



Adjunctive Hyaluronic Acid Gel in Non-Surgical Treatment of Periodontitis

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INTRODUCTION

- Human periodontitis is characterized by bacteria induced inflammatory destruction of periodontal tissue and alveolar bone.
- The host modulating therapies (HMT) has been proposed to be valuable as an adjunct in the management of advanced periodontitis. (Reddy et. al 2003)
- Hyaluronic acid (HA) is a major carbohydrate component of the extracellular matrix and it is found in various tissues including periodontium. (Moseley et. al 2002)
- The exogenous hyaluronan and hyaluronan-based biomaterials may accelerate the wound healing process in ophthalmology, dermatology and rheumatology. (Moseley et. al 2002)
- There is little information on the potential effect of HA product as an adjunct in management of moderate to severe periodontitis.

AIM

This randomized, double-blind and placebo-controlled clinical trial aimed:

- To evaluate the clinical effect of local delivery of HA gel as an adjunct in non-surgical treatment of moderate to severe periodontitis.
- To investigate the possible effect of HA gel on the flow of gingival crevicular fluid (GCF) and granulocyte elastase activity (EA) in GCF in subjects with moderate to severe periodontitis.

MATERIALS AND METHODS

Selection of subjects

- 56 Chinese subjects (44.9 mean of years) with untreated chronic periodontitis.
- Minimum 20 standing teeth, with at least 1 tooth with probing pocket depth (PPD) ≥ 4.6 mm within each quadrant.
- No smoking and no systemic diseases.
- No prior periodontal treatment and antibiotic treatment at least 6 months before baseline examination and no immunosuppressive drugs received before.

Clinical parameters

- Plaque (PI%)
- Bleeding on probing (BOP%)
- Probing pocket depth (PPD)
- Probing attachment level (PAL)
- BOP%, PPD and PAL were taken by Florida Probe (Florida Probe Co.)

Selection of sampling sites

- The site with deepest PPD (≥ 4.6 mm) in each quadrant
- Vital for Electric Pulp Test

GCF sampling and assay of EA

GCF samples were collected by a standard filter strip (IDE Interstate, Amityville, NY) and the volume was measured immediately by a GCF meter (Periotron 8000, IDE Interstate, Amityville, NY).

EA in GCF was analyzed with a low molecular weight substrate specific for granulocyte elastase, pGluProVal-pNA, and EA with 5hours was calculated and presented as Abs/site (Jin et. al 2003).

Study design (Fig. 1)

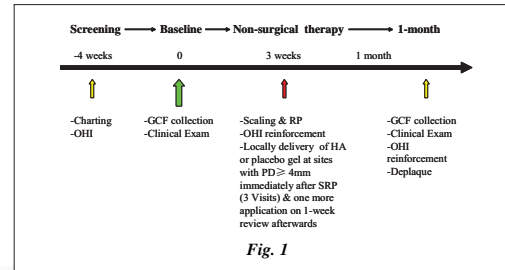


Fig. 1

56 subject were randomly divided into test group (28) and control group (28) by an independent researcher. Clinical data and GCF samples were collected by a single calibrated examiner, and all non-surgical treatment was carried out by senior dental hygienists. HA gel and placebo gel were applied by the single examiner (Figures 2and 3).



Fig. 2 0.8% HA gel (Ricerfarma srl, Italy)



Fig. 3 Application of HA gel

Statistical analysis

- The significance of intragroup difference was tested by using paired *t*-test, while the significance of intergroup difference was analyzed by using independent *t*-tests. The significance level chosen is $\alpha = 0.05$.
- The correlation between GCF parameters and clinical parameters was analyzed by using Spearman's rank correlation.

RESULTS

- The clinical parameters in both groups remarkably improved after the treatment, and no significant difference was found between the groups (Table 1).
- Greater reduction of GCF volume was found in the test group as compared to the control group (0.30 μ l vs. 0.15 μ l, **P*<0.01, Fig. 4).
- Greater reduction of EA in GCF was found in the test group as compared to the control group (0.34 Abs/site vs. 0.11 Abs/site, **P*<0.01, Fig. 5).

Table 1. Clinical data

Parameters	Test group		Control group	
	Baseline	1-month	Baseline	1-month
Full mouth				
PI%	85.2 \pm 11.4	56.9 \pm 16.7*	83.4 \pm 11.1	52.1 \pm 20.0*
BOP%	71.3 \pm 16.8	50.8 \pm 16.0*	67.4 \pm 21.2	50.9 \pm 12.7*
% of PPD ≥ 4.6 mm	10.7 \pm 7.0	2.2 \pm 2.5*	11.6 \pm 11.9	3.3 \pm 4.5*
F/M PPD (mm)	2.4 \pm 0.5	1.7 \pm 0.3*	2.5 \pm 0.7	1.8 \pm 0.3*
Sites				
PI%	100.0	76.9*	100.0	75.0*
BOP %	92.9	61.5*	96.4	61.1*
PPD (mm)	4.5 \pm 1.7	2.6 \pm 1.4*	4.7 \pm 1.9	2.6 \pm 1.6*
Gain of PAL (mm)		0.6 \pm 1.3		0.8 \pm 1.6

Significant difference from Baseline **P*<0.01

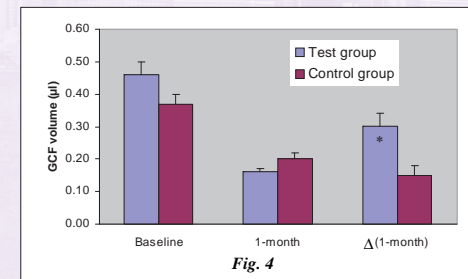


Fig. 4

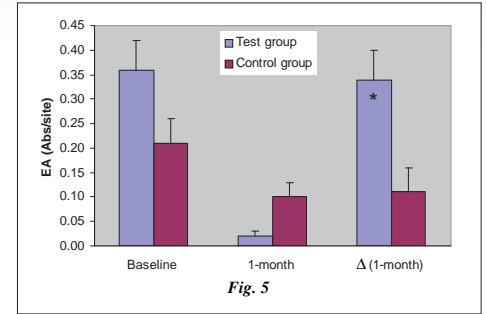


Fig. 5

DISCUSSIONS

- We for the first time investigated the potential clinical effect of subgingival delivery of 0.8% HA gel as an adjunct in management of periodontitis patients.
- HA gel could result in significant reduction of GCF volume and elastase activity in GCF, which might be related to the promotion of periodontal healing responses.
- Our ongoing follow-up study will further evaluate the long-term clinical values of HA gel in management of periodontitis patients.

CONCLUSION

This preliminary study suggests that subgingival application of 0.8% HA gel may have potential effect as an adjunct to non-surgical treatment of chronic periodontitis likely through reduction of GCF flow and elastase activity in GCF.

ACKNOWLEDGEMENT

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