeneous for an I2 value > 40%.
Differences between the SRP + Desiccant and SRP group were expressed in weighted mean differences and 95% confidence interval CI for continuous outcomes using the random effect model. Mean differences and standard errors were computed for each study. The analysis was performed using comprehensive meta-analysis software (CMA, version 4, Biostat, Englewood, NJ).

**Subgroup analysis** This analysis includes five studies. A subgroup analysis was not performed. As a general rule, estimates of heterogeneity based on less than ten studies are not likely to be reliable. (Borenstein, 2019, 2020; Borenstein et al., 2021; Borenstein et al., 2017; DerSimonian & Laird, 1986, 2015; Higgins, 2008; Higgins & Thompson, 2002; Higgins et al., 2003; Higgins & Thomas, 2019; IntHout et al., 2016.).

**Sensitivity analysis** A sensitivity analysis for the assessment of publication bias was performed.

**Language restriction** Publications in English language only were included.

**Country(ies) involved** United States.

**Keywords** desiccants; periodontitis; Hybenx; scaling and root planing; decontamination; local delivery.

**Contributions of each author**

Author 1 - Venkat Yashaswi Kondapalli - Author 1 helped with the study design, data collection, screening, and manuscript drafting. He was also involved in the critical discussion of the results and findings after the meta-analysis was completed. He oversaw the planned execution of the study.
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Author 2 - Sai Bhavana Bhogaraju - Author 2 also helped with data collection, screening, and manuscript drafting. She also helped with processing the data using the meta-analysis software. She was also involved in the critical discussion of the findings.
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