

## **Scaling and Root planning (SRP) and Administration of Probiotic - A Case Control Study**

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### **Abstract**

#### **Background**

Periodontitis is a chronic host immune-mediated inflammatory response involving the supporting periodontal tissues resulting in tissue breakdown and bone loss. It eventually results in tooth loss. Probiotics are live microorganisms when given in adequate amounts attenuate normal body health. It recently finds its benefit in oral health. It stimulates the immune response and interferes with the growth and adhesion of microorganisms. Probiotics can be used as an adjunct in the treatment of periodontitis. This is a pilot study that evaluates the clinical periodontal parameters in generalized periodontitis patients, by giving the oral supplement of probiotics or placebo as

an adjunct to nonsurgical treatment, scaling, and root planning (SRP).

#### **Methods**

A total number of 10 generalized periodontitis patients were included. They were divided into two groups randomly. One group was given a probiotic blend along with SRP and the other group was given a placebo along with SRP. Both the groups are evaluated for periodontal parameters after the period of 4 weeks.

#### **Results**

The results were obtained and statistically analyzed. The treatment group where probiotic supplement intake was found to have an effective

reduction in gingival index, plaque index, probing pocket depth, and gain in clinical attachment level than the placebo group. It was found to be statistically significant,  $p < 0.05$ .

### **Conclusion**

Probiotics can be used as an effective adjunct to SRP, Scaling and root planning in treating periodontitis.

### **Keywords**

Periodontitis, scaling and root planning, probiotic, placebo.

### **Introduction**

Periodontitis is a chronic immune-inflammatory disease affecting the supporting structures of the teeth resulting in progressive attachment and bone loss. Probiotics are live microorganisms administered in an adequate amount with beneficial health effects on the host. It is in use for decades in fermented food products. In recent years the use of probiotics has become a keen interest in the field of dentistry, particularly periodontics. Probiotics have a positive effect on the development and stability of microbiota thereby stimulating the innate and adaptive immune response<sup>(1)</sup>. Probiotics as an adjunct to mechanical therapy in chronic periodontitis proved to be efficient in controlling the disease<sup>(2)</sup>.

It is an established fact that the primary factors in the development of periodontal disease are the host and the bacterial challenge. Periodontal disease affects bone and supporting tissues of the periodontium eventually resulting in tooth loss. The etiological factors of the periodontal disease depend on the presence of pathogenic bacteria, the absence of so-called beneficial bacteria, and the susceptibility of the host<sup>(3,4)</sup>. The overall balance between bacterial challenge and the body's immunoinflammatory responses is critical to periodontal disease. The etiological factors of

periodontal diseases are the presence of pathogenic bacteria. The absence of so-called beneficial bacteria and the susceptibility of the host are the key factors to focus. Despite this knowledge, Initial therapy involves the reduction of periodontopathogens by nonsurgical periodontal treatment<sup>(5)</sup>. It primarily encompasses scaling and root planning and oral hygiene instruction<sup>(6)</sup>. However, the pathogens can be greatly reduced by scaling and root planning, and periodontopathogens quickly recolonize<sup>(7)</sup>. The administration of beneficial bacteria is a developing concept in the prevention and treatment of periodontal diseases. This novel probiotic treatment has emerged which involves the use of some beneficial bacteria which has both antimicrobial as well as inflammatory properties. This method aims to increase the proportion of beneficial bacteria in the oral cavity by either probiotics or prebiotics. Probiotics are live microorganisms administered in adequate amounts with beneficial health effects on the host. Probiotics have been used for a number of years in the field of general medicine for the treatment of inflammatory bowel disease, prevention of allergies, management of vaginal infections, and the prevention of respiratory infections. In the treatment of dental diseases, probiotics have been used for the last decade. In the field of periodontics, probiotics have come up as an attractive alternative to antibiotics. They target particular periodontal pathogens inhibiting the initial plaque adhesion, thereby increasing the long-term success of periodontal therapy. Studies have reported that there is a reduction of bleeding on probing, plaque index, and gingival index after the use of probiotics<sup>(8,9,10,11,12)</sup>. This study was conducted to assess the benefit of the adjunctive use of the probiotic blend to SRP in the treatment of chronic periodontitis patients. The objective

of this study was to evaluate the clinical periodontal parameters in using this probiotic blend as an adjunct to scaling and root planning for a period of 4 weeks in comparison with a placebo.

### **Materials and Methods**

The patients visiting the department of periodontics, Asan memorial dental college, and the hospital, were screened for generalized chronic periodontitis. A total of 10 patients with generalized periodontitis were selected for the study. The patient's informed consent was duly signed and obtained. Institutional ethical clearance was obtained by the institutional and scientific review committee, Asan memorial dental college, Chengalpet.

The inclusion criteria are as follows:

1. Patients with generalized periodontitis with no relevant medical history.
2. Patient of age 35 years and above.
3. Minimum of 3 teeth in each quadrant excluding the third molar.
4. Presence of at least 5 teeth with  $PPD \geq 5\text{mm}$ ,  $CAL \geq 2\text{mm}$ , and bleeding on probing  $>20\%$ .

The exclusion criteria are as follows:

1. Pregnancy and lactating individuals.
2. Patients have undergone any periodontal treatment/anti-inflammatory or antibiotic therapy in the last 6 months.

Patients fulfilling the inclusion and exclusion criteria were included in the study. Written informed consent was obtained from all participants after a

thorough explanation of the purpose of the study, implications, and potential risks and benefits of participating in this study.

### **Experimental Design and Treatment Protocol**

After baseline examination, All patients received full mouth nonsurgical periodontal therapy (scaling and root planning) using an ultrasonic scaler (cavitron, Dentsply, York, PA, USA) and Gracey curette (Hufriedy, Chicago, IL, USA). The following periodontal parameters are taken into account periodontal pocket depth (PPD), clinical attachment level (CAL) using Williams periodontal probe, bleeding on probing, gingival index (Loe and Silness) and plaque index (Loe and Silness).

The commercially available probiotics used in the study is a probiotic blend from Wow life science. Each capsule delivers 20 billion CFUs of good bacteria, which enhances balance and immunity. It is a premium blend of 14 gut-friendly good probiotic bacterial strains: *L.plantarum*, *L.casari*, *L.rhamnosus*, *L.acidophilus*, *B.Lactis*, *L.reuteri*, *L.salivarius*, *L.paracasei*, *L.gasseri*, *S.thermophilus*, *B.fifidium* and *B.Breve*. This is a pilot study done for a period of one month. All the clinical parameters were taken at the baseline and after the treatment period of 1 month. This pilot study includes 10 patients selected randomly, given either probiotics or a placebo. The SRP was done and the supplements were given. They were asked to take one capsule/day 30 minutes before the meal for 30 days. They were asked to report after a period of 1 month according to NICE guidance for reassessment and evaluation. The clinical photographs taken before the treatment and after the treatment period of 4 weeks showed a reduction in the signs of inflammation, as shown in Image 1 and Image 2.

Image 1: Pre-Treatment



Image 2: Post-Treatment



## Results

The mean value of pre-treatment and post-treatment of the following indices gingival index, plaque index, periodontal pocket depth, and clinical attachment level were taken.

Statistical analysis, using SPSS 20 software was done and the results were obtained. It showed that the gingival index between pretreatment and post treatment was statistically significant values. The Gingival index significantly reduced post treatment by  $1.45 \pm 0.89$  mm as opposed to a higher gingival index preop of  $2.46 \pm 0.52$  mm, with a statistically significant decrease of 1.01mm (95% CI, 0.5373 to 1.4826mm,  $t(9) = 4.8339$ ,  $p = 0.0009$ , as shown in graph 1.

The plaque index was also found to be statistically significant. The plaque index was significantly reduced in post treatment by  $1.1 \pm 0.88$  mm as opposed to a higher plaque index preop  $2.47 \pm 0.52$  mm a statistically significant decrease of 1.37 mm (95% CI, 0.8978 to 1.8422 mm,  $t(9) = 6.5636$ ,  $p = 0.0001$  as shown in graph 2.

Periodontal pocket depth reduction was found to be significantly reduced in post treatment by  $6.09 \pm$

1.92 mm as opposed to a higher PPD pretreatment of  $8.74 \pm 3.06$  mm; a statistically significant decrease of 2.65 mm (95% CI, 0.3615 to 4.9385 mm),  $t(9) = 2.6195$ ,  $p = 0.0278$  as shown in graph 3.

It was found clinical attachment loss was also significantly reduced in other terms, there was no significant clinical attachment loss in post treatment by  $8.01 \pm 1.9$  mm as opposed to a higher CAL, clinical attachment loss in pretreatment by  $10.9 \pm 2.77$  mm; a statistically significant decrease of 2.893mm (95% CI, 1.1463 to 4.6396 mm,  $t(9) = 3.7469$ ,  $p = 0.0046$  as shown in the graph in 4.

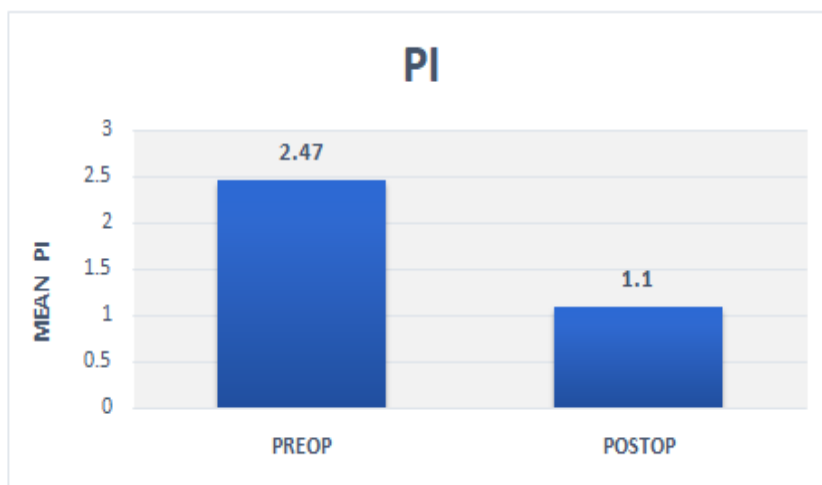
The review after the treatment period showed reduced gingival inflammation on clinical examination. It was found that there were no adverse effects to the supplement except one patient reported mild bloating of the stomach. The remaining patients found no discomfort.

### Graphical Representation

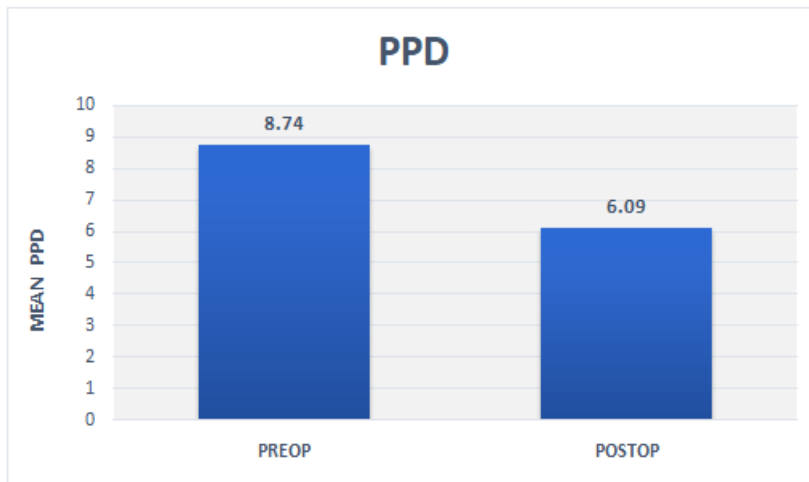
**Graph 1:** Comparison of gingival index between pre-treatment and post-treatment group



**Graph 2:** Comparison of plaque index between pre-treatment and post-treatment group



**Graph 3:** Comparison of periodontal pocket depth in pre-treatment and post-treatment group



**Graph 4:** Comparison of clinical attachment loss in pre-treatment and post-treatment group



### Discussion

This pilot study assessed the benefit of a probiotic blend of the bacterial strains of *L.plantarum*, *L.casari*, *L.rhamnosus*, *L.acidophilus*, *B.Lactis*, *L.reuteri*, *L.salivarius*, *L.paracasei*, *L.gasseri*, *S.thermophilus*, *B.fifidium* and *B.Breve* to SRP, scaling and root planning on clinical parameters in chronic periodontitis patients. The results were found to be statistically significant. The probiotic supplement proved to be well tolerated among all except one patient who reported bloating of the stomach at the end of the treatment period. No other side effects were reported. At the end of the study, patients have significantly fewer deep pockets and increased clinical attachment levels. This also showed a decrease in disease risk progression as concluded in the study done by Lang and Tonetti 2003<sup>(13)</sup>.

The randomized controlled trial study done by Vivekananda et al 2010 confirmed the plaque inhibition and anti-inflammatory and antimicrobial effects of *L.reuteri* Prodentis<sup>(14)</sup>. An RCT study done by Teughels et al in 2013, showed that there was a benefit for the patients using the *L. reuteri* lozenges. In relation to the primary outcome variable, there were significant larger

PPD reductions, especially in deep pockets, and significantly lower percentages of sites and teeth with a residual pocket depth of  $\geq 5$  mm concluding that oral administration of *L. reuteri* lozenges could be a useful adjunct to SRP in chronic periodontitis<sup>(15)</sup>.

The probiotic strains are isolated from numerous sources such as humans, animals, plants, the environment, and foods<sup>(16,17)</sup>. Then, they can be identified and characterized by microbiological, biochemical, and molecular-based techniques. *Streptococcus salivarius*, *S. oralis*, *L. rhamnosus*, *L. fermentum*, *L. plantarum*, *L. casei*, *L. acidophilus*, *L. brevis*, *L. sporogenes*, *L. salivarius*, *L. delbrueckii*, *L. pentosus*, *Bifidobacterium lactis* and *B. longum* are the most reported probiotic strains that exert anti-biofilm activity. The probiotic blend used in this study contains *L.plantarum*, *L.casari*, *L.rhamnosus*, *L.acidophilus*, *B.Lactis*, *L.reuteri*, *L.salivarius*, *L.paracasei*, *L.gasseri*, *S.thermophilus*, *B.fifidium* and *B.Breve*. Probiotics prevent the adhesion and formation of pathogenic micro-organisms<sup>(18)</sup>.

The Study done by Ghadeer Khalil Mohammad El-bagoory et al 2021 involves the local application of

probiotic *L. reuteri* in combination with SRP gives more favorable results than SRP alone in cases with chronic periodontitis. This pilot study assessed the benefit of probiotic blend as an adjunct to SRP over the clinical parameters in chronic periodontitis patients. The clinical results were confirmed statistically to evaluate the effect of probiotics on periodontal parameters. It was proved statistically significant. The probiotic supplement was found to be well tolerated.

### Inference

There was a significant reduction in plaque accumulation in patients who had probiotics along with SRP than in the patients with placebo along with SRP.

### Conclusion

Most studies show a limited and temporary improvement in periodontal parameters when probiotics are given. Well-designed clinical studies with larger sample sizes and long-term follow-ups are required. In our study, there was a significant reduction in plaque accumulation in patients who had probiotics along with SRP than in the patients with placebo along with SRP. The main limitation of our study is relatively the small number of participants. But it could serve as the basis for further studies. Our study proved that a probiotic blend can be used as an adjunct to non-surgical periodontal therapy in treating periodontitis.

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The study received no funding from any agencies or external sources.

### Conflicts of Interest

The author declares that there was no conflict of interest.

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