

# Clinical evaluation of 0.2% hyaluronic acid and its effect on periodontal parameters before and after treatment of plaque induced gingivitis

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## Abstract

Background, one of the most prevalent periodontal diseases is the plaque induced gingivitis. Hyaluronic acid is linear polysaccharide found in the extracellular matrix of connective tissues, synovial fluid and other tissues. HA used as adjunct to the mechanical plaque control because of its anti-inflammatory and bacteriostatic properties. Gengigel (0.2% Ricerfarma-Italy) is a gel form of HA used in dentistry in treatment of gingivitis and acceleration of wound healing as in treatment of mouth ulcers.

Aim of the study to evaluate the effect of 0.2% of Hyaluronic acid gel as an adjunctive in treatment of plaque induced gingivitis by using clinical periodontal parameter which are PLI (Plaque Index), PBI (papillary Bleeding index), GI(Gingival Index) and to compare clinically between the effect of scaling and the gel in treatment of gingivitis

Methods, sample population consists of (25) subject, 11 female and 14 male which have a plaque induced gingivitis. A split mouth procedure was used in this study so that the mouth was subdivided into two division, left and right sides of maxillary arch only. Both sides were received a scaling and collection of periodontal parameters (plaque index, gingival index and papillary bleeding index), then the patient was informed to put a Gengigel on the upper right side only three times daily for 1 week. The second visit presented with only collection of periodontal parameters (PLI, GI, PBI indices).

Results, intragroup comparison showed highly significant difference in both gel and scaling side in plaque, gingival and papillary bleeding indices with largest effect was found in the gel side while lowest effect was found in the scaling side. Intergroup comparison at second visits showed a significant difference in plaque, gingival and papillary bleeding indices between two sides.

Conclusion, the split-mouth procedure used in this research has the advantage of allowing paired comparisons to be made. There was a positive effect of HA on gingival inflammation clinically by rapid reducing the PL, GI, and PBI after one week as compared to the brushing only.

**Keywords:** hyaluronic acid, gingivitis.

## INTRODUCTION

The gingiva is the part of oral mucosa which surrounds the necks of the tooth and covers the alveolar ridge. It is a part of the tooth supporting structure of the periodontium, and by forming a connection with the tooth via the gingival sulcus; it protects the underlying tissues of the tooth attachment from the oral environment(1, 2). Gingival epithelium acts as protector to the deep structure and allowing a selective exchange with the oral environment (3) Plaque-induced gingival disease is derived by an interaction between the tissues and inflammatory cells of the host in hand and the microorganisms found in the dental plaque (biofilm) in the other hand. The host - plaque interaction can be changed by the effects of malnutrition, medications, local factors and systemic factors or both can alter the duration and severity of the response. Local factors that may contribute to gingivitis which added to plaque-retentive calculus formation on root and crown surfaces are Acquired or Developmental Deformities and Conditions of the teeth. These factors have the major responsibility due to their ability to collect plaque microorganisms and prevent their removal by patient- plaque control measures.(4)

HA is occurring in nature and it is a linear polysaccharide of the synovial fluid, extracellular matrix of connective tissue, and other tissues. It's used in the inflammatory process treatment. In dentistry, HA utilized in the treatment of periodontal diseases due to its anti-inflammatory and

antibacterial effects. Also HA could be used as an adjunct to mechanical therapy in the treatment of periodontitis because of its tissue healing properties.(5)

Gengigel is a commonly used topically on gingiva which has been established in gel form recently, involving the active constituent, (exogenous hyaluronic acid) (mean m/w 1,500,000) that high-molecular weight, which is nontoxic in the form of its pure sodium salt achieved by the method of biotechnology, at the concentration of 0.2%.Gengigel has a high adherence property resulting to remain in situ. The addition of 2, 4-dichlorobenzene methanol boost antibacterial and antiseptic activity of Gengigel and the formulation contained a pleasant gel sweetened with the non-cariogenic sugar xylitol. Gengigel® provides maximum adhesion and thus allows hyaluronic acid (which would otherwise be eliminated by constant salivary drainage) to remain in situ.(6)

## MATERIALS AND METHODS

### Subjects

#### Sample selection

The study had been made in Babylon University –collage of dentistry on 25 dental students (14 male and 11 female) of 4<sup>th</sup> and 5<sup>th</sup> stage and about (20-24) years old. Periodontal parameters were taken in the first visit and also collected after 1 week (2<sup>nd</sup> visit)

**Study design**

The study showed experimental randomized with non-masked split mouth comparative clinical trials .The patients were told about the study purpose and they were agree or refuse to play a role in the research and they must sign the consent .They got a questionnaire including: Name, Age, full dental, medical and drug history, and if they smoked or not. After that, the GCF was taken and the clinical periodontal parameters (PLI, GI, and PBI) were recorded.

**Inclusion criteria**

- Subjects with good general and oral health
- Subjects who had not received any periodontal therapy for past 3 months
- Subjects with moderate gingivitis (at least 25% of test sites showing bleeding on probing)
- Ability of the subjects to attend the hospital at regular intervals

**Exclusion Criteria**

- Subjects received medications that could change the state of the gingival tissues
- Subjects got orthodontic intervention
- Subjects had pockets, muco-gingival problems, and periodontitis
- Subjects had more than five carious teeth that need immediate treatment
- Subjects accupy any other supplemental plaque control measures like mouthwashes or interdental cleansing aids
- Subjects had a fixed attitude of taking alcohol, chewing tobacco or smoking

- Subjects had a systemic disease (any type)

**Gengigel Application:**

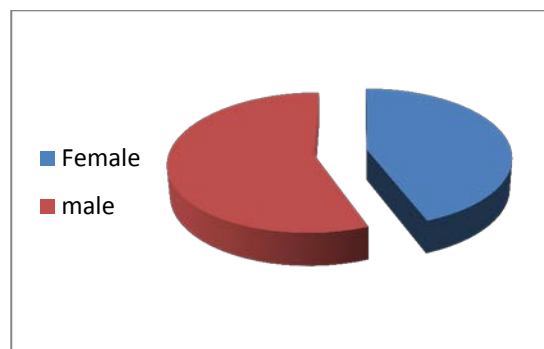
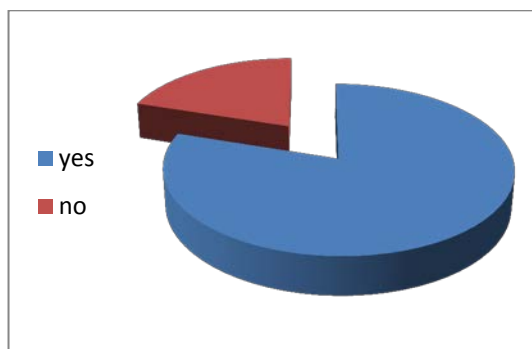
The Gengigel was applied topically onto the gingival surface by putting the gel on the finger and applied gently with pressure on it after taking clinical parameters from each patient. The patient informed to apply the gel repeatedly three times daily in the same way for 7 days after regular oral hygiene regimen. Patients must not drink, eat or rinse for 1 hour after application

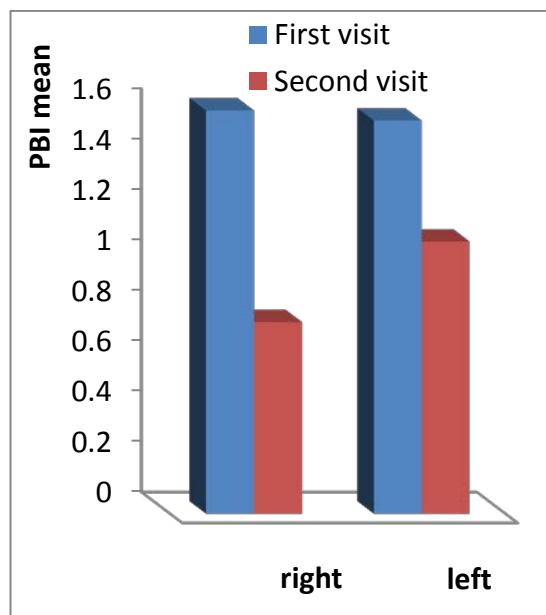
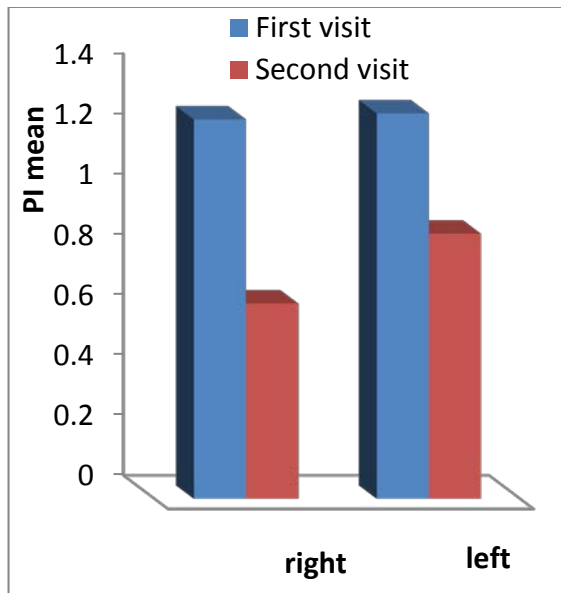
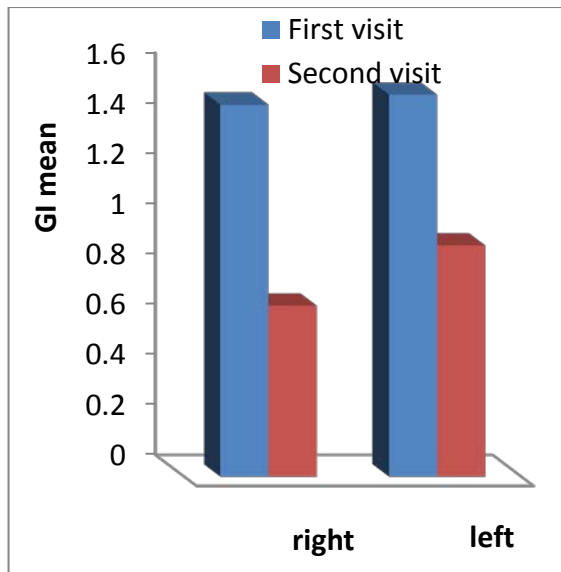
**RESULTS**

The dataset distribution was determined by using Shapiro-Wilk test(7) .This method was used to find the suitable way to verify the difference of periodontal parameters(indices) between 1<sup>st</sup> and 2<sup>nd</sup> visits in each side. Furthermore, a Shapiro-Wilk test examined the distribution of sample size with less than 50. The data set was approximately normally distributed; therefore, parametric paired t-test was used. Besides, the continuous variable values were presented as mean ± standard deviation (SD); the other variables were described by the number and percentage.

variables		N	Percentage (%)
age(range) (20-24)		25	
Gender	Female	11	44%
	male	14	56%
Brushing	yes	20	80%
	no	5	20%

GROUPS	variables	SC			SC + TG			
		Application day	N	MEAN.	S.D	N	MEAN	S.D
PLI	0		25	1.28	0.54	25	1.24	0.522
	1week		25	0.88	0.439	25	0.60	0.10
	T test		3.464			5.62		
	P value		0.002 HS			0.00 HS		
GI	0		25	1.52	0.58	25	1.48	0.58
	1week		25	0.92	0.276	25	0.68	0.476
	T test		4.64			6.196		
	P value		0.00 HS			0.00 HS		
PBI	0		25	1.56	0.583	25	1.60	0.577
	1week		25	1.08	0.40	25	0.76	0.522
	T test		4.706			5.629		
	P value		0.00 HS			0.00 HS		





## DISCUSSION

There is an intimate relation between the dental plaque and the initiation and progression of inflammatory periodontal and gingival disease(8). Recently, pharmacological study has switched from an antimicrobial to an anti-inflammatory approach to therapy on periodontal disease intervention (9). Hyaluronic acid has an anti-inflammatory effect represented to its role in normalizing the macro-aggregation of connective tissue proteoglycans, deactivating bacterial hyaluronidase.(8)

In this study, a try had been made to check the performance of Gengigel (0.2% hyaluronic acid) in the treatment of gingival inflammation applied topically and calculate the clinical parameters (gingival index, plaque index and papillary bleeding index) were recorded at '0' day, 7th day. The plaque index showed significantly decrease in the gel and scaling sides which were from  $1.24 \pm 0.52$  to  $0.6 \pm 0.50$  and from  $1.28 \pm 0.54$  to  $0.88 \pm 0.43$  respectively and this result was similar to the research of Casale, Manuele, et al. (9) . Also gingival index illustrates significantly decrease in the scaling side which was from  $1.52 \pm 0.58$  to  $0.92 \pm 0.27$  and in the gel side from  $1.48 \pm 0.58$  to  $0.68 \pm 0.47$  as the same as the reduction of gingival index in the study of Sapna, N., & Vandana, K. L.(10). In addition, the papillary bleeding index reveals significant decrease from  $1.60 \pm 0.57$  to  $0.76 \pm 0.52$  and from  $1.56 \pm 0.58$  to  $1.08 \pm 0.40$  in the gel side and scaling side respectively this was consistent with the result of Jain, Yashika.(11)

## CONCLUSION

There was a positive effect of HA on gingival inflammation clinically by rapid reducing the PL, GI, and PBI after one week as compared to the brushing only

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