

## Evaluation of Radiographic Pathologic Jaw Finding in Young Women in Bareilly Population – A Retrospective Study

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### ABSTRACT

**Aim and Objective:** The aim of the study was to determine the prevalence and types of jaw pathologic findings as detected in panoramic radiographs of a sample of young women visiting Institute of Dental Sciences, Bareilly (Uttar Pradesh) and to evaluate the most common factors that predict the occurrence of jaw pathologic findings. **Materials and Methods:** A total of randomly selected 200 orthopantomograms of the young female patients from the archived from the Department of Oral Medicine and Radiology, Institute of Dental Sciences, Bareilly, India, will be evaluated. Types of pathologic radiographic jaw findings and their prevalence were determined through screening of panoramic radiographs. Data were analyzed using the statistical analysis software (SPSS version 22 [IBM Corp.]). Multiple linear regression formula was used to explore the significance of some types of dental lesions as predictor variables for the occurrence of jaw pathologic findings. **Results:** In the present study, 85% of study sample had periapical lesions. Total number of retained roots was 34%. Alveolar bone loss was found to be less significant (6%). When talking about the supernumerary teeth, total of 11% was found. In 57% of the panoramic radiographs impacted teeth were found. **Conclusion:** According to the results of the present study, it could be concluded that there is poor oral hygiene among the young women with increased risk of perapical lesions and the needed proper measures to counteract such issues.

**Key words:** Radiographic findings, Jaw pathologies, Alveolar bone loss, Periapical lesions

### INTRODUCTION

Our mouth is the mirror of our health and it might be said that numerous diseases which affect our body may be manifested in the mouth.<sup>[1]</sup> However, oral health is frequently affected on a daily basis by various forms of oral diseases, mainly dental caries, and periodontal disease. It is considered as one of the most common health problems and it lead to loss of tooth in very early phase of life.<sup>[1]</sup> Poor oral hygiene may also lead to various health issues such as cardiac problem and adverse pregnancy outcomes.<sup>[2]</sup> Various studies in recent years showed considerable increase risk of oral health problem in young women with a need to evaluate their health and health risk-related behaviors.<sup>[3,4]</sup> Erratic oral health researches regarding oral hygiene and their maintenance were conducted among younger group individuals or among the general population, but younger women age group received hardly any consideration in this field.<sup>[5]</sup> The present study was conducted among a sample of young women to quarry those who are in an significant phase of life and to address a vital period of any woman's life, the age of being families, and motherhood. With the significant lack in current research on women's oral health, the aims of this study were to evaluate the prevalence of jaw findings as perceived in

panoramic radiographs and to inquire the significance of Decayed, Missing, and Filled Teeth (DMFT) components as seen for the radiographic findings in a sample of young women attending the Institute of Dental Sciences college and hospital in Bareilly, (Uttar Pradesh).

### MATERIALS AND METHODS

The present study consisted of 200 randomly selected digital panoramic radiographs taken from the archives of extra oral digital Panoramic (Allengers SMART PAN<sup>DX</sup>) radiographic machine with (70 kvp) in the Department of Oral Medicine and Radiology, Institute of Dental Sciences, Bareilly. The procedure involved in the study was according to the standards of the Institutional Ethical Committee with clearance. The inclusion criteria included high quality radiographs with respect

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to geometric accuracy and contrast of the image. Patients with poor quality radiographs, presence of jaw fracture or any pathology in maxilla or mandible were excluded from the study. The study involved retrieving electronic files stored in archive of Digital Panoramic Machine (Allengers SMART PAN<sup>DR</sup>) using standardized parameter. Extracted data included patient's age and sex, with age range of 18–25 years. The presence of a recent, high quality, clear panoramic radiograph was also an inclusion criterion. Patients with radiographs that were unclear or had distortion, overlapping, or positioning errors, were excluded from the study. Records of patients with systemic disease were also excluded from the study and patients' records fulfilling the inclusion criteria were selected. Data on DMFT of patients were retrieved, recorded, and evaluated from dental charts that existed in the clinical records to study the association with radiographic findings.

With the help of experienced radiologist, radiographic interpretation of pathologies and abnormalities affecting the jaw bones and teeth were performed and the finding includes alveolar bone loss (localized and generalized), radiolucent periapical bony lesions, retained roots, supernumerary teeth, and impacted teeth. All working conditions were similar and standardized each time during panoramic interpretation in the study period.

### Statistical analysis

The data were compiled using Microsoft Excel sheet (Windows 2007) and were analyzed using Statistical Package for the Social Sciences Software (Version 22.0). Chi-square test was applied to determine the association between the variables. A significance level of  $P < 0.05$  was used for all tests and comparisons.

## RESULTS

A total of 200 digital panoramic radiographs, were included in the study for the evaluation the pathological jaw findings. The mean age of the patient was 21.5 years. Digital panoramic radiographs revealed a wide variety of jaw lesions and other pathological condition involving retained roots, alveolar bone loss, periapical lesions, impacted teeth, and supernumerary teeth [Figure 1].



**Figure 1:** Panoramic radiograph of a young female showing filled teeth

The number of periapical lesions and alveolar bone loss was calculated using the formula given by Khateeb *et al.*<sup>[5]</sup> as mentioned below:

$$\text{No. PA lesions} = 2.942 - 0.106 \times (\text{Age of patient in years}) + 0.069 \times (\text{no. of carious teeth}) + 0.039 \times (\text{no. of missing teeth}) + 0.002 \times (\text{no. of filled teeth}).$$

The level of alveolar bone loss was calculated by:

$$\text{Level of alveolar bone loss} = -0.765 + 0.044 \times (\text{Age of patient in years}) - 0.019 \times (\text{no. of carious teeth}) + 0.091 \times (\text{no. of missing teeth}) - 0.006 \times (\text{no. of filled teeth}).$$

The results of the present study of revealed that the majority of the panoramic radiographs had periapical (85%) lesions. Total number of retained roots was found to be 34%. Alveolar bone loss was found to be less significant (6%). Supernumerary teeth, accounted for total of 11%, were found. In 57% of the panoramic radiographs impacted teeth were found [Table 1].

**Table 1:** Preiapical lesions, Retained roots, alveolar bone loss, supernumerary teeth, and impacted teeth among the study sample

Lesions and abnormalities	Number	%
Periapical lesions (PAI* >2)		
None	30	15.0
1	168	84.0
2	2	1.0
3	0	0.0
4 or more	0	0.0
Total with any lesions	170	85.0
No of retained roots		
None	132	66.0
1	30	15.0
2	20	10.0
3 or more	18	9.0
Total with retained roots	68	34.0
Alveolar bone loss		
None	188	94.0
Localized bone loss (posterior)	4	2.0
Generalized bone loss	8	4.0
Total with bone loss	12	6.0
Supernumerary teeth		
None	178	89.0
1	22	11.0
2	0	0.0
3 or more	0	0.0
Total with supernumerary teeth	22	11.0
Impacted teeth		
None	86	43.0
1	42	21.0
2 or more	72	36.0
Total with impacted teeth	114	57.0

Tables 2-6 display the details of regression models for the prediction of number of periapical lesions and level of alveolar bone loss. Tables 2 and 4 provide a description of both models. Tables 3 and 5 both show factor coefficients, and Table 6 shows the predictor variables correlation matrix and dependent variables in both models.

## DISCUSSION

Panoramic imaging (also called orthopantomography) is a technique for producing a single tomographic image of the facial structures that include both the maxillary and mandibular dental

**Table 2:** Regression analysis with dependent variable: Number of periapical lesions. Predictor variables: Age of the patients, carious teeth, missing teeth, and filled teeth

R	R square	Adjusted R square	Std. error of the estimate
0.769 <sup>a</sup>	0.592	0.582	0.070

p=0.0009 is considered extremely significant

arches and their supporting structures. This is a curvilinear variant of conventional tomography and is also based on the principle of the reciprocal movement of an X-ray source and an image receptor around a central point or plane, called the image layer, in which the object of interest is located.<sup>[6]</sup>

The present study was aimed at utilizing panoramic radiographs and dental charts archived from the data of orthopantomograms machine to evaluate the prevalence of pathologic jaw findings, as well as to determining the significance of DMFT component as seen for the radiographic findings in a sample of young women aged between 18 and 25 years. Almost all radiographs, 85% revealed periapical lesions which were in contrast with a study conducted by Khateeb *et al.*<sup>[5]</sup> Taking into account the critical age range of our sample, the childbearing age, these patients may be susceptible to a high risk of shorter pregnancy and reduced intrauterine growth due to such a high prevalence of periapical lesions.<sup>[7]</sup> Where only 53.6% of the radiographs revealed periapical lesions.<sup>[5]</sup> These results were also in contrary with the studies conducted by Rushton *et al.*<sup>[8]</sup> and Harjunmaa *et al.*,<sup>[7]</sup> where 40.2% and 23.5%, respectively, of

**Table 3:** Coefficients and significance of their contribution to the model. Dependent variable: Number of periapical lesions

	Unstandardized coefficients		t	Sig.	95% confidence interval for B		Collinearity statistics	
	B	Std. error			Lower bound	Upper bound	R <sup>2</sup>	VIF
(Constant)	0.944	0.059	16.020	0.000	0.827	1.060		
Patient's age	0.002	0.003	0.728	0.467	-0.004	0.008	0.937	1.067
No of carious teeth	-0.007	0.004	-1.945	0.054	-0.014	0.000	0.841	1.189
No of missing teeth	0.040	0.003	15.007	0.000	0.035	0.045	0.873	1.146
No of filled teeth	-0.003	0.005	-0.704	0.482	-0.013	0.006	0.990	1.010

**Table 4:** Regression analysis with dependent variable: Level of alveolar bone loss. Predictor variables: Age of the patients, carious teeth, missing teeth, and filled teeth

R	R square	Adjusted R square	Std. error of the estimate
0.500 <sup>a</sup>	0.250	-0.179	0.535

P<0.0001 is considered extremely significant

**Table 5:** Coefficients and significance of their contribution to the model. Dependent variable: Level of alveolar bone loss

	Unstandardized coefficients		T	Sig.	95% confidence interval for B		Collinearity statistics	
	B	Std. error			Lower bound	Upper bound	R <sup>2</sup>	VIF
(Constant)	2.111	2.152	0.981	0.359	-2.977	7.200		
Patient's age	-0.035	0.082	-0.426	0.683	-0.230	0.160	0.426	2.348
No of carious teeth	0.082	0.062	1.314	0.230	-0.065	0.229	0.698	1.432
No of missing teeth	-0.015	0.053	-0.275	0.791	-0.140	0.111	0.405	2.469
No of filled teeth	0.253	0.263	0.961	0.369	-0.369	0.874	0.591	1.693

**Table 6:** Correlation matrix of predictor variables for the two regression models

	Patient's age	Carious teeth	Missing teeth	Filled teeth	Periapical lesions	Alveolar bone loss
Patient's age	1.0000	0.0600	-0.1060	0.0000	-0.8570	0.417 <sup>**</sup>
Carious teeth	0.0600	1.0000	0.322 <sup>**</sup>	-0.0863	0.395 <sup>**</sup>	0.192 <sup>**</sup>
Missing teeth	-0.1060	0.322 <sup>**</sup>	1.0000	-0.0234	0.477 <sup>**</sup>	0.848 <sup>**</sup>
Filled teeth	0.0000	-0.0863	-0.0234	1.0000	-0.0300	-0.0427

the radiographs were showing periapical lesions.<sup>[8]</sup> This gives an indication that the majority of the subjects in our study had poor oral health and poor oral health education. Many studies from the Western countries revealed that the same age group subjects on the other hand were having excellent oral and dental health.<sup>[9]</sup>

Discussing about the bone loss, only 6% were affected with it, where in 4% were affected with generalized and 2% were affected with localized bone loss. As we have not investigated about the oral hygiene practices, in our study; therefore, we cannot associate the oral hygiene status with the alveolar bone loss. The present study was an initial attempt to study the prevalence of radiographic jaw findings in Indian young females, so at this age, thought they could not reveal alveolar bone loss, but they are more susceptible to develop the same in their upcoming years of life. However, literature claims that periodontal disease can be associated with the preeclampsia,<sup>[10]</sup> preterm birth,<sup>[11]</sup> and low-birth weight.<sup>[12]</sup>

In our study, supernumerary teeth were sum to be with 11% and more than half (57%) of the radiographs were showing impacted teeth which is in agreement with a study conducted by Arabion *et al.* where 56.3% of the females were having impacted teeth. The reason for such may be because of the different growth pattern between the genders which explains higher prevalence of impaction in young women. The growth of the jaws in the females usually ceases at early phase of life.<sup>[13]</sup>

Regression analysis in this study indicated that the patient age, number of carious, missing, and filled teeth were not significant indicators for the bone loss [Table 5]. DMFT was not used in the two regression models for periapical bone lesions and alveolar bone loss because of problems of multicollinearity of predictor variable (i.e., number of carious, missing, and filled teeth). When eliminating the DMFT factor, multicollinearity was not a problem. In addition, R2 was <0.75 and indicated independent variables.

## CONCLUSION

A high prevalence of pathologic radiographic jaw findings were detected indicating poor oral health among young women. Risk factors contributing to these findings are urgently needed to be addressed to design policies that counteract this problem. Age and the number of decayed teeth were significant predictors for periapical lesions. Along with the number of missing teeth, they were also significant predictors for alveolar bone loss. A very high prevalence of dental caries indicates poor oral health among the present sample. Further studies are needed with more sample size to investigate the possible risk factors with a vision to change women's attitudes and awareness toward oral health as vital factors in determining quality of life and general systemic health for such serious trend of poor oral health, and the needed strategy to counteract such issues.

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## CONFLICTS OF INTEREST

Nil.

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