



## Medicinal Clays as Antibacterial Agents Used in Chronic Periodontitis

### KEYWORDS

medicinal clays, chronic periodontitis, scaling and root planing, antibacterial

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**ABSTRACT** *The aim of this study is to assess the antimicrobial properties of medicinal clays as adjuvant in scaling and root planing in non-surgical treatment of chronic periodontitis. Thirty subjects, aged between 25-60 were randomly distributed in two groups according to inclusion and exclusion criteria. All the subjects received scaling and root planing. The test group received local instillation with the medicinal clay after scaling and root planing. The control group received no treatment with medicinal clay after scaling and root planing. The clinical parameters, probing depth and clinical attachment level, were assessed in both groups at baseline, one month and three months after treatment. The results showed significant improvement in clinical parameters in both groups, with the test group showing significantly higher improvement as compared with the control group. In conclusion, the effect of medicinal clays used as adjuvant in scaling and root planing has been successfully proved.*

### INTRODUCTION

Periodontal diseases represent the most frequent conditions of the human body, affecting it irrespective of sex, age or geographical area. Periodontal diseases are induced by determinant factors such as microbes associated with local factors (scale, caries, edentations, dental-maxillary abnormalities, parafunctions, smoking, iatrogenics, etc) and general factors (diabetes, cardiovascular, haematological and hepatic conditions, nutrition deficiencies, immune and endocrine dysfunctions, nervous system related diseases).

Periodontitis is an infectious disease which, left untreated, results in progressive attachment and bone loss and ultimately leads to dental loss. Periodontitis seriously affects various aspects of the quality of life of many individuals. The conservative periodontal therapy can result in predictable pocket reduction and stop further disease progression. However, in some cases of aggressive therapy tissue recession and bone loss can appear. Scaling and root planing are followed by healing of the tooth attachment apparatus and are often associated with the formation of a long junctional epithelium.

Lately, several dental studies have evidenced that periodontal disease can be kept under control and treated with non-surgical methods. Medicinal plants and clays have been used since prehistoric times for various diseases and are preferred especially due to their minimal side-effects.

Most research on healing clays focused on the physical characteristics of clay minerals that benefit digestion or protect and cleanse the skin [1]. The adsorptive and absorptive properties of clay minerals have been investigated previously. At present, medicinal clays are being used in pharmaceutical products as active ingredients, excipients

or additives [2, 3].

Medicinal clays have been used efficiently for a very long time, yet the understanding of their action mechanism and their composition is still limited [4], most of the studies being oriented towards their therapeutic use in diarrhea[5].

Medicinal clays are widely used, however their use should be discouraged in pregnant women because of the high content of lead and arsenic [6].

The antibacterial activity of clays seems to be associated with low pH and oxidation state [7]. It has a very good effect against *Candida Albicans*, and can be used topically or as an internal cure in numerous other disorders.

The aim of this study is to assess the antibacterial properties of medicinal clays as adjuvant in scaling and root planing in non-surgical treatment of chronic periodontitis.

### METHODOLOGY

Thirty subjects, aged between 25-60 were randomly distributed in two groups (test group and control group) according to the following inclusion criteria: diagnosed with moderate or severe chronic periodontitis, a minimum of four sites with probing depth  $\geq 4$  mm (PD), presence of  $\geq 16$  gradable teeth, no systematic periodontitis treatment within the previous 12 months, smoking  $\leq 10$  cigarettes/day, good general condition.

Subjects were excluded from both groups (test and control) on the following criteria: need for periodontal surgery during the study, intake of medication known to affect the periodontal status, pregnancy, and other chronic diseases. Informed consent was obtained from all subjects. The periodontal status was recorded on Ramfjord teeth, which

include the maxillary right first molar, the maxillary left central incisor, the maxillary left first premolar, the mandibular left first molar, the mandibular right central incisor, and the mandibular right first premolar.

The following parameters were assessed: bleeding on probing (BOP), probing depths (PD), and clinical attachment level (CAL).

The presence or absence of plaque was evaluated with plaque index (PI) [8]. Gingival inflammation was assessed by the gingival index (GI) [9].

The subjects were randomized in two groups. Test group: fifteen subjects received scaling and root planing and subgingival instillation of medicinal clay. Control group: fifteen subjects received scaling and root planing, but no instillation with medicinal clay.

The scaling and root planing were performed with manual and ultrasonic instruments. All the subjects were instructed with regard to oral hygiene.

The clinical parameters were assessed at baseline (day one), one month and three months after the treatment.

Statistic analysis and data processing were done using The Statistical Package for Social Science (SPSS) for all clinical parameters recorded during the study.

**RESULTS**

At the three time intervals, the results showed a significant decrease in all the parameters ( $p < 0.05$ ), in the test group. The initial results showed significant changes after treatment, with differences in the test group compared to control group regarding plaque index, bleeding on probing and gingival index (Table 1).

Bleeding on probing showed positive results after treatment in the control group compared to baseline and compared to the baseline in the test group. Our observations demonstrate the antimicrobial effect of the medicinal clays associated with correct brushing on adequate oral health with PI and BOP of 0 or 1.

**Table 1. Comparison of clinical parameters in control and test groups**

	Control group (Mean)			Test group (Mean)		
	Baseline	1 Month	3 Months	Baseline	1 Month	3 Months
PI	1.89	1.55	1.13	1.77	1.22	0.63
GI	2.05	1.78	1.35	2.57	2.18	1.35

A comparison of the mean change in clinical parameters between baseline and three months revealed a statistically significant difference for all parameters with the test group showing significant decreases as compared to the control group ( $p < 0.05$ ) (Table 2, 3).

**Table 2. PD value (mean) for control and test group at baseline, one month and three months after treatment**

	Baseline	1 Month	3 Months	p-value
PD-control group	3.35	2.18	2.45	0.001
PD-test group	3.26	3.05	1.87	0.001

**Table 3. CAL value (mean) for control and test group at baseline, one month and three months after treatment**

CAL - group	Baseline	1 Month	3 Months	p-value
CAL-control group	4.43	4.25	3.79	0.001
CAL-test group	4.45	4.07	3.29	0.001

**DISCUSSION**

The Complementary medicine can be define as a group of variant medical systems and their practices and products are not considered to be part of the conventional medicine [10, 11, 12].

In the present study, the effects of medicinal clays as local drug delivery was evaluated associated with scaling and root planing alone for three months. The clinical parameters were recorded at baseline, one and three months after treatment.

Decreases in the PI and GI were observed in both groups. The decreases in PI and GI were more significant in the test group.

The use of antibiotics agents during for the past century represents one of the greatest advances in human health care and has led to remarkable reduction of morbidity and mortality related to bacterian infections.

The term ‘antibiotic’ is often used to describe antibacterial or chemotherapeutic agents which are synthetically manufactured. Although the antibacterial clay minerals discussed herein are natural substances, they are not produced by microorganisms and are not considered antibiotics [13, 14].

The ingestion of dried clay minerals or clay suspension is commonly used as a source of dietary elements, as a detoxifying agent, and as an allopathic treatment of gastrointestinal illnesses and acute and chronic diarrhea [1].

The study of medicinal applications of minerals requires collaborative efforts by many specialists with diverse expertise and educational background including geology, geochemistry, microbiology, environmental science, pedology and agriculture, medicine, statistics, and pharmacology[9, 13].

The potential discovery of medicinal clay to combat pathogenic bacteria would be particularly advantageous. Research is carried on concerning the interaction between clay minerals and various bacterian cultures in order to understand the mechanism by which bacterian development can be inhibited. Local treatment with clay minerals has had valuable advantages over both surgery and antibiotic therapy because it is easy to use for the doctor and easy to tolerate for the patient[14].

The antibacterial mechanism of the mineral clay is still largely unknown, but research is carried on to determine the mechanism, pathways and reaction responsible for the bactericidal activity.

One subject that remains to be explored is how supportive periodontal therapy combined with medicinal clays act upon the bacterian biofilm.

## CONCLUSIONS

With all the limitations regarding the number of patients and the follow-up period, the results showed a decreased of all the clinical parameters followed by scaling and root planing with additional instillation of medicinal clays in supportive periodontal treatment of chronic periodontitis.

The clinical importance of our findings is that they showed the possibly to improve the periodontal status after local instillations with medicinal clays.

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