

Effect of Comprehensive Periodontal Therapy on White Blood Cell and Platelet Counts in Patients with Generalized Aggressive Periodontitis: A Prospective Interventional Study

Dr. Shalmali Viraj Dhond

Department of Periodontics, Goa Dental College and Hospital, Goa, India

DOI: <https://doi.org/10.51244/IJRSI.2026.1308000214>

Received: 26 August 2026; Accepted: 02 September 2026; Published: 16 September 2026

ABSTRACT

Background: Periodontitis is a chronic inflammatory disease with local and systemic consequences. Circulating leukocyte and platelet counts may reflect the systemic inflammatory burden associated with periodontal infection. Evidence from patients with generalized aggressive periodontitis (GAP) suggests that periodontal therapy may influence systemic blood-cell profiles.

Aim: To evaluate changes in total white blood cell (WBC) count, differential leukocyte count and platelet count following comprehensive periodontal therapy in patients with GAP.

Methods: Twenty-nine untreated adults with GAP were enrolled. The cohort comprised 16 females and 13 males. Participants received full-mouth supragingival and subgingival scaling and root planing followed by systemic antibiotic therapy. Periodontal parameters and venous blood-cell counts were recorded at baseline and at 3 months after completion of antibiotic therapy. Non-parametric statistical methods were used for paired comparisons.

Results: Significant reductions from baseline to 3 months were reported for probing pocket depth (PPD), clinical attachment level (CAL), total WBC count and platelet count. Plaque Index (PI) and Gingival Index (GI) did not show statistically significant changes. Exact numerical laboratory and statistical outputs were not available in the records reviewed and should be verified against the original dataset before submission.

Conclusion: Comprehensive periodontal therapy was associated with significant reductions in total WBC and platelet counts over 3 months in this cohort of patients with GAP. These findings support a potential systemic hematological response to periodontal treatment.

Keywords: generalized aggressive periodontitis, white blood cell count, leukocyte count, platelet count, periodontal therapy

INTRODUCTION

Periodontitis is a chronic inflammatory disease characterized by inflammation of the periodontal tissues and progressive destruction of the tooth-supporting apparatus. Although the disease is initiated by a dysbiotic subgingival biofilm, tissue destruction is mediated substantially by the host inflammatory response. Periodontal inflammation can therefore have biological effects extending beyond the periodontal tissues.

Circulating hematological parameters, including total leukocyte count, differential leukocyte counts and platelet count, are inexpensive and routinely available indicators of systemic inflammatory and immune activity. Increased leukocyte and platelet counts have been reported in patients with periodontitis, and treatment of periodontal inflammation has been associated with reductions in these parameters [1,4,7,8].

Of particular relevance to the present study, Christan et al. reported that non-surgical periodontal therapy in generalized aggressive periodontitis was associated with reductions in WBC, neutrophil and platelet counts,

with differences according to smoking status [2]. The present investigation examines a young cohort of patients diagnosed with generalized aggressive periodontitis who received comprehensive periodontal treatment.

The term “generalized aggressive periodontitis” reflects the classification framework used when this study was conducted. The 2017 World Workshop subsequently incorporated diseases previously described as “chronic” and “aggressive” periodontitis into a single category of periodontitis characterized by stage and grade [6]. The historical diagnostic terminology is retained here to accurately describe the original study population; retrospective reassignment to a contemporary stage/grade should only be performed if the original clinical and radiographic records permit it.

The primary objective of this study was to evaluate the effect of comprehensive periodontal therapy on total WBC count and platelet count. Secondary objectives were to assess changes in differential leukocyte counts and periodontal clinical parameters.

METHODOLOGY

Study design and setting

This was a prospective, single-arm interventional clinical study conducted at Goa Dental College and Hospital. The study included 29 untreated patients diagnosed with generalized aggressive periodontitis. The study population comprised 16 females and 13 males, aged 18–30 years.

Ethical considerations

Ethical approval was obtained from the Ethical Committee of Goa Dental College & Hospital, dated 4 April 2020. The formal approval/reference number was not provided in the current records and should be inserted if available. Written informed consent should be confirmed from the original study documents.

Eligibility criteria

Participants were adults diagnosed with generalized aggressive periodontitis according to the American Academy of Periodontology (AAP) criteria applicable at the time of the study. The complete AAP diagnostic criteria used should be reproduced/cited from the original protocol. Participants were non-smokers and reported no systemic disease.

Baseline assessment

A detailed medical history and family history were recorded. Clinical examination included full-mouth periodontal pocket charting. Radiographic assessment was performed as part of the diagnostic work-up. Periodontal parameters recorded were PPD, CAL, PI and GI using a UNC-15 periodontal probe.

Periodontal intervention

All participants underwent full-mouth supragingival and subgingival scaling and root planing using hand scalers, ultrasonic instrumentation and Gracey curettes. Adjunctive systemic antibiotic therapy consisted of amoxicillin 500 mg three times daily and metronidazole 400 mg three times daily for 10 days, as recorded in the study materials.

The source records document AXL 500 mg as amoxicillin 500 mg. The recorded regimen was amoxicillin 500 mg three times daily plus metronidazole 400 mg three times daily for 10 days. The original prescription/record should be retained as the source of truth.

Approximately 15 days after completion of antibiotic therapy, periodontal sites with PPD >6 mm were reassessed. The current study record states that no periodontal surgery was performed in the present study.

Clinical outcome assessment

Periodontal examinations were performed at baseline and at 3 months after completion of antibiotic therapy. PPD, CAL, PI and GI were recorded using standardized clinical procedures.

Hematological assessment

Venous blood samples were collected at baseline and at the 3-month follow-up for analysis of total WBC count, differential leukocyte count and platelet count. Hematological analysis was performed using the laboratory facility at Goa Medical College. The specific analyzer/model, units and laboratory reference ranges are not currently available and should be verified from the laboratory records.

Statistical analysis

Because the study compared paired observations obtained from the same participants at baseline and 3 months, a non-parametric paired analysis was planned/used. The exact statistical test and test statistics could not be recovered from the available records and must be verified before submission. The available study material states that the relevant comparisons were statistically significant and that P values were >0.01 ; exact P values should not be inferred. Statistical significance should be reported using the prespecified threshold from the original protocol.

RESULTS

Participant characteristics

Twenty-nine participants were included, comprising 16 females (55.2%) and 13 males (44.8%). The source manuscript also reports a mean age of 33 ± 4 years; however, the methodology section records an age range of 18–30 years. This internal discrepancy must be resolved from the original case records before submission.

Table 1: Participant characteristics and intervention profile

Characteristic	Data
Sample size	29 participants
Sex	16 females (55.2%); 13 males (44.8%)
Age	Mean 33 ± 4 years in Results; methodology states 18–30 years
Smoking/systemic disease	Participants described as non-smokers with no systemic disease
Periodontal treatment	Full-mouth supragingival/subgingival scaling and root planing
Antibiotics	Amoxicillin 500 mg TID + metronidazole 400 mg TID for 10 days
Follow-up	Baseline and 3 months after completion of antibiotic therapy
Periodontal surgery	No periodontal surgery performed in present study

Periodontal outcomes

The study reported statistically significant changes in PPD and CAL from baseline to the 3-month follow-up. In contrast, PI and GI did not demonstrate statistically significant changes over the same period.

Hematological outcomes

Total WBC and platelet counts decreased significantly from baseline to 3 months following completion of periodontal therapy. Differential blood counts were also assessed; the exact direction and statistical significance of each leukocyte subtype should be reported from the original laboratory/statistical dataset.

Table 2: Summary of reported changes in periodontal and hematological outcomes

Outcome	Baseline value	3-month value	Reported statistical result
Probing pocket depth (PPD)	6 +/- 1	4.2 +_1	Significant reduction p <0.01
Clinical attachment level (CAL)	7.2 +/- 1	5.6 +/- 1	Significant change
Plaque Index (PI)	1.2	1	Not statistically significant
Gingival Index (GI)	2.0	1.8	Not statistically significant
Total WBC count	9000	7100	Significant reduction (p < 0.01)
Neutrophils	4.9×10^9 per L	4.7×10^9 per L	not statistically significant
Lymphocytes	1.9×10^9 per L	1.8×10^9 / L	Not statistically significant
Monocytes	0.35×10^9 per L	0.35×10^9 / L	Not statistically significant
Platelet count	2.14 +/- 41,400	1.77 +/- 5000	statistically Significant reduction p < 0.1

DISCUSSION

The present study found that comprehensive periodontal treatment was accompanied by significant reductions in total WBC and platelet counts over a 3-month period in young adults with generalized aggressive periodontitis. The hematological changes occurred alongside significant improvement in periodontal probing depth and clinical attachment parameters, suggesting that reduction of periodontal inflammatory burden may be accompanied by measurable systemic hematological changes.

The findings are biologically plausible because periodontitis can produce a persistent inflammatory stimulus capable of influencing circulating immune and hematological cells. Previous work in generalized aggressive periodontitis demonstrated reductions in WBC, neutrophil and platelet counts after non-surgical therapy, particularly among non-smokers [2]. Studies in other periodontitis populations have similarly reported higher circulating WBC and platelet counts in periodontitis and reductions after periodontal treatment [1,4,7,8].

The present study differs from earlier work in several respects. First, the cohort was restricted to young adults with generalized aggressive periodontitis. Second, treatment was comprehensive. Third, both WBC and platelet counts were evaluated together with conventional periodontal clinical parameters. These features allow the study to contribute to the literature concerning the relationship between periodontal inflammatory burden and systemic hematological status.

The absence of a significant change in PI and GI despite significant changes in PPD and CAL is noteworthy. However, this finding should be interpreted cautiously because PI and GI are influenced by examiner scoring, oral hygiene behavior and the distribution of residual inflammation. Importantly, lack of a statistically significant change in a clinical index does not establish that plaque or gingival inflammation was unrelated to periodontal destruction.

One possible biological explanation for the reduction in circulating inflammatory cell counts is resolution of the systemic inflammatory response following control of periodontal infection. Specialized pro-resolving mediators have been implicated in resolution of periodontal inflammation [3,5]; however, the present study did not measure these mediators. Therefore, any proposed role for SPMs or Resolvin E1 should be regarded as a hypothesis rather than a demonstrated mechanism.

These results should not be interpreted as evidence that periodontal therapy directly prevents cardiovascular disease. WBC and platelet counts are nonspecific systemic markers and are influenced by numerous

physiological, infectious, inflammatory, behavioral and medication-related factors. The clinical significance of a modest change in these counts requires evaluation in larger controlled studies with longer follow-up.

LIMITATIONS

- Single-arm design without a healthy or untreated comparison group limits causal inference.
- Small sample size (n=29) limits statistical power and generalizability.
- The study population was young and may not represent patients with periodontitis in other age groups.
- The historical diagnosis of generalized aggressive periodontitis should ideally be mapped to the contemporary stage-and-grade classification using the original records.
- The laboratory analyzer and several methodological details were not recorded in the materials currently available and must be verified from the original study records.
- Exact numerical results, effect sizes and confidence intervals are not present in the supplied record and should be reconstructed from the original dataset rather than estimated from the graph.
- Potential confounders such as smoking, recent infections, medications, body mass index and other systemic inflammatory conditions should be explicitly reported and controlled for if these data were collected.

CONCLUSION

Within the limitations of this prospective interventional study, comprehensive periodontal therapy was associated with significant reductions in total WBC and platelet counts over 3 months in patients with generalized aggressive periodontitis. The findings support the concept that periodontal inflammation may have measurable systemic hematological correlates and that successful periodontal treatment may modify these parameters. Larger controlled longitudinal studies using contemporary periodontitis classification criteria and standardized hematological outcomes are warranted.

DECLARATIONS

Ethics approval

Institutional Ethics Committee approved. Approval/reference number and informed-consent documentation should be verified from the original study records before submission.

Funding

No external funding; self-funded.

Conflict of interest

None declared.

REFERENCES

1. Ali M, Yang F, Plachokova AS, Jansen JA, Walboomers XF. Application of specialized pro-resolving mediators in periodontitis and peri-implantitis: a review. *Eur J Oral Sci.* 2021;129(1):e12759. <https://doi.org/10.1111/eos.12759>
2. Al-Rasheed A. Elevation of white blood cells and platelet counts in patients having chronic periodontitis. *Saudi Dent J.* 2012;24(1):17-21. <https://doi.org/10.1016/j.sdentj.2011.10.006>
3. Christan C, Dietrich T, Hägewald S, Kage A, Bernimoulin JP. White blood cell count in generalized aggressive periodontitis after non-surgical therapy. *J Clin Periodontol.* 2002;29(3):201-206. <https://doi.org/10.1034/j.1600-051x.2002.290303.x>
4. D'Aiuto F, Parkar M, Andreou G, Suvan J, Brett PM, Ready D, Tonetti MS. Periodontitis and systemic inflammation: control of the local infection is associated with a reduction in serum inflammatory markers. *J Dent Res.* 2004;83(2):156-160. <https://doi.org/10.1177/154405910408300214>

5. Fredman G, Oh SF, Ayilavarapu S, Hasturk H, Serhan CN, Van Dyke TE. Impaired phagocytosis in localized aggressive periodontitis: rescue by Resolvin E1. *PLoS One*. 2011;6(9):e24422. <https://doi.org/10.1371/journal.pone.0024422>
6. Papapanou PN, Sanz M, Buduneli N, et al. Periodontitis: consensus report of Workgroup 2 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. *J Periodontol*. 2018;89(Suppl 1):S173-S182. <https://doi.org/10.1002/JPER.17-0721>
7. Romandini M, Laforí A, Romandini P, Baima G, Cordaro M. Periodontitis and platelet count: a new potential link with cardiovascular and other systemic inflammatory diseases. *J Clin Periodontol*. 2018;45(11):1299-1310. <https://doi.org/10.1111/jcpe.13004>
8. Sanz M, Herrera D, Kebschull M, et al; EFP Workshop Participants and Methodological Consultants. Treatment of stage I-III periodontitis—The EFP S3 level clinical practice guideline. *J Clin Periodontol*. 2020;47(Suppl 22):4-60. <https://doi.org/10.1111/jcpe.13290>
9. Siddeshappa ST, Nagdeve S, Yeltiwar RK, Parvez H, Deonani S, Diwan V. Evaluation of various hematological parameters in patients with periodontitis after nonsurgical therapy at different intervals. *J Indian Soc Periodontol*. 2016;20(2):180-183. <https://doi.org/10.4103/0972-124X.175172>