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Role of Periodontal Health Status on Bleeding and Clotting Time

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ABSTRACT :

The extent and severity of periodontal disease determines the necessity for a surgical or nonsurgical treatment approach in its management.The dental professional must be aware of the

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possibility that periodontal patients with no previous indication of bleeding can manifest their first bleeding event in the dental office. In order to prevent any ill event, it is always safe to advise the patient for a blood test to determine their bleeding and clotting times and check if they are within the normal range.The aim of this study was to assess the relationship between periodontal status and bleeding and clotting time. A retrospective study was conducted using the patient records from Saveetha Dental College, Chennai from June 2019 - April 2020. The study population included patients with recorded bleeding and clotting time values, selected by non-probability purposive sampling. Data was collected and then subjected to statistical analysis. Microsoft Excel 2016 (Microsoft office 10) data spreadsheet was used to collect data and later exported to SPSS IBM (version 20.0). Descriptive statistics and chi square test were employed with a level of significance set at $p<0.05$. The mean age of patients included in this study was 38.15 +/- 17.55 years. 45.77% were females and 54.23% were males. The prevalence of periodontitis among patients with recorded bleeding and clotting time values was 28.17%. Within the limits of this study, there is no significant correlation between bleeding time, clotting time and periodontal status, though the values were lower than the normal range in periodontitis patients.

Keywords :

bleeding time; clotting time; periodontitis; haematological disorders

INTRODUCTION :

Periodontium refers to the supporting structures around the tooth - namely gingiva, cementum, periodontal ligament and alveolar bone. (1),(2) Periodontitis is the inflammatory disease of these supporting tissues of the teeth caused by specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with periodontal pocket formation, gingival recession or both.(3),(4) Almost all forms of periodontal disease occur as a result of mixed microbial infections within which specific groups of pathogenic bacteria coexist.(5),(6)

For the past few decades a lot of literature evidence has proved that these infectious diseases of the periodontium apart from posing local inflammatory response contributes to a significant inflammatory burden systemically.(7),(8) This inturn may result in systemic events like atherosclerosis, preterm low birth weight, diabetes mellitus etc. Also there are preliminary reports that periodontal disease may contribute to increase in blood viscosity.(9)(10) Patients with periodontal diseases pose a risk for increased bleeding as well as hypercoagulation and thrombi formation.(11)(12)

There is accumulating evidence of association between some periodontal infections and atherosclerosis . One possible mechanism is through endothelial injury by infectious agents, triggering in part; an inflammatory response seen in atherosclerosis. The role of infections has been recently reviewed by Danesh and colleagues; there is mounting evidence that infection by

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Chlamydia pneumoniae, Helicobactor pylori, Periodontal bacteria, and Cytomegalovirus are associated with heart disease.(13,17)

There is increasing amount of evidence that periodontal infections may directly contribute to the pathogenesis of atherosclerosis and thromboembolic events by providing repeated systemic challenges with liposaccharides and inflammatory cytokines.(5)

Herzberg and co-workers have reported that the Streptococcus sanguis and Porphyromona gingivalis have been shown to induce platelet aggregation and activation through the expression of collagen-like platelet aggregation-associated proteins. The aggregated proteins may play a role in atheroma formation and thromboembolic events.(18)

An increasing number of periodontally compromised patients within the aging population manifest signs of increased bleeding time.(14,15) The dental professional must be aware of the possibility that periodontal patients with no previous indication of bleeding can manifest their first bleeding event in the dental office.(16,17)

It is of great importance to check bleeding time and clotting time prior to any periodontal therapy. The normal range of bleeding time is 2 to 7 minutes and Clotting time is between 8 to 15 minutes(18,19). Treatment modifications can be done with the help of these investigations.(20,21,22) hence there is an increased need to create awareness among dental professionals regarding the impact of periodontal diseases in bleeding and clotting time(23),(24),(25)

The aim of this study was to assess the relationship between periodontal status and bleeding and clotting time.

MATERIALS AND METHODS :

Study design and setting :

This pilot retrospective study examined the records of subjects who reported to the outpatient ward at Saveetha dental college, Chennai from the time period , June 2019 - April 2020. Ethical approval was obtained from the Institutional Ethics Committee. The study population included patients with various inclusion and exclusion criterias ;

INCLUSION CRITERIA:

1. Patients who reported to the outpatient department , who has recorded bleeding and clotting time and a complete case record .
2. Patients who reported to the outpatient ward between the time period June 2019 - April 2020

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EXCLUSION CRITERIA :

1. Pediatric patients
2. Completely and partially edentulous patients
3. Patients with thrombotic diseases
4. Patients under anticoagulants such as heparin

Based on the above mentioned inclusion and exclusion criteria , the total number of patients eligible for the study was found to be 142 during the time period of June 2019 - April 2020

Data collection :

For the included 142 subjects the following parameters were retrieved from the dental records

1. bleeding and clotting time values ,
2. periodontal records such as pocket depth , loss of attachment , bleeding on probing and complete case records in the hospital database.
3. Relevant data such as patient age, sex, recorded.

Repeated patient records and incomplete records were excluded. Data was verified by an external reviewer.

Statistical analysis :

Data was recorded in Microsoft Excel 2016 (Microsoft office 10) and later exported to the Statistical Package for Social Science (SPSS IBM version 20.0) and subjected to statistical analysis. Descriptive statistics and chi square test were employed with a level of significance set at $p<0.05$.

RESULTS :

The mean age of patients included in this study was 38.15 +/- 17.55 years. [Fig 1]

45.77% were females and 54.23% were males. [Fig 2]

Among the study population 28.17% were diagnosed with periodontitis , 71.83 % of the study population had chronic gingivitis [Fig 3]

The overall bleeding time of the patients was between 1-2 mins, which is less than the normal value. 19.18% of patients with periodontitis had a bleeding time of 1 min 20 sec to 1 min 40 sec, 6.85% of patients had a bleeding time of 1 min to 1 min 20 seconds and 1.37% had a bleeding

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time of 1 min 40 sec to 2 minutes. However, there was no significant correlation between bleeding time and periodontal status ($p>0.05$). [Fig 4, Table 1]

The clotting time in patients with periodontitis was lower than the patients without periodontal disease, but it was not statistically significant ($p>0.05$). 18.84% of periodontitis patients had a clotting time of 6-7 minutes, between 5-6 minutes in 8.7% of patients and 4-5 minutes in 1.45% of periodontitis patients. [Fig 5, Table 2]

DISCUSSION :

The data for this retrospective study was based on residents of Chennai seeking treatment at Saveetha dental college, Chennai. Currently there are no existing studies investigating the association between bleeding time, clotting time and periodontal disease in South Indian population.The assessed parameters (BT, CT) are commonly evaluated indicators of systemic health and disease and can show alterations due to oral infectious diseases (e.g., chronic periodontitis). (26)

Test for BT is done to assess platelet function and the body's ability to form a platelet plug at the site of injury. According to Duke's method, the normal BT ranges from 2 to 7 min.(27) Platelets play a significant role in controlling bleeding. BT is commonly evaluated before any periodontal surgery and is case of aesthetic procedures such as crown lengthening .(28)

According to the results of this study, the overall bleeding time of the patients was between 1-2 mins, which is less than the normal value.However, there was no significant correlation between bleeding time and periodontal status. This was similar to a study by Kalsi DS et al, which shows a significant reduction in BT in chronic periodontitis patients after scaling and root planing.(29) In a study by Nitin Sangwan et al, mean bleeding time was less as compared to baseline readings after two weeks in periodontitis patients, but not statistically significant.(30) Similar results were reported by R. Banthia et al in 2013.They conducted a 2 week study on 30 patients with chronic periodontitis to investigate the effect of non-surgical periodontal therapy on blood parameters including BT and CT. The author reported non- significant decrease in bleeding time and clotting time.(31)

Coagulation tests measure your blood's ability to clot, and how long it takes to clot.(32) Testing can help your doctor assess your risk of excessive bleeding or developing clots (thrombosis) somewhere in your blood vessels.(33)

In the present study, the clotting time in patients with periodontitis was lower than the patients without periodontal disease, but it was not statistically significant. This was in accordance with a study by Siddeshappa ST et al, where a statistically significant decrease in clotting time in patients with chronic periodontitis after nonsurgical periodontal therapy had been reported.(34) Similar results were reported by Christan *et al*.who showed a decrease in bleeding time and

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clotting time after periodontal therapy.(35) Taylor *et al*. also reported a statistically significant decrease in bleeding and clotting time after full-mouth tooth extraction.(36)

The study design had some limitations which were smaller sample size and less time duration. Large sample size and longer time duration would result in more statistically significant values. More hematological parameters could be included i.e red cell distribution width (RDW), C-reactive proteins, systemic markers, ESR, TLC, etc. to correlate the exact relationship between blood values and periodontal disease.

The results of this study have to be interpreted with the geographic limitation of the study population. Hence, it cannot be generalized to other populations of geographic and cultural variation.

CONCLUSION :

Within the limits of this study, there was no significant correlation between bleeding time, clotting time and periodontal status, though the values were lower than the normal range in periodontitis patients.

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GRAPHS AND TABLES :

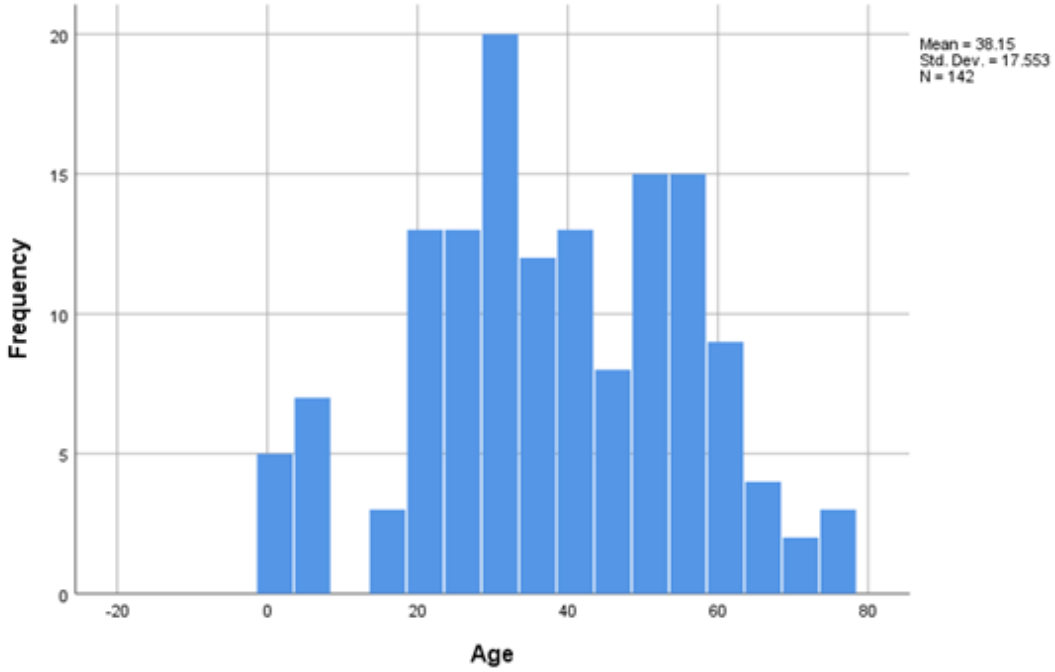

Figure 1 : Graph representing the age distribution of patients included in this study (Mean - 38.15 +/- 17.55 years)

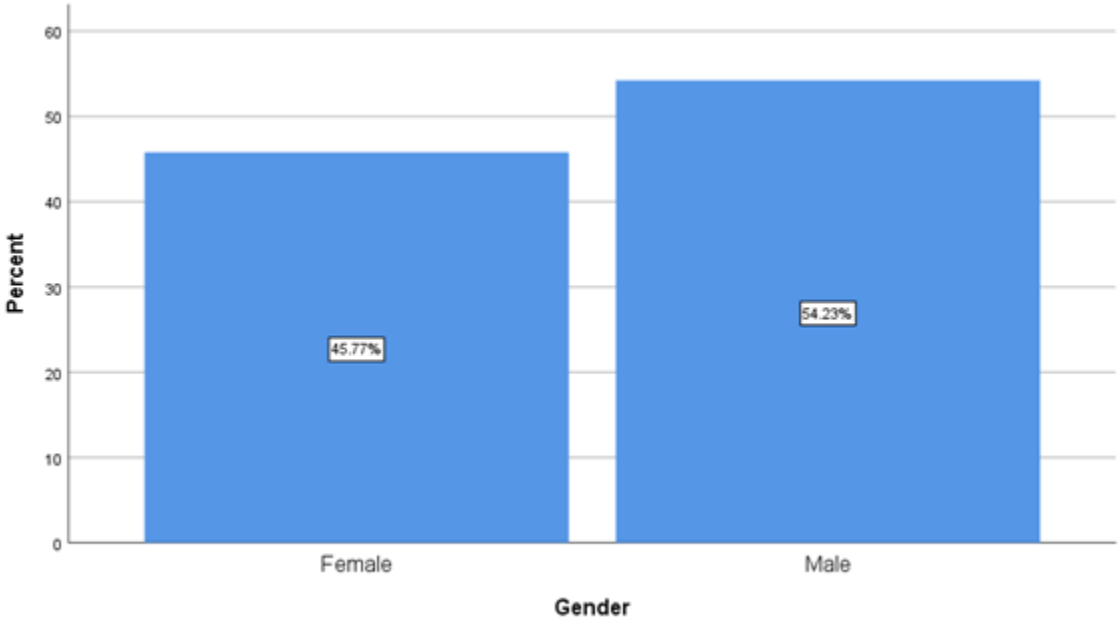

Figure 2 : Graph representing the gender distribution (45.77% - females, 54.23% - males)

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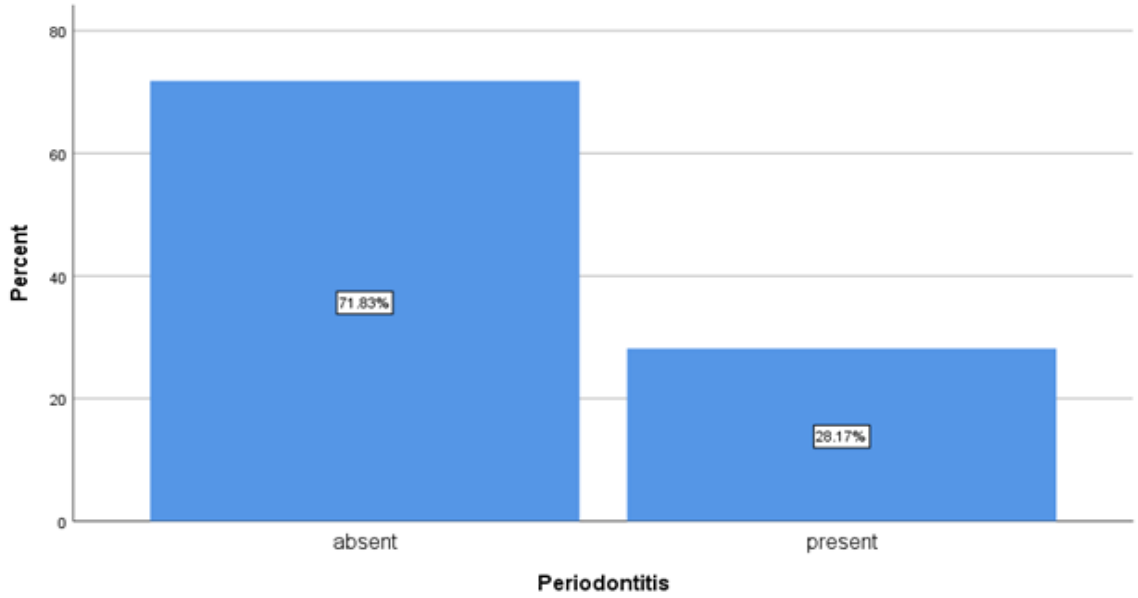

Figure 3 : Graph representing the percentage of study population with recorded bleeding and clotting time which included 28.17% patients with periodontitis.

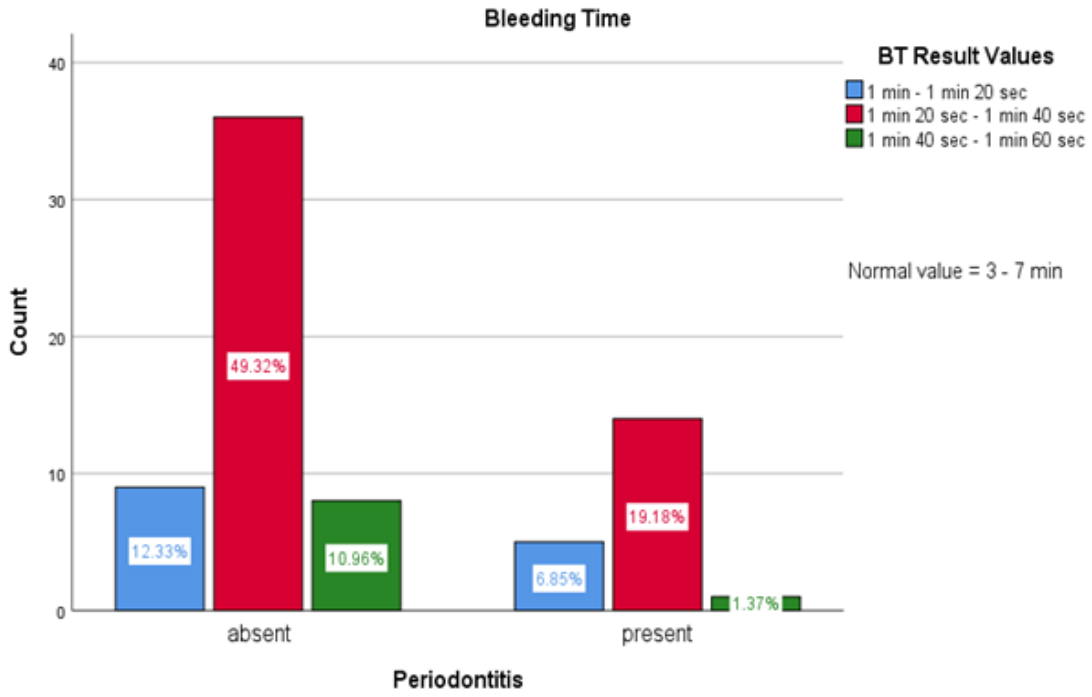

Figure 4 : Graph representing the bleeding time among patients with and without periodontitis (19.18% of patients with periodontitis had a bleeding time of 1 min 20 sec to 1 min 40 sec,

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6.85% of patients had a bleeding time of 1 min to 1 min 20 seconds and 1.37% had a bleeding time of 1 min 40 sec to 2 minutes)

	Value	dF	Asymptomatic significance (2-sided)
Pearson Chi-square	1.696	2	0.428
Likelihood ratio	1.903	2	0.386
N of valid cases	73		

*Table 1 : Chi square test - Bleeding time * Periodontitis*
*p= 0.428, *statistically insignificant*

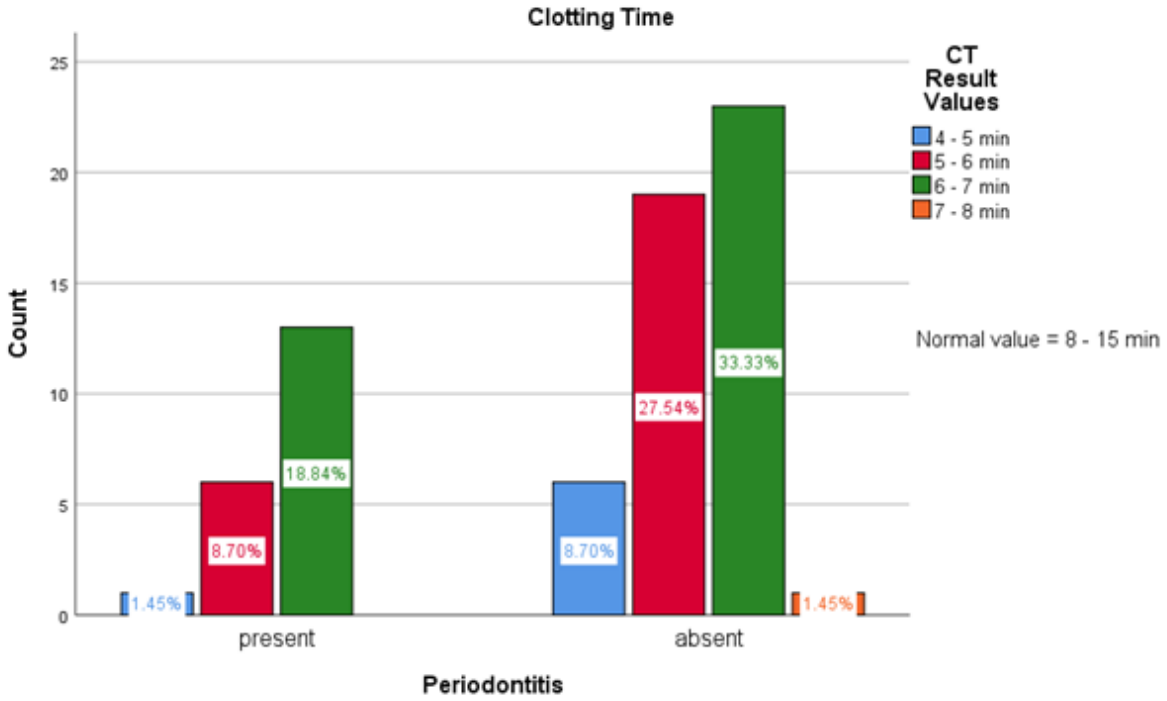

Figure 5 : Graph representing the clotting time among patients with and without periodontitis (18.84% of periodontitis patients had a clotting time of 6-7 minutes, between 5-6 minutes in 8.7% of patients and 4-5 minutes in 1.45% of periodontitis patients)

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	Value	*dF*	*Asymptomatic significance (2-sided)*
Pearson Chi-square	*2.333*	*3*	*0.506*
Likelihood ratio	*12.691*	*3*	*0.323*
N of valid cases	*69*		

*Table 2 : Chi square test - Clotting time *Periodontitis*
*p=0.506, *statistically insignificant*