



## After-Treatment Localized Periodontal Pathogenic Flora Reduction for Oak Bark Mouthwash Use

### KEYWORDS

oak bark, periodontitis, geriatric patient

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### ABSTRACT

*Periodontal diseases are the most prevalent illnesses in Mexico (over 50% of the geriatric population), there are several types of periodontal disease: localized, and generalized, which include from periodontal inflammation to tooth loss if the geriatric patient is not attended promptly. Periodontal diseases are multifactorial such as systemic illnesses, secondary actions for drugs, type of diet, poor oral hygiene which favors the reproduction of periodontal pathogenic flora. Mouthwash was used based on oak bark.*

*It was found that it reduces periodontal pathogenic flora and opportunistic microorganisms. In some types of bacteria, the agent was eliminated up to 60% ( $p < 0.001$ ) lowering thereby post-operative recovery time regarding healing of the periodontal tissues of the participant patients.*

### Introduction

When periodontitis is developed, the main etiologic factor in inflammatory periodontal disease is dental biofilm, which produces imbalance that may result from the change in the type of microorganisms and media components can set a favorable environment to create it.

Geriatric Stomatology faces everything related to complications during dental treatment and changes in the oral health of the GP<sup>1</sup> age own common chronic conditions. Periodontal disease is caused by plaque, there being a correlation between the accumulation of dental plaque and periodontitis, these microbial accumulations removing leads to the resolution of the inflammatory condition.

In geriatric patients, (GP) oral cavity deserves special attention due to be part of the public health problems, because it presents degenerative conditions, tumor pathology, infections, malocclusion, temporomandibular joint osteoarthritis, dental caries and periodontal disease<sup>2</sup>.

Another factor in the GP is the alteration in nutritional and digestive processes, like the pharmacologically compromised patients. Lack of awareness of the population on the prevention and oral hygiene promotes microbial growth, an unbalanced supply can lead to malnutrition which is accompanied by muscle weakness and immune alterations which generate less resistance to infections and increased oral disease in the GP<sup>1, 2</sup>.

The deterioration is compounded by physical and mental disabilities as well as incapability associated with personal care, creating a relationship between skill and oral hygiene<sup>2, 3</sup>.

In GP with periodontitis, reduction of specific microorganisms by means of anti-infective treatment produces significant

clinical improvement<sup>4</sup>. The downside is that if the patient has nutritional and digestive disorders, being medicated accentuates gastric problems decreasing appetite with some other systemic complications.

There is a variety of microorganisms related to periodontal disease; microbiological processes show that the rate and amount of bacterial morphotypes in the dental subgingival plaque is higher in people with periodontitis than in periodontally-healthy individuals<sup>5</sup>. The aqueous extract of *Quercus Ilex* (QI) has a high tannin content (15% to 17%) used in wound healing by creating a dry environment, preventing the bacteria growth<sup>6, 7, 8</sup>, a factor which is expected to be prevented in the oral cavity of the geriatric patients (GP).

### Periodontal Structures

It comprises the gum which is part of the protecting joint. The periodontal joint, cementum, and alveolar bone are part of the periodontal insertion.

### Gum

That part of the oral mucosa that covers up the apophysis alveolar bone and surrounds the cervical portion of the teeth.

### Periodontal Joint

It is the structure of the connective tissue located between the cementum and hard alveolar lamina.

### Cementum

It is a calcified connective tissue overlying the root surfaces.

### Alveolar Bone

It is the marrow cavity which houses and supports the tooth.

### Periodontal Disease

Periodontal disease is an infection of the tissues that sur-

round and support the teeth. It is one of the leading causes of tooth loss in GP. Periodontal disease is caused by plaque, a sticky film of bacteria that constantly is formed on teeth<sup>4</sup>.

### Bacterial Plaque

It is an adherent substance composed of bacteria and their products, dead cells, desquamated cells, and leukocytes within a matrix of proteins and polysaccharides, microbial populations are wrapped by a matrix adhered to one another and / or to surfaces or interfaces.

### Microbiological Diagnosis

The cultures are a good way in the microbiological diagnosis to identify microbial species associated with periodontal disease. In order to follow up the work, prepared transport tubes will be used<sup>9</sup> (one tryptone soya agar and one with sodium chloride).

### Tryptone Soya Agar

By containing two peptones obtained by enzymatic hydrolysis of casein from soy, it will be used to develop some range/s of microorganisms including the difficult and delicate crop, both aerobic and anaerobic.

### Mannitol and Salt Agar

Mannitol and Salt Agar are used for isolation and differentiation of staphylococci from clinical specimens.

### Objective

To determine the effect of oak bark mouthwash in after-treatment localized periodontal pathogenic flora in periodontitis of geriatric patients.

### Methodology

A clinical, prospective, observational, comparative, and longitudinal study was carried out.

### Laboratory Instruments and Material

Transport pipe containing tryptone soy and sodium chloride at 0.9%

Swabs and sterile paper points.  
Petri dishes with sterile agar  
Tryptone Soy Agar, salt, and mannitol agar  
Metal rack  
Spark plug  
Gas Lighters  
Bacteriological loop  
Alcohol at 98%  
Incubators  
Thermometers  
Gloves, covering mouth  
Refrigerator at 4°C  
Zipper bags (ziploc)

### Study Sample

90 GP (45 of each gender), aged 65-75, in good general health who attended to dental consultation at the FEBUAP 's clinics (Faculty of Dentistry of the Autonomous University of Puebla) during the period from January to December 2012.

Participation was voluntary, following the guidelines of the Declaration of Helsinki II (Article 19) and the Mexican General Health Law<sup>10</sup>, it was assessed that patients retain 80% or more of the dental organs, specifically the 1st lower molars with localized periodontitis.

Disclaimer: apparently controlled GP ingesting a drug for more than two years or other drugs that have ceased or have Tx. with less than five years' time, presenting chronic generalized periodontal disease (retaking the Russell's periodontal Index)<sup>11</sup>.

GP with chronic disease/s.

Smokers GP in psychological state of anxiety or depression, who have ingested alcohol the day before collection, coffee or food before collecting the sample, who have also brushed their teeth with toothpaste containing triclosan, and before sampling they have brushed their teeth with toothpaste or have used mouthwash.

### CRITERIA FOR DISPOSAL

#### Technical errors in sample-taking METHODOLOGY

Phase 1: Based on the diagnosis, patients get selected if they meet the criteria, appropriate medical history, diagnosis of general health, signing the informed consent, taking periapical radiographs of 1<sup>st</sup> lower molars was performed as periodontal diagnosis backup, stomatological oral examination evaluating: a) presence of plaque, b) periodontal disease (including GP with localized periodontitis in 1<sup>st</sup> lower molars) and laboratory c) Percentage of isolation of microorganisms.

Phase 2: In the clinical area: once the patients are selected previous instruction in writing, it is proceeded to collect the required samples for the study: With prepared transport tubes (one tryptone soya agar and one with sodium chloride at 0.9%) with two sterile swabs and two sterile paper points, cervical tooth contour samples are taken from the selected organs (1st lower molars, in the first phase were the right ones and left ones are taken in the second phase) smear corresponding to the gingival mucosa tissue is performed, which were placed in each tube to be transported to the laboratory of the Faculty of Biomedicine (BUAP). After the seizure of the smears, GP were treated with scaling and curettage in the 1st right molars and patients follow-up was given at 5, 8 and 15 days.

Phase 3: Laboratory Area: To render: work area is disinfected with alcohol, two burners are located at a distance of 40cm. each from the other and are lighted in order to create a microorganisms zone-free. Transport tubes with swabs and paper points are placed on a rack to prevent spillage. The tubes are uncovered in the petri dish with prepared agar in a previously sterile bacteriological loop (placing it directly in a flame until red hot pen tip), once cold, the oral mucosa scrapings is extracted from the handle swab tip putting it directly into the agar to inoculate microorganisms, the petri dish is then closed. The plates were inoculated by the method of mass striatum.

The plates at 35 ± 2°C are incubated in aerobiosis for 24 hours and the development is observed.

Phase 4: In the clinical area: For the second stage, it proceeds to collect other samples again using the same parameters, the scraping and curettage were performed in the 1st left lower molars and mouthwash was prescribed based on oak bark, follow-up was given again and at 15 days samples were taken. Patients were given follow-up at 5, 8 and 15 days and again the sample was taken.

### Statistical Analysis

An Excel database was created to empty and carry out statistical analysis according to the objectives and the comparative study. Averages, standard deviation, standard error, variance, coefficient of variation, maximum, minimum and range were calculated.

### Results

From the 90 studies of patients with localized periodontitis, mucosal smears were analyzed by detecting the presence of unusual Gram- microorganisms (30%), *Pseudomonas* type (30%) and staphylococci (60%) of the GP both genders with chronic localized periodontitis showing significant differences between pre-and post-operative clinical diagnoses (p > 0.001). (See Table 1)

Concerning the bacilli, it was found in 100% of the samples

the clustering of characters by 80% and the filament by 60%, although their presence is considered normal in the mucosa and in the periodontal tissues, they were eliminated by the use of mouthwash by 100%. It is important to mention that filamentous bacilli grow in acidic environment, which impairs the healing process. Being wiped away, it contributed to the fast-healing of the tissues where scaling and curettage (the wound) was performed.

No changes were found regarding the formation of coccobacilli, diplococci and micrococci.

The highest prevalence of microorganisms corresponded to the genre of Gram+ bacilli. Statistically significant associations between the presence or absence of rare microorganisms in patients with periodontal disease were found in both genders.

Bacterial Incidence Initial Examination		Bacterial Incidence After-treatment Examination	
Right lower quadrant Both genders		Left lower quadrant Both genders	
Streptococci G+	80%	Streptococci G+	80%
Streptococci G-	30%	Streptococci G-	0%
Micrococci	100%	Micrococci	100%
Diplococci	100%	Diplococci	100%
Bacilli	100%	Bacilli	70%
Letter groupings Bacilli	80%	Letter groupings Bacilli	50%
Pseudomonas	30%	Pseudomonas	0%
Coccobacilli	80%	Coccobacilli	80%
Filamentous Bacilli	60%	Filamentous Bacilli	0%
Staphylococci	60%	Staphylococci	0%

(Table 1) Comparison of localized periodontal pathogenic flora before and after treatment with the use of oak bark mouthwash.

## Discussion and Conclusions

There are about 300 species of bacteria in dental plaque, but only a few are related to periodontitis, although not all of them were discovered, the ones rarely located in the subgingival microbiota may contribute to the periodontal pathogenesis<sup>12</sup> in GP that does not respond adequately to conventional therapy.

The found microorganisms are species of non-fermenting Gram- bacilli such as *Pseudomonas* and *Staphylococcus* species. Factors are characterized by resistance to antibiotics that favor their stay for long periods in the infected tissues, coinciding with Slots J, Feik D, Rams TE<sup>13</sup> and Pollack M.<sup>14</sup>

They share unusual microorganisms and are often opportunistic pathogens as well as considered part of the normal microbiota according to immunosuppression condition which aggravates the disease. The results show its deletion with routine treatment and the mouthwash recovering the tissue in the short term.

Researchers report that not all patients nor tooth sites respond favorably to conventional mechanical therapy, this is explained by the microbial composition of the subgingival plaque. Slots<sup>13</sup>, Listgarten<sup>15</sup> and Handal<sup>16</sup> due to patients treated with traditional mechanical therapy had no improvement in those periodontal bags which showed enterobacteria, coinciding with our results.

After an analysis of the results, it is recorded that periodontal disease has a high prevalence in the GP, from the 90 patients who formed the sample, 78 were affected with varying degrees of gingivitis and moderate periodontitis, which represented 86% total. These approaches are consistent with those reported by other research.<sup>17-18</sup> The unusual microbiota of patients included in this study showed a 30% proportion of bacilli with *Pseudomonas*, *Staphylococcus* 60% and filamentous bacilli (60%) (Gram-). The bacteria found are characterized for being opportunistic agents to humans. To be removed without antibiotic, is a breakthrough in improving the quality of the GP life, avoiding drug use and preventing discomfort to intestinal flora and the economy.

Further studies are needed to determine the role of these unusual microorganisms in the pathogenesis and / or progression of periodontal disease, so our line of work continues conducting research on the different effects of bacterial-level mouthwash.

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