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COMPARISON OF OROGRANULOCYTE MIGRATORY RATE IN HEALTHY AND GINGIVITIS PATIENTS

ABRAHAM C[*1] AND MALAIAPPAN S[2]

1: Post Graduate Student, Department of Periodontics, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India

2: Professor, Department of Periodontics, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India

***Corresponding Author: Christeena Abraham: E Mail: christeenajinu@gmail.com; Mob No: +917509879568**

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ABSTRACT

Introduction

Chronic periodontitis is an inflammatory disease and it affects the supporting tissues of the teeth. Bleeding and swollen gums are the usual manifestations. Periodontal indices are mainly used to evaluate the severity of the disease, however the limitation of such indices is that it is based on the clinical judgement of the examiner and there is huge chance of variation in the measurement. Orogranulocyte migratory rate is a better alternative for evaluation of inflammation. Therefore, this study aims to evaluate and compare the orogranulocyte migratory rate in gingivitis patients and healthy individuals.

Materials and methods

This study was conducted on 2 groups of patients from both sexes, age ranging from 20 to 45 years. Group 1 (n = 6) included subjects with moderate gingivitis having grade 2 bleeding on probing and Group 2 (n = 6) included healthy individuals. The subjects were made to rinse their mouths 12 times with a 0.9%saline solution, and the 6th, 9th, and 12th expectorants were analysed for evaluating orogranulocyte migratory rate.

Results

The statistical test performed was paired t test using SPSS version 20. The mean orogranulocyte rate was more in group 1 (14.7 x 10^3/30 seconds) than in group 2 (9.39 x 10^3 /30 seconds) but the difference between the two groups was not statistically significant (p = 0.264).

Conclusion

Therefore, orogranulocyte migratory rate can be used as a measure to evaluate gingival inflammation. However, long term studies with larger sample size is needed to confirm this association.

Keywords: Orogranulocyte migratory rate, gingivitis, gingival inflammation, gingival disease

INTRODUCTION

Serious threats to oral health include oral diseases ranging from cavities to cancer, thus oral health plays an important role in the health of an individual **[1]**. The fundamental component of the tooth is the periodontium which is the support provided for the actual function of the tooth **[2]**. Periodontitis which is a chronic inflammatory disease results in the loss of connective tissue and alveolar bone support of the teeth **[3]**.

There is a large population in the world that suffers from gingivitis or periodontitis. Based on a clinical estimation of the deviation from normal of the periodontal tissues, periodontal disease is evaluated quantitatively by periodontal indexes. These observations rely to a great extent on the clinical judgment of the investigator and do not represent a precise measurement **[1]**. "Orogranulocytes" has been designated living granulocytes in the oral mucus **[2]**. OMR is defined as the number of cells migrating into the oral cavity per 30 seconds and expresses the rate of inflammatory cell migration through the gingival pocket epithelium **[4]**. Evaluating the orogranulocyte migratory rate is another way of measuring inflammation.

After penetrating the walls of capillaries, venules and lymphatic vessels, polymorphonuclear granulocytes become extravascular. A constant number of polymorphonuclear granulocytes are maintained throughout the tissues through this process of leukopedesis. The only tissues in the human mouth that appear to provide the pathway for extravascular polymorphonuclear granulocytes to continue their migration into the mucus that covers all free surfaces of the oral cavity are the epithelial attachment and gingival crevice **[2]**.

The rate of leukopedesis and the rate at which the granulocytes emerge into the oral mucus are proportional. The rate of leukopedesis is increased in the presence of an inflammatory reaction in the periodontal tissues which leads not only to the formation of a cellular infiltrate but also to an increase in the rate of granulocytic migration. "Orogranulocytes" has been designated living granulocytes in the oral mucus **[2]**.

By counting the cells in the collected mucus, the number of orogranulocytes can be determined. However, the OMR can only be

calculated from a series of accurately timed, consecutive collections of the mucus.

The aim of the study was to assess and compare the orogranulocyte migratory rate in gingivitis patients and healthy individuals.

MATERIALS AND METHODS

This study was conducted on 2 groups of patients from both sexes, age ranging from 20 to 45 years. Group 1 (n = 6) included subjects with moderate gingivitis and Group 2 (n = 6) included healthy individuals. Patients with systemic disorders, smokers, subjects under antimicrobial therapy and pregnant women were excluded from the study. Each of the patients were evaluated for gingival index.

The subjects were made to rinse their mouths 12 times with a 0.9%saline solution, and the 6th, 9th, and 12th expectorants were analyzed. The total number of polymorphonuclear granulocytes was determined, and the mean number of orogranulocytes contained in the three rinses gave the value of the orogranulocyte migratory rate.

RESULTS

A total of 12 patients were examined, and one clinical evaluation and one leukocyte determination were made for each of the patients participating in the study **(Table 1) (Figure 1)**.

The statistical test performed was paired t test using SPSS version 20. The mean orogranulocyte rate was more in Group 1 (14.7 x 10^3) than in Group 2 (9.39 x 10^3) but the difference between the two groups was not statistically significant (p = 0.264).

Table 1: The orogranulocyte rate of both the groups, the difference was not significant (p=0.264)

Gingivitis		Healthy	
GI	OMR (x 10^3/sec)	GI	OMR (x 10^3/sec)
0.14	5.6	0.07	0.5
0.13	1.8	0.03	0.33
0.46	1.2	0.02	1.66
0.14	2.0	0.03	1.8
0.41	3.5	0.03	3.6
0.21	0.6	0.06	1.5

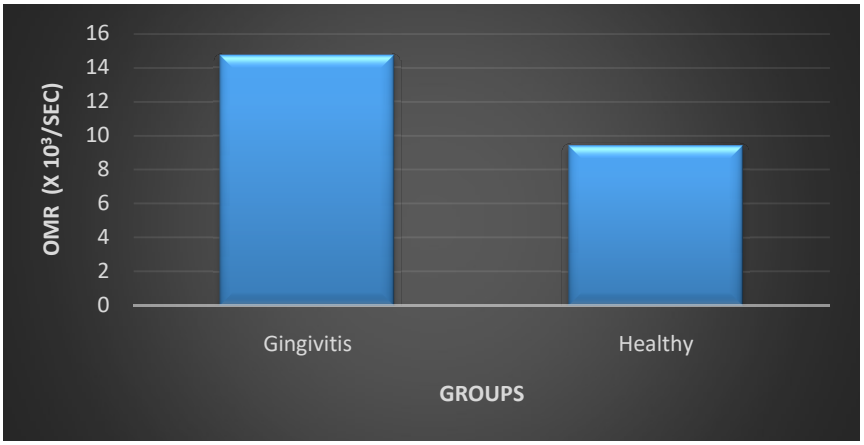

Figure 1: Graph depicting the OMR (orogranulocyte migratory rate) in both the groups

DISCUSSION

Mean leukocyte counts were higher in the diseased group, but not statistically significant. In both the groups, the predominant cell type in the oral rinses was the polymorphonuclear (PMN) leukocyte.

It has been documented that a direct relationship exists between increasing OMR and increasing clinical gingival inflammation **[4]**.

Evidently, the OMR can be used to evaluate periodontal inflammation only after a certain point in the transition from health to disease **[5]**.

It has been well established that in determining the outcome of an infection, the host defence mechanisms play a major role while the environment and microbe usually have a secondary role **[6]**. The body is protected against acute infection by polymorphonuclear leukocytes and has the ability for amoeboid movement and can pass through capillaries and through tissues, including the epithelium gingival connective tissue **[7]**.

It hasbeen suggested by Klinkhamer **[8]** and others **[9]** that oral leukocytes play a crucial role in host defence. The bacteria in the deeper tissues are destroyed by the granulocytic leukocytes and they also participate in inflammation **[10, 11]**.

By the tendency of leukopenic patients to develop stomatitis and severe ulcerative gingivitis, role that oral leukocytes play in the defense against invasion of the gingival tissues by dental plaque is well illustrated **[12]**.

As reviewed by Tempel *et al*, **[13]** and others **[14]**, oral leukocytes are also responsible for the maintenance of gingival inflammation by releasing potent enzymes at the epithelial surface of the gingival sulcus. A balance probably exists between protection and destruction in health.

In gingivitis, there is enlargement in the marginal tissues due to inflammation, which provides greater epithelial area for leukocyte migration. During inflammation, the gingival crevicular fluid flow is increased and it may carry migrating leukocytes out of the gingival crevice **[12, 15]**.

The OMR reflects oral inflammation, just as a WBC count reflects systemic inflammation and, being technically an easy method, can be used as a laboratory test. The test is easy and painless for the patient, and is also simple to perform.

CONCLUSION

Therefore, orogranulocyte migratory rate can be used as a measure to evaluate gingival inflammation. However, long term studies with larger sample size is needed to confirm this association.

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