Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies *NLM ID: 101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 100

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

The CRP Connection: Linking Local Inflammation to Systemic Response in Peri-Implantitis

[1]Seema Akshay Rathi, [2]Aishwarya Mehrotra, [3]Shefali Kataria, [4]Nikhil Kumar Sharma, [5]M.Subhashree, [6]Bir Sukhman Kaur Thind

[1]PG Resident, Department of Periodontology and Implantology, RKDF Dental College and Research Centre, Bhopal, India;
[2,3]Postgraduate Student, Department of Prosthodontics, JCD Dental College & Hospital, Sirsa, India
[4]Sr. Lecturer, Department of Prosthodontics, ITS Dental College, Muradnagar, Ghaziabad, Uttar Pradesh, India;
[5]Dental Surgeon, Rajah Muthiah Dental College, Annamalai University, India;
[6]Senior Lecturer, Department of Periodontology, Desh Bhagat Dental College, Mandi, Gobindgarh, Punjab, India

ABSTRACT:
Background: This study was conducted to assess CRP levels in peri-implantitis patients. **Material and methods:**This study sought to assess CRP levels in individuals diagnosed with peri-implantitis. The research involved 100 participants, comprising 50 control subjects and 50 individuals with peri-implantitis. The procedure of the study was comprehensively communicated to all participants, who were subsequently asked to give their consent. All participants provided their consent, thereby permitting their inclusion in the study. CRP levels were measured for both the control group and the peri-implantitisgroup. The findings were compared and presented in tabular format. Statistical analysis was conducted using SPSS software. **Results:**In this study, group 1 comprised of 50 control subjects, whereas group 2 comprised of 50 patients diagnosed with peri-implantitis. The mean CRP levels for the control group were recorded at 1.7±2.5 mg/dl. Conversely, the mean CRP concentrations for the peri-implantitis group were found to be 6.8±5.7 mg/dl. **Conclusion:**According to the findings of this study, it can be concluded that the mean CRP levels in individuals diagnosed with peri-implantitis were higher than those observed in the control group.
Keywords:CRP, Peri-implantitis.

Received: 11 November, 2025 Acceptance: 17 November, 2025 Published: 26 November, 2025

Corresponding Author: Seema Akshay Rathi, PG Resident, Department of Periodontology and Implantology, RKDF Dental College and Research Centre, Bhopal, India

This article may be cited as: Rathi SA, Mehrotra A, Kataria S, Sharma NK, Subhashree M, Thind BSK. The CRP Connection: Linking Local Inflammation to Systemic Response in Peri-Implantitis. J AdvMed Dent Scie Res 2025; 13(11):46-48.

INTRODUCTION

Dental implants have transformed oral rehabilitation and have become integral to standard treatment in prosthetic rehabilitation.[1] Significant progress has been made in the design of implants, the materials utilized, and the surgical protocols employed. A notable implant survival rate has been documented over a follow-up period of 13 years.[2] Approximately 90% of patients who received an implant reported satisfaction with their chewing function and the ease of plaque control at the implant sites.

Despite the high long-term survival rates, complications arising from peri-implant diseases are common and can, in severe instances, lead to the loss of both the implants and their associated prostheses. An increased concentration of inflammatory mediators, such as C-reactive protein (CRP), fibrinogen, and cytokines, is noted in patients with periodontal diseases. Elevated levels of interleukin-6 (IL-6) have been identified in various studies and tend to diminish with appropriate periodontal treatment. IL-6 is recognized as the primary pro-coagulant cytokine. Furthermore, it triggers the expression of CRP, which in turn enhances the responses of pro-coagulants and inflammatory mediators.[3-5]

Peri-implant disease represents a persistent inflammatory condition instigated by the contamination of bacterial plaque. It can be categorized into peri-implant mucositis, which denotes a reversible inflammatory state limited to the soft tissues, and peri-implantitis, which is marked by a progressive inflammatory reaction resulting in the loss of alveolar bone.[6]

Clinical manifestations of peri-implantitis that resemble chronic periodontitis encompass bleeding upon probing, inflammation of the soft tissue, increased probing depth, discomfort, and the presence of pus. While bacterial plaque serves as the principal factor in the development of peri-implantitis, microbial virulence factors, including lipopolysaccharides, exacerbate the intensity of inflammatory responses, which are further supported by cytokines released from host immune cells.[6-8]

This study was conducted to assess CRP levels in peri-implantitis patients.

MATERIAL AND METHODS

This study sought to assess CRP levels in individuals diagnosed with peri-implantitis. The research involved 100 participants, comprising 50 control subjects and 50 individuals with peri-implantitis. The procedure of the study was comprehensively communicated to all participants, who were subsequently asked to give their consent. All participants provided their consent, thereby permitting their inclusion in the study. CRP levels were measured for both the control group and the peri-implantitis group. The findings were compared and presented in tabular format. Statistical analysis was conducted using SPSS software.

RESULTS

Table 1: Group-wise distribution of subjects

Groups	Number of subjects	Percentage
Group 1(Control)	50	50
Group 2(Peri-implantitis)	50	50
Total	100	100

In this study, group 1 comprised of 50 control subjects, whereas group 2 comprised of 50 patients diagnosed with peri-implantitis.

Table 2: CRP Levels in the subjects of both groups

Groups	CRP Levels (mg/dl)
Group 1(Control)	1.7±2.5
Group 2(Peri-implantitis)	6.8±5.7

The mean CRP levels for the control group were recorded at 1.7±2.5 mg/dl. Conversely, the mean CRP concentrations for the peri-implantitis group were found to be 6.8±5.7 mg/dl.

DISCUSSION

Peri-implantitis is an inflammatory condition linked to a complex bacterial assault. Nevertheless, there are certain circumstances in which an altered immune response could be the cause of marginal bone loss, with the influence of microbial attack being secondary. Consequently, this may result in the failure of implant osseointegration due to a shift in tissue dynamics from a stable state to a more active immune response.[9,10]

The failure of a dental implant is predominantly attributed to the deterioration of osseointegration. The criteria for categorizing a dental implant as a failed case include the absence of osseointegration, as well as bone loss exceeding 1 mm around the implant surface at the end of one year, and 0.2 mm in the subsequent year. Peri-implantitis can contribute to the failure of the implant prosthesis by triggering peri-implant bone loss.[11-13]

Hence, this study was conducted to assess CRP levels in peri-implantitis patients.

Sharma M.etal[14]evaluated C-reactive protein (CRP) levels in peri-implantitis patients.This study comprised a total of 100 participants. Fifty participants with a confirmed clinical and radiological diagnosis of peri-implantitis formed one group. Another group of 50 volunteers who came in for a normal health checkup served as healthy controls. All the patients were recalled in the morning. Fasting venous blood samples were collected. CRP concentrations in the laboratory were determined using an auto-analyzer.In this study, there were 40 females and 60 males. Mean CRP levels among subjects of the peri-implantitis group and the control group were 0.615 and 0.201 mg/dL, respectively.It was observed that mean CRP levels were higher among subjects having peri-implantitis as compared to the controls.

Khichy A et al[15] conducted a study for assessing the C-reactive proteins (CRP) levels and IL-6 levels in patients with peri-implantitis.A total of 20 patients with confirmed clinical and radiographic diagnosis of peri-implantitis were included in the present study. Another set of 20 subjects who reported for routine health check-up were included as healthy controls. All the subjects were recalled in the morning and fasting (minimum of 12 h) venous blood samples were obtained. Plain vials were used for collecting the venous blood which was sent to the laboratory for biochemical analysis. In the laboratory, levels of CRP

were assessed by means of latex enhanced nephelometric method, and interleukin 6 (IL-6) was assessed by means of Elisa kit.Mean levels of CRPs in patients of the peri-implantitis group and the control group was found to be 0.795 mg/dL and 0.294 mg/dL respectively. Mean IL-6 levels among the patients of the peri-implantitis group and the control group was found to be 12.178 pg/ml and 6.458 pg/ml respectively. While analyzing statistically, significant results were obtained. Enhanced periodontal inflammation in peri-implantitis patients is accompanied by a considerable increase in the concentration of CRPs and IL-6.

CONCLUSION

According to the findings of this study, it can be concluded that the mean CRP levels in individuals diagnosed with peri-implantitis were higher than those observed in the control group.

REFERENCES

1. Amornvit P, Rokaya D, Bajracharya S, Keawcharoen K, Supavanich W. Management of obstructive sleep apnea with implant retained mandibular advancement device. World J Dent. 2014;5:184–9.
2. Moraschini V, Poubel LA, Ferreira VF, Barboza Edos S. Evaluation of survival and success rates of dental implants reported in longitudinal studies with a follow-up period of at least 10 years: A systematic review. Int J Oral Maxillofac Surg. 2015;44:377–88.
3. Berglundh T, Armitage G, Araújo MG, Avila-Ortiz G, Blanco J, Camargo PM, et al. Peri-implant diseases and conditions: Consensus report of workgroup 4 of the 2017 World Workshop on the classification of periodontal and peri-implant diseases and conditions. J Periodontol. 2018;89(Suppl 1):S313–8.
4. Fransson C, Tomasi C, Pikner SS, Gröndahl K, Wennström JL, Leyland AH, et al. Severity and pattern of peri-implantitis-associated bone loss. J Clin Periodontol. 2010;37:442–8.
5. Chen S, Darby I. Dental implants: Maintenance, care and treatment of peri-implant infection. Aust Dent J. 2003;48:212–20.
6. Sennerby L. Dental implants: Matters of course and controversies. Periodontol 2000. 2008;47:9–14.
7. Peri-implant mucositis and peri-implantitis: A current understanding of their diagnoses and clinical implications. J Periodontol. 2013;84:436–43.
8. Zitzmann NU, Berglundh T, Marinello CP, Lindhe J. Experimental peri-implant mucositis in man. J Clin Periodontol. 2001;28:517–23.
9. Ridker PM, Rifai N, Rose L, Buring JE, Cook NR. Comparison of C-reactive protein and low-density lipoprotein cholesterol levels in the prediction of first cardiovascular events. N Engl J Med. 2002;347:1557–65.
10. Susanto H, Nesse W, Dijkstra PU, Hoedemaker E, van Reenen YH, Agustina D, et al. Periodontal inflamed surface area and C-reactive protein as predictors of HbA1c: A study in Indonesia. Clin Oral Investig. 2012;16:1237–42.
11. Association of elevated C-reactive protein with severe periodontitis in hypertensive patients in Lagos, Nigeria: A pilot study. Alade GO, Ayanbadejo PO, Umeizudike KA, Ajuluchukwu JN. Contemp Clin Dent. 2018;9:0–9.
12. Hs-CRP levels in patients with periodontitis - A cross sectional study. Shah MA, Shah BK, Modi BB, Shah EB, Dave DH. J Integr Health Sci. 2015;3:15–20.
13. The impact of C reactive protein on global cardiovascular risk on patients with coronary artery disease. Cozlea DL, Farcas DM, Nagy A, Keresztesi AA, Tifrea R, Cozlea L, Carașca E. https://pubmed.ncbi.nlm.nih.gov/24778862/ Curr Health Sci J. 2013;39:225–231.
14. Critical appraisal of C-reactive protein throughout the spectrum of cardiovascular disease. Osman R, L'Allier PL, Elgharib N, Tardif JC. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1993979/ Vasc Health Risk Manag. 2006;2:221–237.
15. Sharma M, Singh AP, Kumar B, Girdhar P, Brar AS, Mittal P. Evaluation of C-Reactive Proteins Levels in Peri-Implantitis Patients. J Pharm Bioallied Sci. 2024 Jul;16(Suppl 3):S2800-S2802.
16. Khichy A, Khichy R, Singh R, Bali Y, Kaur S, Gill TK. Assessment of Levels of C-Reactive Proteins and Interleukin 6 in Patients with Peri-Implantitis: A Case-Control Study. J Pharm Bioallied Sci. 2021 Jun;13(Suppl 1):S444-S447.