

# The Relation of Probiotic Treatment to Periodontal Pocket in Comparison to Chlorohexidine

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## ABSTRACT

**Background:** Probiotics are harmless bacteria usually isolated from human commensal microbiota. The most commonly used species of probiotics belong to the *Lactobacillus*, *Bifidobacterium*, *Escherichia*, present in GIT and plaque.

**Aim of the study** to compare the effect of probiotic paste in periodontal pocket with chlorhexidine

**Materials and Methods:** 25 patients with chronic periodontitis enrolled in this study, spilt mouth technique for applying the probiotic paste and compare with other side which is chlorhexidine paste, pocket depth measure before and after treatment statistical analysis perform by SPSS program.

**Results:** Showed that a significant effect in the severities of pocket in side which treat with probiotic.

**Conclusions:** On conclusion the probiotic have significant effect on treatment of pocket in periodontal disease and have on side effect.

**Key words:** Probiotic, Prebiotic, Periodontitis

**HOW TO CITE THIS ARTICLE:** Alaa Omran Ali, Amer Abdulrahman Al-Shikhdaheer, Rahem Alziadi, Wesal A Al-Obaidi, The Relation of Probiotic Treatment to Periodontal Pocket in Comparison to Chlorohexidine, J Res Med Dent Sci, 2021, 9(12): 134-137

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**Received:** 04/10/2021

**Accepted:** 25/11/2021

## INTRODUCTION

Probiotics are harmless bacteria usually isolated from human commensal microbiota. The well-recognized species of these probiotics including *Lactobacillus*, *Bifidobacterium*, *Enterococcus* and *Bacillus*.

The aforementioned species are prevalent in gastrointestinal tract, dental biofilm in oral cavity and vagina [1].

*Lactobacilli* are Gram-positive, rod-shaped, and facultatively anaerobic microorganisms that were isolated and studied on a limited scale such as *Lactobacillus acidophilus*, *L. reuteri*, *L. bulgaricus*, *L. rhamnosus*, *L. salivarius*, and *L. casei*. *Bifidum* do bacteria are Gram-positive anaerobes, among which *B. breve*, *B. longum*, and *B. infantis* are the most recognized members [2].

Probiotics possess range of beneficial functions which significantly impact the health and wellbeing. For instance, they are essential to preserve the stability of bile salts while produced and stored [3].

Furthermore, several studies have linked probiotics and prebiotic to the pathogenesis of gingivitis and periodontitis as they were suggested to be highly involved in decreasing plaque accumulation, gingival bleeding and inflammation [3-8].

Aim; was to clarify the effect of probiotic paste (probiotic and prebiotic) in treatment of periodontal pocket.

## MATERIAL AND METHOD

A double-blind randomized control clinical trial was designed to answer the research question. 25 Patients attended or referred to the Department of Periodontics, College of Dentistry, and University of Baghdad. The study was started in September 2019 and finished in January 2021.

A written consent given to all participants to explain the aim and all relevant aspects of the study. Before enrolment in the study, each patient was requested to sign an informed consent.

All necessary precautions to infection were followed during measuring clinical parameters and collection.

The study protocol was submitted to the ethics committee, College of Dentistry, University of Baghdad to obtain an ethical approval.

The selected patients were categorized into the periodontitis group which were defined as those with sign of bleeding on probing (BOP) with detectable clinical attachment loss equal to 3mm at  $\geq 2$  non-adjacent teeth.

Inclusion criteria were: (1) Healthy; no institutionalized male or female patients, (2) 35-65 years of age, (3) At least three natural teeth, excluding third molars, should be present in each quadrant. (4) Previously untreated moderate to severe generalized periodontitis.

Exclusion criteria were as follows: (1) Those who received antibiotics for any purpose within 6 months before enrolment to the study or the need for antibiotic consumption during the trial, (2) pregnant and nursing mothers, (3) Diabetes, rheumatic fever, liver or kidney disease, neurological deficiencies, immunological diseases. In addition, (4) Chronic use of medication or as a therapy for a chronic disease, and (5) Current smoker.

### Sample size calculation

Sample size was calculated for experimental design and treatment protocol (which is split mouth technique baseline examination. The full-mouth gingival index (GI) was recorded according to Loe and Silness (1963) [5] and full-mouth plaque index (PI) was calculated according to Silness and Loe) pocket depth measuring and bleeding on probing.

After baseline examination, all patients received proper oral hygiene instructions. The participants were randomized divided left and right one side scaling and root planning (SRP) with synbiotic paste (prepared in

Science Department college of basic education and Department of food science, College of agriculture engineering sciences, University of Baghdad.

And other side with SRP and commercial Chx paste after 4 weeks all patients were re exam for pocket depth in each side left and right,.

Statistical analysis was performed by using spss program virgin 26. Chi-squared test of independence and Fisher's exact test of independence are used for statistical analysis to assess the association between two variables.

Limitations in the application of X2: this test will not give reliable result if the expected frequency in any one cell is less than 5.

Although in practice Fisher's exact is employed when sample sizes are small ( $\leq 30$ ), it is valid for all sample sizes.

So Fisher's exact test is more accurate than the chi-squared test when the expected numbers are small. The significance will be considered when  $P < 0.05$  otherwise it is not significant.

### RESULTS

Table 1 reveals the distribution of periodontal pocket depth; number and percent, according to the sides; left and right, before treatment. It was found that the lowest score was 5 mm while the highest one was 7.5.

Besides, there is no difference in the distribution of the severity of periodontal pocket between the two sides of the mouth before any treatment at  $P < 0.05$  even the number of the sites is unequal.

**Table 1: Severity of periodontal pocket with sides of the mouth before any treatment.**

Sides	Cases	Depth of periodontal pocket (mm)						Total
		5	5.5	6	6.5	7	7.5	
Left	No.	35	27	23	22	28	25	160
	%	11.3	8.7	7.4	7.1	9	8.1	51.6
Right	No.	30	25	26	20	25	24	150
	%	9.7	8.1	8.4	6.5	8.1	7.7	48.4
Total	No.	65	52	49	42	53	49	310
	%	21	16.8	15.8	13.5	17.1	15.8	100

Chi square=0.609; df=; p=0.98 not significant

While after using probiotic treatment, Table 2 illustrates the severity of periodontal pocket after and before treatment on left side. It was found that there is an association between the severity of periodontal pocket depth and probiotic treatment at  $P < 0.05$ .

Even that the lowest score was 5; it has the highest rank for both before and after treatments. And the highest score (7.5) will be the lowest rank after treatment.

**Table 2: Severity of periodontal pocket with probiotic treatment.**

Probiotic	Cases	Depth of periodontal pocket (mm)						Total
		5	5.5	6	6.5	7	7.5	
Before treatment	No.	35	27	23	22	28	25	160
	%	16.8	13	11.1	10.6	13.5	12	76.9
After treatment	No.	24	10	3	5	4	2	48
	%	11.5	4.8	1.4	2.4	1.9	1	23.1
Total	No.	59	37	26	27	32	27	208
	%	28.4	17.8	12.5	13	15.4	13	100

Chi square=18.63; df=5; p=0.002 significant

By using chlorohexidine treatment on right side, Table 3 shows the distribution of the severity of periodontal pocket after and before chlorohexidine treatment.

It was found that there is no association between the severity of periodontal pocket and chlorohexidine treatment at  $P < 0.05$ .

**Table 3: Severity of periodontal pocket with chlorohexidine treatment.**

CHX	Cases	Depth of periodontal pocket (mm)						Total
		5	5.5	6	6.5	7	7.5	
Before treatment	No.	30	25	26	20	25	24	150
	%	14.4	12	12.4	9.6	12	11.5	71.8
After treatment	No.	20	8	10	7	10	4	59
	%	9.6	3.8	4.8	3.5	4.8	1.9	28.2
Total	No.	50	33	36	27	35	28	209
	%	23.9	15.8	17.2	12.9	16.7	13.4	100

Chi square=6.44; df=5; p=0.26 not significant

Table 4 illustrates the distribution of periodontal pocket with both treatments on left and right sides of the mouth.

By using Fisher's exact test, it was found that there is no association between the severity of periodontal pocket and both treatments at  $P < 0.05$ .

**Table 4: Severity of periodontal pocket with both treatments.**

Sides	Cases	Depth of periodontal pocket (mm)						Total
		5	5.5	6	6.5	7	7.5	
Left Probiotic	No.	24	10	3	5	4	2	48
	%	22.4	9.3	2.8	4.7	3.7	1.9	44.9
Right CHX	No.	20	8	10	7	10	4	59
	%	18.7	7.5	9.3	6.5	9.3	3.7	55.1
Total	No.	44	18	13	12	14	6	107
	%	41.1	16.8	12.1	11.2	13.1	5.6	100

Fisher's exact test=6.73; df=5; p=0.24 not significant

Table 5 reveals the healed periodontal pocket for both treatments. The highest number of the healed pocket was found in 7 mm pocket depth for probiotic treatment,

Besides, there is no difference in the distribution of the healed periodontal pocket between the two treatments at  $P < 0.05$ .

**Table 5: Healed periodontal pocket with both treatments.**

Sides	Cases	Depth of periodontal pocket (mm)						Total
		5	5.5	6	6.5	7	7.5	
Left Probiotic	No.	11	17	20	17	24	23	112
	%	5.4	8.4	9.9	8.4	11.8	11.3	55.2
Right CHX	No.	10	17	16	13	15	20	91
	%	4.9	8.4	7.9	6.4	7.4	9.9	44.8
Total	No.	21	34	36	30	39	43	203
	%	10.3	16.7	17.7	14.8	19.2	21.2	100

Chi square=1.15; df=5; p=0.94 not significant

### DISCUSSION

Probiotics can be defined as beneficial live microorganism mainly bacteria from lactobacillus and Bifidobacterium species when it Consumed in sufficient amounts at least 10 – 100 million cfu/gram or ml reflected health benefits on the host.

Prebiotics are particular soluble fibers like inulin, Galacto-Oligosaccharides, and Fructans. They Encourage and stimulate the growth of probiotics microbes. Prebiotics can be found in many sources especially that contain complex carbohydrates. Also, it had many health benefits like Colorectal Cancer, degradation by probiotics and releasing SCFAs, Irritable Bowel Syndrome and Crohn's Disease and improve immunity functions.

A synbiotic can be defined as Combination of probiotics and prebiotics that beneficially affects the host by increasing total living count, the survival and activities of the probiotics.

Psyllium (*Plantago ovata*) seed is one of the promising prebiotics. This plant mostly grows in India, Asia, America but it can be found worldwide [6].

So as discussions of the result of this study, there is no significant distribution in no. of pockets between two groups in table one because there is before treatment although periodontitis the pocket depth differ from side to side and from tooth to tooth. While regarding to table 2 there is significant difference in distribution between two sides this result is in agreement with many studies [3, 6]. While by using Chx treatment the result showed no effect of Chx this may be due to the consistency of chlorhexidine paste is not inter the depth of the pocket so there is no association between two sides after treatment.

Regarding the table 4, it reviled the efficient of probiotic (synbiotic) paste the way same of the chlorhexidine which is commercial used.

These studies, the use of probiotic and prebiotic (paste) have an effect on periodontal health without any side effect this result is in agreement with another Iraqi study [7, 8].

### CONCLUSION

Probiotic and prebiotic have useful effect and applicable method to treat the periodontitis without any side effect and easy to use.

### CONFLICT OF INTEREST

None.

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