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RESEARCH ARTICLE

PROBIOTIC CHEWING GUM TREATMENT OF PERIODONTAL DISEASE.

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Abstract

Background: Periodontitis is defined as an inflammatory disease of the supporting tissues of the teeth caused by specific microorganisms or groups of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with pocket formation, recession, or both. The clinical feature that distinguishes periodontitis from gingivitis is the presence of clinically detectable attachment loss.
Aim of the study: Comparative study the effect of probiotic s as chewing gum in patient with periodontal disease.
Methods: In thisstudy, 20 patient with periodontal disease (chewing gum with probiotic supplement group)(test group) and 20 patient(chewing gum) (control group) both received treatment in periodontal department of dentistry college by means of scaling and polishing , the (test group) in addition received probiotic chewing gum in order to study its effect and compare it with the(control group).
Result: Probiotic chewing gum users demonstrated less amount of plaque than in the (control group), and less gingival inflammation in the study group than in the control group.
Conclusion: Probiotic chewing gum has more effect on the periodontal tissue health, by decreasing the amount of plaque and gingival inflammation with adjunct scaling when compared to the control group.

Introduction:-

The first studies of the use of probiotics for enhancing oral health were for the treatment of periodontal inflammation.[43] Patients with various periodontal diseases, gingivitis, periodontitis, and pregnancy gingivitis, were locally treated with a culture supernatant of a *L. acidophilus* strain. Significant recovery was reported for almost every patient. There has been significant interest in using probiotics in treatment of periodontal disease recently, too. The probiotic strains used in these studies include *L. reuteri* strains, *L. brevis* (CD2), *L. caseiShirota, L. salivarius* WB21, and *Bacillus subtilis. L. reuteri* and *L. brevis* have improved gingival health, as measured by decreased gum bleeding[1, 2, 3]. The use of probiotic chewing gum containing *L. reuteri* ATCC 55730 and ATCC PTA 5289 also decreased levels of pro-inflammatory cytokines in GCF,[3] and the use of *L. brevis* decreased MMP (collagenase) activity and other inflammatory markers in saliva.[2] With *L. casei*Shirota and *Bacillus subtilis* no difference in test and control groups in gingival bleeding or measured plaque index was observed, but the use of *L. casei*Shirota decreased PMN elastase and MMP-3 activities in GCF, and gingival inflammation was lower in the group consuming the probiotic product, as measured by MPO activity after a four-day period of experimental gingivitis.[4]*B. subtilis* seemed to reduce the number of periodontal pathogens.[5] Use of tablets containing *L.*

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salivarius WB21 has been shown to decrease gingival pocket depth, particularly in high-risk groups such as smokers, and also affect the number of periodontalpathogens in plaque.[6, 7]

Again, although encouraging results have been observed, most studies have been fairly short. Furthermore, in some studies the observed differences were quite small, though statistically significant.
Some probiotic *Lactobacillus* and *Streptococcus* strains seem able to colonize the oral cavity of some people during the time that products containing them are in active use. However, both in vitro and in vivo evidence indicate that the differences between various probiotic strains, products, and also host individuals are obvious.[16,2,]*L. rhamnosus* GG and two different *L. reuteri* strains have been reported to colonize the oral cavity of 48–100% of volunteers consuming products containing them.[2,]

At least some of the probiotic bacteria used in various probiotic products may colonize the oral cavity during the time they are in use; thus, the effects of probiotic bacteria in the oral cavity are important to understand. Probiotic bacteria seem to affect both oral microbiota and immune responses. On the other hand, the extent to which bacteria in food or in food ingredients can influence relatively stable oral microbiota is difficult to predict. Thus, both research to unravel the mechanisms of possible probiotic action and long-term clinical trials are needed if probiotics are to provide a new scientifically proven means of preventing or treating oral diseases,[2,3].

Material And Method:-

Across-sectional survey of forty patient divided in to two group(test group),chewing gum with probiotic and(control group) chewing gum without probiotic(probiotic chewing gum prepared in college of agriculture department of food science .the test group was composed of twenty subject and control group was composed also of twenty subject .the patient was selected from periodontal department in collage of dentistry-university of Baghdad .the subjects for the study were selected randomly and they were in good general health and were not using any medications and the subject we take contain male and female patient we carried out a careful examination of patient using the plaque index (PI)(silnness and loe in 1964),gingival index (GI)(loe, 1967) of those patient a comparison analysis. We usedSPSS statistics for analysis and Microsoft excel 2013 for figures.

Method:-

After doing scaling and polishing for test group subjects asked them to use probiotic chewing gum(with lactobacillus acidophilus probiotic) two time daily 10 minute during one week and examined the subject during the first and second visit to make comparison analysis . While control group was done scaling and polishing askedthem to chew sugar free chewing gum two time daily for 10 minute during one week, and made comparison analysis. A thorough periodontal examination was carried out under good artificial light ,and parameter selected for the study were carefully record .plaque index , gingival index all were measured using these specific index and record on case sheet design for this study .
Informed consent was obtained from all the subjects before starting periodontal examination.

Clinical examination:-

Plaque index:-

The plaque index (loe and silneess,1963)was created for the assessment of the plaque accumulation on the basis of 0 to 3 the criteria are:

Scores	Criteria
0	No plaque
1	A film of plaque adhering to the free gingival margin and adjacent area of the tooth cant be seen by naked eye.
2	Moderate accumulation of soft deposit within the gingival pocket or the tooth and gingival margin can be seen by naked eye.
3	Abundance of soft matter within the gingival pocket and 0r on the tooth and gingival margin

Gingivalindex :-

The gingival index (loe1967)was created for the assessment of the gingival condition and records qualitative changes in the gingival .it records the gingival and interproximal tissue separately on the basis of 0 to 3.the criteria are :

Scores	Criteria
0	Normal gingival
1	Mild inflammation –slight change in color and slight edema but no bleeding on probing
2	Moderate inflammation –redness ,edema ,glazing bleeding on probing
3	Sever inflammation –marked redness and edema, ulceration , with tendency to spontaneous bleeding

Instrument:-
-dental mirror
-tweezers
-towels
-mask
-Kidney dish
-periodontal probe
-Cotton
-Alcohol
-Gloves

Statistical analysis
Use spss.21. of windows 7 and use excel.10 for fig.
1-desicriptive statistic
-tables
-mean
-standard deviation (SD)
2-invertial statistic
- t-test
-person complex (r)
-p-value
If $p<0.05$ significant
If $p> 0.05$ non significant
If $p<0.01$ high significant

Result:-

Plaque Index and gingival index:-
The following table and figures summarized the descriptive statistics of group A and B regarded plaque index (PI) and gingival index(GI).

Table 1:-Descriptive of group A(test group)

	Base line		**Week1**	
	Mean	**SD**	**Mean**	**SD**
Pl	**1.3**	**0.033**	**0.7**	**0.018**
Gl	**1.2**	**0.03**	**0.6**	**0.015**

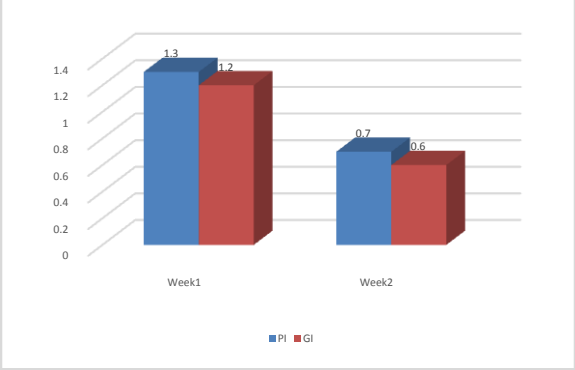

Figure 1:-Descriptive statistic of group A(test group)

As we see in the figure (1) there are high differences between PI and GI of test group between first and second week

Table2:-t-test between weeks(test group)

	t-test	P-value	Sig
Pl	**3.862**	**0.029**	**S**
Gl	**4.36**	**0.028**	**S**

Now if we see the descriptive statistic of subject group B(see figure 2) we also see a result similar to group A also there are high differences between the first and second week.

Table3:-Descriptive of groups B(Control)

	Week1		Week2	
	Mean	**SD**	**Mean**	**SD**
Pl	**1.3**	**0.033**	**0.9**	**0.023**
Gl	**1.1**	**0.028**	**0.8**	**0.02**

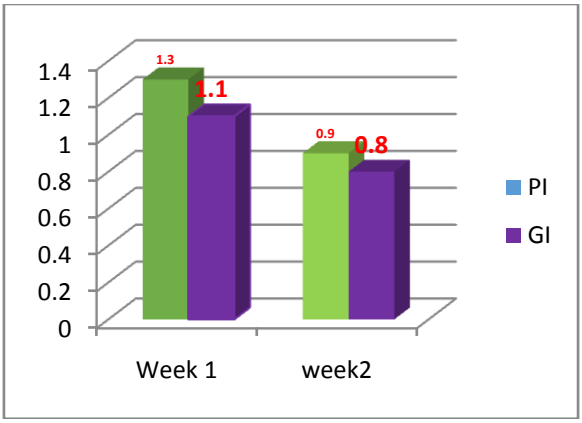

Figure 2:-Descriptive statistic of group B(control).

If we compared between the result of group (A) and (B) we will found the following result (see figure 3).

Table 4:-Descriptive of groups by weeks.

	Base line				Week1			
	GroupA		GroupB		GroupA		GroupB	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Pl	**1.3**	**0.033**	**1.3**	**0.0325**	**0.7**	**0.018**	**0.9**	**0.023**
Gl	**1.2**	**0.03**	**1.1**	**0.0275**	**0.6**	**0.015**	**0.8**	**0.02**

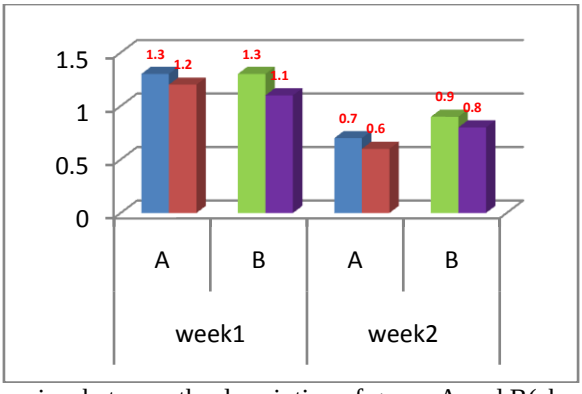

Figure 3:-A comparism between the descriptive of group A and B(chewing and control)

Table 5:-t-test between Group A& Group B of weeks

	Base line		Week1	
	t-test	P-value	t-test	P-value
Pl	0	NS	0.36	0.86 NS
Gl	0.12	NS	0.465	0.796 NS
**P>0.05 Non significant				

	Group A		GroupB	
	t-test	P-value	t-test	P-value
Pl	4.26	0.034 S	3.625	0.036 S
Gl	2.03	0.049 S	2.036	0.028 S
*P<0.05 Significant				

Table6:-PH of saliva and FR of saliva

Second week	Test group		Control group	
	Mean	SD	mean	SD p-value
PH	7.85	-+0-31	7.50	-+0.23 0.23
FR	5.7	-+2.3	4.83	-+2.6 0

P`0.5 not significant

Table (7):

	Control group	Test group	Total subject
chewable	10	8	20 control
trestles	10	10	20 test
sticky	0	1	
flaweble	0	1	

Discussion:-

Probiotics can be defined as living microbes, or as food ingredients containing living microbes, that beneficially influence the health of the host when used in adequate numbers.[1]

In figure (1) the (20) patient (groupA) and make scaling to them after that we record the plaque and gingival index then give to them probiotic chewing gum. After one week we record (GI,PI) index we see high difference between the first and second week , this agree with (Wetman et al ,2009).

In figure (2) the same experience another (20) patient (group B)but give them just chewing gum, after one week we also see difference in (GI,PI) index between the first and second week due to mechanical plague control.

In figure (3) we compare between group A(chewing gum) and group B(control) , the chewing gum patient show slightly higher decrease in in plaque index and gingival index between the first and second week than the controlled patient ,this agree with(Hojo et al.,2007).
In table 5 shown that there are significant deference between two group and that agree with many research that the probiotic can defense the bacterial plague and enhance the oral hygiene which is the ability of lactobacillus acidophilus to fight the biofilm in oral cavity. Della Riccia DN, Bizzini F, Perilli MG, Polimeni A, Trinchieri V, Amicosante G, et al 2007., . Mayanagi G, Kimura M, Nakaya S, Hirata H, Sakamoto M, Benno Y, et al.2009.

Some probiotic *Lactobacillus* and *Streptococcus* strains seem able to colonize the oral cavity of some people during the time that products containing them are in active use. However, both in vitro and in vivo evidence indicate that the differences between various probiotic strains, products, and also host individuals are obvious.[26,44,57,58]*L. rhamnosus* GG and two different *L. reuteri* strains have been reported to colonize the oral cavity of 48–100% of volunteers consuming products containing them.[44,58–60] In addition, *S. salivarius* K12, used for treating oral malodor, temporarily colonizes the oral cavity for a short time after use.[61] Furthermore, consumption of a mixture of seven different *Lactobacillus* strains increased the number of salivary *Lactobacillus* counts, although the identities of the strains in the saliva were not determined.[41]

Patients with various periodontal diseases, gingivitis, periodontitis, and pregnancy gingivitis, were locally treated with a culture supernatant of a *L. acidophilus* strain. Significant recovery was reported for almost every patient. There has been significant interest in using probiotics in treatment of periodontal disease recently, too. Improved gingival health, as measured by decreased gum bleeding. The use of probiotic chewing gum containing *L. reuteri* ATCC 55730 and ATCC PTA 5289 also and Use of tablets containing *L. salivarius* WB21 has been shown to decrease gingival pocket depth, particularly in high-risk groups such as smokers, and also affect the number of periodontontalpathogens in plaque.[7,8] Again, although encouraging results have been observed, most studies have been fairly short. Furthermore, in some studies the observed differences were quite small, though statistically significant.Table 6 show that he chewing gum increase the salivary flow and the ph of the saliva and that also in agreement with many study40,41.which decrease the gingivitis by washing the mouth from materia alba and plague .

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