

## Correlation Of C - Reactive Protein With The Severity Of Periodontitis

Research Article

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### Abstract

**Introduction:** Although periodontitis is a chronic inflammatory disease, some factors of the acute inflammation phase are involved in this disease among which is the C-Reactive protein (CRP). CRP is one of the diagnostic markers used for the prediction and early detection of periodontal disease.

**Aim:** The main aim was to correlate CRP level with severity of periodontitis.

**Materials and Methods:** The present non-randomized clinical trial was carried out from June 2020 to December 2020 in the Department of Periodontics, Saveetha Dental College and Hospitals, Chennai, India. A total of 21 patients with mild, moderate and severe periodontitis were enrolled and were divided into three groups: Group 1 - Mild periodontitis, Group 2 - Moderate periodontitis and Group 3 - Severe periodontitis with 7 patients in each group. Unstimulated salivary samples were collected and subjected to latex agglutination assay.

**Result:** The mean level of C-Reactive protein level in mild periodontitis patients was  $2.25 \pm 0.50$  mg/dl,  $0.56 \pm 0.78$  mg/dl in moderate periodontitis patients and  $4.07 \pm 0.67$  mg/dl in severe periodontitis patients. We observed a positive correlation that the CRP level increases as the severity of periodontitis increases.

**Conclusion:** The present study suggests that levels of CRP increases with severity of periodontitis. Therefore, CRP can be used as a diagnostic marker for periodontitis.

**Keywords:** C-Reactive Protein; Periodontitis; Biomarker; Innovative; Chronic periodontitis; Gingivitis.

### Introduction

Periodontitis is a chronic disease in the oral cavity. It is classified into three types as mild, moderate and severe. Periodontitis is an inflammatory condition that affects the teeth's supporting tissues and is caused by a community of microorganism [1-7]. It causes the degradation of both soft and hard tissues, resulting in increased pocket width, clinical attachment loss, recession, mobility, bone loss, pathologic migration of the teeth, and tooth loss if left untreated. The apical migration of junctional epithelium, as well as alveolar bone destruction, are the hallmarks of periodontitis. It is known to be caused by numerous complex colonies of bacteria that develop on the tooth surface, causing bone and periodontal tissue damage. It's an inflammatory reaction that causes tissue to

deteriorate [8-11].

One of the most prevalent disorders of the oral cavity is periodontitis. Scaling and root planing is one of the most common approaches for treating periodontitis. Many adjuncts, such as topical agents, medicinal agents like tetracycline, minocycline, and other antibiotics, are used to aid in the quicker healing of periodontitis. [3, 12-17].

The liver produces C-reactive protein (CRP). When the body is inflamed, the amount of this substance increases. LDL cholesterol not only coats but also destroys the walls of the arteries [18]. This damage triggers inflammation, which the body attempts to resolve by dispatching a "response team" of proteins known as "acute phase reactants," of which CRP is one. Inflammatory fac-

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tors, such as C-reactive protein, is an acute-phase reactant released in response to a variety of inflammatory stimuli such as heat, trauma, infection, and hypoxia. CRP levels are useful in the diagnosis, control, and treatment of the inflammatory process [19]. Because of its long plasma half-life, CRP plays an important role in the innate immune response and is easily assessed (12 to 18 hours). CRP levels are present in trace quantities in healthy people, with levels ranging from 0.3 mg/l to 0.3 mg/l. 6–8 CRP levels in the blood can reach 100 mg/l in the presence of a systemic infection, making it a useful marker for monitoring the infection's progression [20]. In humans, CRP is the prototypical acute phase reactant. In diseases including rheumatoid arthritis and vasculitis, CRP is used as a control of the inflammatory response [21].

Our team has extensive knowledge and research experience that has translate into high quality publications [22-41].

Literature evidence reveals only minimal studies have assessed the correlation of C-Reactive protein in periodontitis patients [42-46]. Therefore, the aim of this article was to assess the correlation of C-Reactive protein level with the severity of periodontitis among the patients reported to Saveetha Dental College and Hospitals, Chennai.

**Materials and Methods**

**Population Selection:**

The present non-randomized clinical trial was carried out from June 2020 to December 2020 in the Department of Periodontics, Saveetha Dental College and Hospitals, Chennai, India. A total of 21 patients with mild, moderate and severe periodontitis were enrolled. The ethical clearance was obtained from the Institutional Ethical Committee and a written informed consent was obtained from all the study participants. Patients who were systemically healthy, with presence of atleast 4-20 teeth having clinical attachment loss were included in the study. Smokers, pregnant or lactating mothers, patients under long term medications, systemically compromised patients were excluded from the study.

**Study Design:**

Patients were assigned to three groups: Group 1 - Mild periodontitis, Group 2 - Moderate periodontitis and Group 3 - Severe periodontitis with 7 patients in each group. Severity of periodontitis was classified based on the amount of clinical attachment loss (CAL) and was designated as mild (1-2mm CAL), moderate (3-4mm CAL) and severe (>5mm CAL).

**Sample Collection:**

Unstimulated salivary samples were collected from each patient before the procedure in a sterile container and stored under -22 degree celsius.

**Latex Agglutination Method:**

1ml of saliva sample was diluted with 2ml water in a ratio of 1:2. In the glass slide 1 drop of CRP latex reagent was added and the sample was then added. If there was visible agglutination, it was considered a positive reaction and indicates presence of detectable level of CRP in test specimens. If there was no visible agglutination, it was considered a negative reaction and indicates absence of detectable level of CRP in test specimens.

**Statistical Analysis:**

The data was analyzed using Statistical Package for Social Sciences (SPSS Software, Version 23.0). Descriptive and inferential statistics were done for data summarization and presentation.

**Results**

In the present study, the mean level of C-Reactive protein level in mild periodontitis patients was 2.25±0.50 mg/dl, 0.56±0.78 mg/dl in moderate periodontitis patients and 4.07±0.67 mg/dl in severe periodontitis patients. We observed a positive correlation that the CRP level increases as the severity of periodontitis increases. (Table 1 and Figure 1).

**Discussion**

The present study assessed the correlation of C-Reactive protein level in mild, moderate and severe periodontitis patients.

In the present study, CRP level was high among severe periodontitis patients followed by moderate and mild periodontitis patients.

Matilla K *et al.*, [42] conducted a study to assess the effect of periodontal treatment on C-Reactive protein level. It was observed that the CRP level was high in periodontitis patients and there was a decrease in CRP level after periodontal therapy. Podzimek S *et al.*, [47] compared the systemic levels of CRP in the peripheral blood samples of patients with chronic and aggressive periodontitis, gingivitis and observed that CRP levels increased subsequently with the severity of periodontitis.

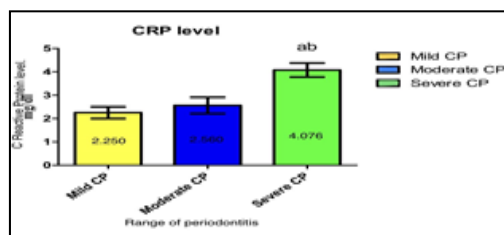
In a study by Gomes-Filho IS *et al.*, [45] it was reported that chronic periodontitis is associated with elevated plasma CRP levels, even after controlling for several potential confounders. Similar results were seen in studies by Noach B *et al.*, [46] Patil V *et al.*, [48] Yamazaki *et al.*, [49] where CRP levels were high in periodontal diseased patients initially and were reduced after periodontal therapy. The result of the present study is in accordance with the previous studies.

Salzberg T N *et al.*, [43] conducted a study to determine the relative level of serum CRP in periodontally healthy subjects and ag-

**Table 1: CRP level in mild moderate and severe periodontitis patient.**

STATISTICAL VALUE	MILD	MODERATE	SEVERE
MEAN	2.25	2.56	4.076
STANDARD DEVIATION	0.507	0.783	0.671

Figure 1. Correlation of CRP level with severity of periodontitis.



gressive periodontitis patients and found out that periodontally healthy subjects had the CRP level within the range of 0.4-0.8 mg/l. Whereas the CRP level was found to be within the range of 1.5-2.8 mg/l in aggressive periodontitis patients. Similarly Gupta *et al.*, [50] evaluated the role of CRP as a diagnostic marker in chronic periodontitis patients. The authors found out that the periodontally healthy subjects and periodontally compromised patients possessed a mean CRP level of  $0.252 \pm 0.0393$  mg/l and  $0.106 \pm 0.029$  mg/l respectively.

Dholey M K *et al.*, [51] estimated the salivary and serum CRP level in healthy individuals and chronic periodontitis patients. The mean baseline serum CRP concentrations in healthy individuals and chronic periodontitis patients were -  $4.490 \pm 10.223$  mg/l,  $18.245 \pm 25.680$  mg/l respectively, The mean baseline salivary CRP concentrations in healthy individuals and chronic periodontitis patients were -  $4.955 \pm 6.803$  mg/l,  $0.4735 \pm 8.255$  mg/l respectively, The result of the present study is in agreement with the previous studies as the CRP levels were found to be higher in all the periodontitis patients.

Even though severe periodontitis patients had higher C-Reactive protein level than mild and moderate periodontitis, these results cannot be generalised since this study was conducted among a small population. Also, more randomized controlled clinical trials need to be conducted to assess and compare the salivary and serum CRP levels between periodontally healthy and compromised patients before and after periodontal therapy to confirm this finding.

## Conclusion

Within the limitations, the present study suggests that levels of CRP increases with severity of periodontitis. Therefore, CRP can be used as a diagnostic marker for periodontitis.

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