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Prevalence of alveolar bone crest resorption patterns at the age of 12-30 years from panoramic radiographs at RSGMP Universitas Trisakti

Arifah Billah[1*], Muhammad Novo Perwira Lubis[2]

ABSTRACT

Objectives: The aim of this study is determine the prevalence of alveolar bone crest resorption patterns at the age of 12-30 years from panoramic radiographs.

Materials and Methods: This study used consecutive sampling method based on secondary data from panoramic radiographs at the age 12-30 years, who had resorption on central insisivus and first molars at maxilla and mandibula. The samples used in this study were teeth 11, 21, 31, 41, 16, 26, 36 and 46 with using digital measurements from the CEJ to the top of the alveolar bone. Data is presented in tabular form with simple statistical calculations using SPSS and MS. Excel, and intraobserver reliability test. After the measurements were taken, intraobserver reliability was tested using the Cohen's Kappa test. Data processing was carried out using SPSS and Microsoft Excel.

Results: The results of this study showed that the prevalence of patients diagnosed with periodontitis was 6.19% with Horizontal bone resorption 4,26% and vertical 1.93%.

Conclusion: The prevalence of patients diagnosed with periodontitis in 2022 was 6.19% with horizontal bone destruction patterns of 4.26% and vertical 1.93%.

Keywords: *Panoramic radiograph, prevalence, vertical bone crest resorption, horizontal bone crest resorption*
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INTRODUCTION

Radiography could be used as a supporting examination in dental practice to establish a diagnosis and plan treatment.[1] Dental radiography consists of intraoral radiography and extraoral radiography. Radiograph panoramic is extraoral radiograph which a type of radiography that is often used, because it can cover both the maxilla, mandible and other supporting tissue structures.[2]Panoramic radiography is also important to see the condition of periodontal disease.[3]

Periodontal disease is an infection or inflammation that attacks the tissues supporting the teeth.[4] The periodontal diseases that Frequently encounter are gingivitis and periodontitis.[5] Periodontitis is a periodontal disease of the teeth that Affecting tooth's tissues support, usually caused by the accumulation of plaque and microorganisms that develop in the oral cavity, which can cause defects in the periodontal ligament and alveolar bone, characterized by pocket formation, gingival recession or both.[6] Obtained showed alveolar bone resorption covering the area and shape with horizontal and vertical patterns.[7,8]

According to the American Academy of Periodontology (AAP) 1999, the classification of periodontal disease and its conditions is classified into gingival disease, chronic periodontitis, aggressive periodontitis, periodontitis caused by systemic disease and the development of acquired deformities and conditions. Chronic periodontitis is often found in adult or pediatric patients. Bone resorption that is often found in chronic periodontitis is horizontal bone resorption. Aggressive periodontitis is found in patients aged <25 years with a vertical pattern of bone resorption.[8] Chronic periodontitis occurs more frequently in adults aged < 35 years, highest in the elderly population (82%), followed by adults (73%) and adolescents (59%).

Periodontal disease is the second largest disease after caries which attacks periodontal tissue. Based on the results of Basic Health Research (RISKESDAS) in 2018, the prevalence of periodontitis in Indonesia reached 74.1%, which shows that the incidence of periodontal disease is still high.[9] Based on research that has been conducted by Ahmad Ridwan Turgani the largest bone resorption In periodontitis was 8,77% horizontal resorption and 2,34% vertical resorption and the vertical resorption pattern is 2.34%.[10] The purpose of this study was to determine the prevalence of alveolar bone crest damage at the

[1]Faculty of Dentistry, Universitas Trisakti, Jakarta, Indonesia 11410

[2]Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Universitas Trisakti, Jakarta, Indonesia 11410

*Correspondence to:
Arifah Billah
arifahbillah25@gmail.com

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age of 12-30 years based on panoramic radiographic studies in the Radiology of Dentistry installation RSGMP FKG USAKTI.

MATERIALS AND METHODS

This research is a descriptive observational study with a cross sectional approach to the pattern of resorption to the alveolar bone crest. The research sample used was secondary data from panoramic radiographs at the Radiology Installation of RSGM-P at Universitas Trisakti. Sampling was carried out using a consecutive sampling technique with a total research sample of 1,291 panoramic radiographs for the period January-December 2022 with inclusion criteria, namely patients aged 12-30 years. The exclusion criteria of this study were images with poor radiograph quality and missing teeth 11,21,31,41,16,26,36,46Measurement of alveolar bone crest resorption above the Cemento Enamel Junction ≥3mm was in accordance with the predetermined inclusion and exclusion criteria. After that, visual observation was carried out, namely by observing the pattern of resorption to the alveolar bone in a vertical and horizontal pattern. Then all secondary data from panoramic radiography results were recorded in Microsoft Excel software and processed using SPSS for intraobserver reliability testing.

RESULTS

This study conducted an intraobserver reliability test with two measurements at different times. Observations and consistency tests were carried out on teeth 11,21,31,41,16,26,36,46. The results of the intraobserver reliability test can be seen in Table 1.

Based on the results of intraobserver reliability measurements using the Cohen's Kappa Coefficient test, the results show ≥ 0.60, where these results prove that the data taken based on the selected variables is declared reliable.

Table 2 shows the prevalence of alveolar bone crest defects in incisor and molar teeth differentiated by gender. The prevalence of alveolar bone crest defects in females found in incisor teeth was 5.94% and males were 1.9%. The prevalence of alveolar bone crest damage in females found in molar teeth was 4.1% and males were 1.9%.

Based on the number of patients who came for radiographic examinations in January-December 2022, there were 1,291 panoramic radiographs. Based on the samples that have been studied with age grouping 12-30 years, patients diagnosed with periodontitis were found in 80 samples (25,47%), horizontal bone resorption patterns in 55 samples (68.75%), and vertical bone resorption patterns in 25 samples (31.25%). Data on the results of the prevalence calculation can be seen in table .

DISCUSSION

The results showed that the prevalence of periodontitis found at RSGM-P Trisakti University, West Jakarta was 25,47%, this is said to be low because based on the inclusion and exclusion criteria there were 80 patients diagnosed with periodontitis from 314 panoramic radiography

Table 1. Kappa Coefficient Value

Variable	Number of samples	Result	Category
Periodontitis	80	0,737	*Moderate*
Horizontal bone resorption	55	0,719	*Moderate*
Vertical bone resorption	25	0,771	*Moderate*

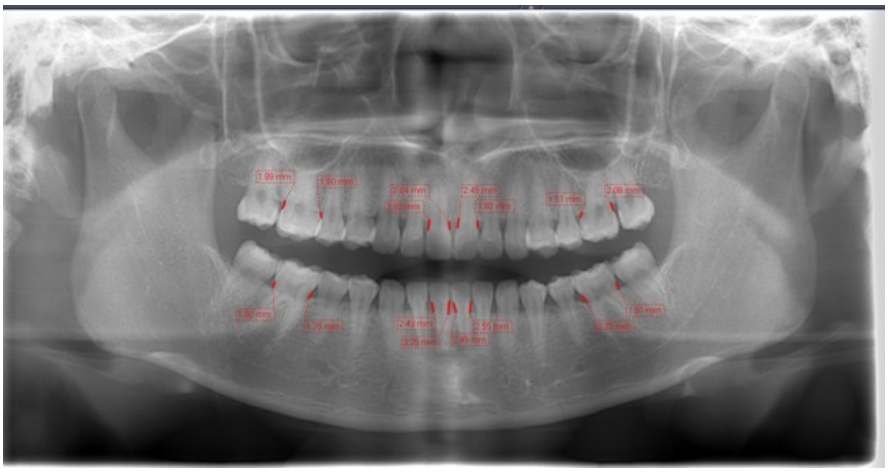

Figure 1. Measurement of the alveolar bone crest on a panoramic radiograph

Table 2. Prevalence of bone decay patterns occurring in gender differentiated incisors and molars.

Gender	Insisivus	%	Molar	%
Female	76	5,94%	52	4,1%
Male	24	1,9%	24	1,9%

Table 3. Prevalence of alveolar bone crest resorption patterns at RSGMP Universitas Trisakti

Pattern of bone resorption	Number of samples	Percentage based on number of panoramic radiographs
Horizontal	55	68.75%
Vertical	25	31.25%

samples. This research is in line with the results of research carried out at the dental polyclinic at Tikala Baru Health Center based on ages 20-30 years showing that the prevalence of periodontitis in 2018 was 17.7%.[11] However, there are differences in the results of research conducted by Sugiarti et al which shows that the prevalence rate of periodontitis in 2013 was 60%, then increased in 2014 to 62%.[12]

The research was carried out by measuring the crest of the alveolar bone at 11, 21, 31, 41, 16, 26, 36 and 46. This is in line with the results of research which shows that in periodontitis patients the teeth where the most bone loss occurs are the incisors, then followed by molars, premolars and canines.[13] According to Carranza, it is proven that periodontitis can be found in the incisors and first molars.[8]

Based on Table 3, it can be seen that the prevalence of horizontal bone resorption patterns found in periodontitis is 68.75%. The results of the study were obtained from the number of patients who experienced horizontal bone damage from 314 panoramic samples as many as 55 patients, measured from the CEJ to the apex of the alveolar bone on panoramic radiographs. Research conducted by Naingolan et al. suggested that horizontal bone resorption patterns were found more in patients with periodontitis.[14] This study is in line with the research of Muhammad et al. which shows that the results of research on the profile of alveolar bone loss in patients diagnosed with chronic periodontitis seen based on periapical radiographs found the most horizontal bone resorption pattern of 92%, while the vertical bone resorption pattern was only 8% in the research sample conducted.[13]

Based on Table 2 which shows the prevalence of alveolar bone crest resorption differentiated by gender in incisors and molars. These results were obtained from the number of measurements on the mesial and distal of 16 areas, then divided by the total number of teeth examined in patients diagnosed with periodontitis 1,280.

The prevalence of vertical bone resorption patterns found in periodontitis was 31.25%. the results of the study were obtained from the number of patients who experienced vertical bone damage from 314 panoramic samples as many as 25 patients, measured from the CEJ to the apex of the alveolar bone on panoramic radiographs. The results of this study are not in line with research conducted by Ahmad Ridwan Turgani which shows the prevalence of vertical bone resorption patterns of 2.34% obtained from.[10] The results of this study are in line with research conducted by Hidayat et al showing that the pattern of bone resorption found in aggressive periodontitis patients is a vertical bone resorption pattern.[15] According to Carranza, states that a vertical pattern of bone resorption can be found in patients with aggressive periodontitis and is found in patients aged <25 years.[8]

Research conducted at RSGMP Faculty of Dentistry Universitas Trisakti with the age category 12-30 years in 2022 is low. This is because in samples taken based on ages 12-30 years, patients with periodontitis are more often found in elderly patients. This is in accordance with research conducted by Titin et al which proves that increasing age indicates the severity of the condition of the periodontal tissue. The severity of periodontal tissue can be caused by the aging process so that changes will be seen in periodontal tissue anatomy, morphology and function.[16]

CONCLUSION

Based on the results of research that has been conducted on the prevalence of alveolar bone crest resorption at RSGMP Faculty of Dentistry Universitas Trisakti at the age of 12-30 years which was reviewed using panoramic radiography in January-December 2022 it was found that 25,47% of patients were diagnosed with periodontitis with a horizontal bone resorption pattern of 68.75% and a vertical bone resorption pattern of 31.25%. the results of the above measurements have differences because they use different parameters namely the radiographs used, medical records and patient diagnosis.

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FOOTNOTES

All authors have no potential conflict of interest to declare for this article. This research has received ethical approval from the Research Ethics Commission of the Faculty of Dentistry, Trisakti University with number 649/S1/KEPK/FKG/7/2023. All procedures conducted were in accordance with the ethical standards.

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