



## Comparative Evaluation Of Alkaline Phosphatase Levels In Saliva And Gcf In Chronic Periodontitis Patients: Pre And Post Periodontal Therapy

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### Abstract

**Aim & Objectives:** The aim of this study is to estimate and compare the GCF and saliva levels of alkaline phosphatase in chronic Periodontitis patients Pre and Post Periodontal therapy.

**Materials And Methods:** In this study, 30 chronic Periodontitis patients Pre and Post Periodontal therapy of both gender matching in age and sex were included. The analysis of biochemical parameters was done by using diagnostic reagent kit.

**Results:** In the present study the Mean of GCF and salivary alkaline phosphatase level was lower in post periodontal therapy patients than pre periodontal therapy patients (P < 0.001). The mean of GCF alkaline phosphate level was higher than salivary alkaline phosphatase level in chronic pre and post periodontal therapy patients.

**Conclusion:** In comparison to salivary alkaline phosphatase levels GCF alkaline phosphatase levels is more accurate diagnostic and prognostic marker along with the clinical signs and symptoms to assess periodontal disease and its progression. It can also be used in the early detection of gingival and periodontal disease states.

**Keywords:** Periodontitis, Oxidative stress, GCF (Gingival Crevicular Fluid)

### Introduction

Periodontal diseases which consist of a group of inflammatory diseases result from an interaction of periodontal microflora that colonizes the teeth and the multifaceted host response. The neutrophils present within the gingival sulcus which play a role in the innate cellular response, ingest the bacteria and secrete proteolytic enzymes and immunomodulatory compounds. The end result of this is the clinical manifestation of the disease which comprises of several signs and symptoms such as increasing probing pocket depth and radiographic evidence of

bone loss. These effectively describe a periodontal history and have been used semi quantitatively to evaluate patients with periodontal disease but cannot indicate the present or future extent of periodontal destruction. Though the conventional methods to evaluate the periodontal tissues are usually sufficient to arrive at a diagnosis and enable effective clinical treatment, they also have limitations like detection of periodontal disease before it has caused destruction and difficulty in determination of activation of periodontal disease and its treatment.(1-6)

Gingival Cevicular fluid (GCF) is a transudate that is formed when fluid excludes from the vessels of the microcirculation into the periodontal tissue and the gingival sulcus or pocket. It is derived from microbial dental plaque, host tissues, polymorphonuclear leukocytes, macrophages, plasma cells and serum, but it becomes an exudate in case of inflammation. A number of GCF constituents including host enzymes in particular have been shown to be diagnostic markers of periodontal health and disease. Alkaline phosphatase (ALP) is one of the first of the diagnostic markers identified in GCF.<sup>1,6,7</sup>

ALP is a hydrolase enzyme responsible for removing phosphate groups from many types of molecules and is a marker of bone metabolism. It is a membrane-bound glycoprotein produced by a various number of cells, such as polymorphonuclear leukocytes, macrophages, fibroblasts, and osteoblasts, within the area of the periodontium and gingival crevice.<sup>[8]</sup>

Therefore this study is designed to determine possible associations and relationships between periodontitis and Alkaline Phosphatase by assessing changes in Alkaline phosphatase levels in GCF and saliva of Chronic periodontitis patient's pre and post periodontal therapy.

**Material And Methods**

This study was carried out in the Department of Periodontics and Department of Biochemistry, Yogita Dental College and hospital khed in collaboration with Department of Biochemistry PIMS&R Islampur, Maharashtra.

This study includes 30 chronic periodontitis patients reported to the Department of Periodontics after obtaining their informed consent. This study was conducted in age group between 20 to 60 years. The analysis of biochemical parameters was done using standard grade reagent chemicals. ALP enzyme activity in GCF and serum was determined spectrophotometrically with the help of a semi-autoanalyzer using ALP enzyme kit.

The exclusion criteria included subjects of any systemic or metabolic disease, liver disease, vascular diseases, renal artery stenosis, alcoholics, pregnant female and those who were taking any kind of medication in last few years. A record was maintained including current history, diet along with laboratory investigations and previous history of any disease.

**Distribution Of Study Subjects**

<b>Group I</b>	N = 30 pre periodontal therapy patients.
<b>Group II</b>	N = 30 post periodontal therapy patients

**Collection Of Samples**

All the samples, prior to and after periodontal therapy, were collected within 48 hours after the clinical measurements in the morning, following an overnight fast. All participants were told not to eat or drink anything or chew gum that morning. The subjects were asked whether they had followed these instructions before samples were collected. Unstimulated whole saliva samples were used in this study. Saliva samples were obtained in the morning,

over five-minute periods. Seated patients were instructed to allow saliva to pool in the bottom of the mouth and drain into a collection tube.

During GCF sample collection sites were isolated using cotton rolls and were gently air dried before sampling. It was ensured that the samples were not contaminated by saliva. Collections were performed over 30 seconds with standardized paper strips (Periopaper).

**Results**

**Table no. 1: The mean value of salivary Alkaline Phosphatase in chronic Periodontitis patients Pre and Post Periodontal therapy.**

Name Of the Parameters	Pre Periodontal Patients (N=30)		Post Periodontal Patients (N=30)		Significance
	Mean ±SD	Std. Error of Mean	Mean ±SD	Std. Error of Mean	
Salivary Alkaline Phosphatase	17.1 ± 1.68 ***	0.3	10.23±1.59	0.29	<b>P =&lt; 0.001</b>

The statistical method uses to compare data was unpaired ‘t’ test

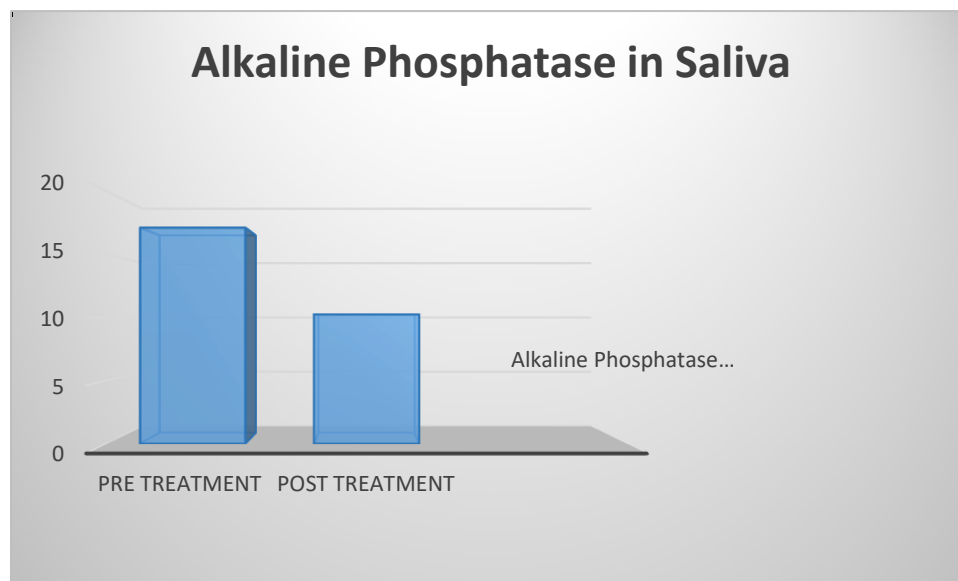
\*P> 0.05.....Not Significant

\*\*P<0.05.....Significant

\*\*\*P<0.001.....Highly Significant

There is highly statistically significant difference in means of Salivary Alkaline Phosphatase (P < 0.001) in pre periodontal therapy patients as compare to post periodontal therapy patients.

**CHART I : The mean value of Salivary Alkaline Phosphatase in chronic Periodontitis patients Pre and Post Periodontal therapy.**



**Table no. 2: The mean value of GCF Alkaline Phosphatase in chronic Periodontitis patients Pre and Post Periodontal therapy.**

Name Of the Parameters	Pre Periodontal Patients (N=30)	Post Periodontal Patients (N=30)	Significance

	Mean ±SD	Std. Error of Mean	Mean ±SD	Std. Error of Mean	
GCF Alkaline Phosphatase	19.2 ± 1.8 ***	0.34	15.1±1.9	0.34	<b>P =&lt; 0.001</b>

The statistical method uses to compare data was unpaired ‘t’ test

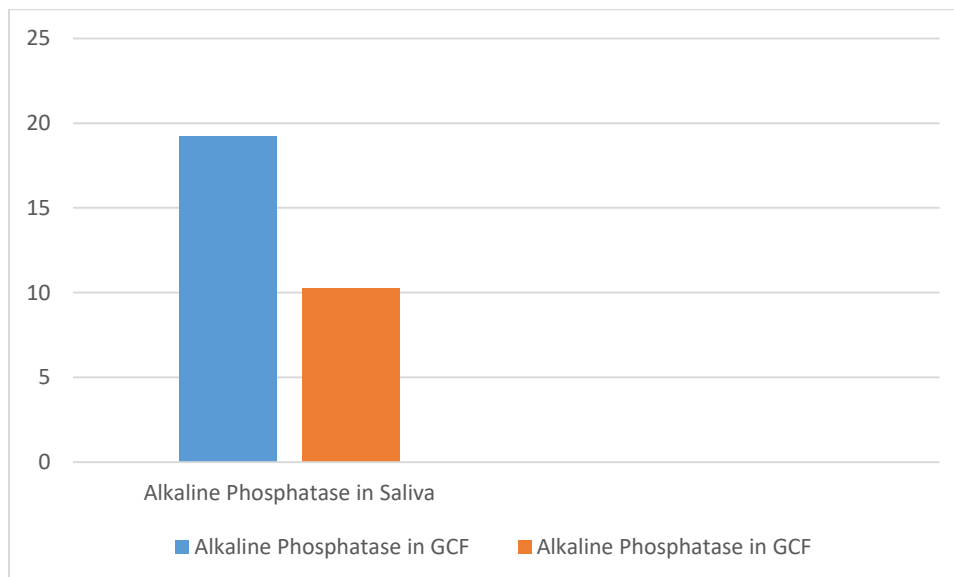
\*P> 0.05.....Not Significant

\*\*P<0.05.....Significant

\*\*\*P<0.001.....Highly Significant

There is highly statistically significant difference in means of GCF Alkaline Phosphatase (P < 0.001) in pre periodontal therapy patients as compare to post periodontal therapy patients.

**Chart II : The mean value of GCF Alkaline Phosphatase in chronic Periodontitis patients Pre and Post Periodontal therapy.**



**Discussion**

Periodontal disease is an inflammatory process initiated by the group of microorganisms and their products that colonise the teeth and the surrounding soft tissues and form the components of the tissue destruction. Periodontal disease manifests in the form of the clinical signs and symptoms like increased probing pocket depth, radiographically evident bone loss which are used to semi quantitatively evaluate the affected patients.(9,10) The purpose of this study was to evaluate the concentration of ALP levels in GCF and saliva in chronic periodontitis patients in pre and post periodontal therapy and the result suggests that ALP is an important enzyme of GCF

and saliva for evaluation of the status of periodontal tissues.

In the present study there is highly statistically significant difference in means of Salivary and GCF Alkaline Phosphatase (P < 0.001) in pre periodontal therapy patients as compare to post periodontal therapy patients.

However, consistent with our finding, other studies conducted by Miglani et al., in 1974(11) revealed the relationship between periodontal disease and ALP levels in saliva was the first study in the Indian population, correlating the periodontal disease status with salivary ALP levels. Later, various studies that include Todorovic et al., in 2006,(12) Desai et al., in

2008,(13) Dabra and Singh in 2012,(14) Trivedi and Trivedi in 2012,(15) Ramesh et al., in 2013,(16) and Luke et al., in 2015(17) have correlated the relationship between the enzyme ALP levels in saliva with that of clinical parameters in healthy controls, gingivitis patients, and patients with chronic periodontitis and the significant outcomes of the ALP levels after Phase I periodontal therapy.

All the studies conducted so far has aimed to rationalize the use of ALP from either saliva or serum or even GCF solely in patients with chronic periodontitis and even comparison of the same with periodontally healthy individuals. (18,19) However, limited studies have compared the salivary and GCF ALP levels in chronic periodontitis patients before and after periodontal treatment.

The results of present study showed that ALP levels were increased in both saliva and GCF in patients with chronic periodontitis.

### Conclusion

In comparison to salivary alkaline phosphatase levels GCF alkaline phosphatase levels is more accurate diagnostic and prognostic marker along with the clinical signs and symptoms to assess periodontal disease and its progression. It can also be used in the early detection of gingival and periodontal disease states.

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