

## Evaluation of Alveolar Bone Level & its Density in Postmenopausal Women: A Radiovisiographic Study

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**Abstract:** Introduction: Nutritional deficiencies and periodontal diseases are quiet common due to negligence, improper diet and oral health care particularly in Indian women. These deficiencies and improper oral hygiene give rise to various effects like osteoporosis, anemia, loosening of teeth, bleeding of gums...which debilitate these women.

**Aim:** To determine the alveolar bone level and its density in postmenopausal women with the help of radiovisiography (RVG).

**Materials and Methods:** 80 women were included, group I – Pre menopausal without Periodontitis and any systemic disease, group II - Pre menopausal without Periodontitis and any systemic disease, group III - Postmenopausal without Periodontitis and any systemic disease and group IV - Postmenopausal with Periodontitis and without any systemic disease. A digital intraoral periapical view (with help of RVG) of distal side of right mandibular first molar was obtained of these groups and studied for alveolar bone level and its density by keeping the variables of radiographic exposure constant.

**Results:** There is prominent decrease in alveolar bone density in postmenopausal women compared to premenopausal women with or without periodontitis.

**Conclusion:** There is definite reduction in Alveolar bone density in Post menopausal women, but comparison of periodonal cases of Post menopausal women with Premenopausal women, there was decrease in Alveolar bone density but not its height.

**Keywords:** Post menopausal, Premenopausal women, osteoporosis, DEXA.

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### I. Introduction

In India, women are among the most neglected population in terms of health consideration and among them, the postmenopausal group forms the majority.

In postmenopausal women, physiological hormonal changes result in decreased serum calcium level and this homeostasis in calcium level is maintained by resorption of calcium from bone.

This reduction in calcium content of bone leads to a condition called as Osteoporosis.(1)

Osteoporosis is characterized by increased fragility of bone and thus easy susceptibility to fractures – termed pathologic fracture. There is also accompanied bone pain. Therefore early diagnosis of Osteoporosis is imperative to avoid complications and its morbidity. Early signs of Osteoporosis is usually diagnosed by assessing the bone density . Various methods commonly used for measurement of bone density are: (2&3)

Dual-energy X-ray absorptiometry (DXA or DEXA)

Quantitative computed tomography (QCT)

Qualitative ultrasound (QUS)

Single photon absorptiometry (SPA)

Dual photon absorptiometry (DPA)

Digital X-ray radiogrammetry (DXR)

Single energy X-ray absorptiometry (SEXA)

DEXA is currently the most widely used.

These methods of Bone Density Measurement (BDM) are costly, require special set up, experienced operating personnel and are available in specific centers and therefore are out of reach of common persons. Thus, we intended to find out a simple, easy and cost effective method of Bone Density Measurement (BDM).

The purpose of the present study was to evaluate the alveolar bone level and its density in postmenopausal women with the help of a radio-visiography (RVG) and to determine whether decrease in alveolar bone density affects the reduction in alveolar bone level.

## II. Materials and method

The study was carried out in the Outpatient Department of Oral Medicine and Radiology, VSPMS Dental College and Research center, Nagpur. To maintain the uniformity RVG of right mandibular first and second molar region is selected in all patients.

### Inclusion criteria:

Women having their mandibular right first and second molar (46 & 47) present.  
Women above 18 years of age.

### Exclusion criteria:

Women with any lesion in mandibular right first and second molar (46 & 47) present  
Women with any systemic disease which has its manifestation in jaw bone.

The Study consisted of 80 women which were grouped as:

**Group I** : 20 Premenopausal women without Periodontitis

**Group II** : 20 Premenopausal women with Periodontitis

**Group III** : 20 Postmenopausal women without Periodontitis

**Group IV** : 20 Postmenopausal women with Periodontitis

RVG machine from Blue X Company with Soredex Digora software was used in the study. A digital intraoral periapical view (with help of RVG) of distal side of right mandibular first molar was obtained and studied for alveolar bone level and its density by keeping the variables of radiographic exposure constant.

### In Calibration option:

A line from CEJ to the level of alveolar bone was marked and measurements were obtained to determine the alveolar bone level as shown in Fig.I

### In Density measurement option:

A square area, size 0.5 cm sq was selected to determine the bone density on distal side of right mandibular first molar as shown in Fig.II

## III. Result

Comparison of Alveolar bone Density mean values in patients without periodontitis in both Premenopausal (23.43) and Post menopausal women (21.97) i.e Group I and Group III shows P value highly significant (\*\* $p < 0.00$ ) suggesting that there is prominent decrease in alveolar bone density in postmenopausal women compared to premenopausal women.

Also, comparison of mean Alveolar bone length between these Groups i.e Group I (0.34) and Group III (0.46) showed significant ( $*p < 0.05$ ) reduction in alveolar bone length in Group III compared to Group I as shown in Table I.

On comparison of mean Alveolar bone Density values of Premenopausal and Post menopausal women with periodontitis i.e Group II (14.94) and Group IV (20.50) shows P value highly significant (\*\* $p < 0.00$ ) suggesting that there is prominent decrease in alveolar bone density in postmenopausal women compared to premenopausal women.

Also, comparison of mean Alveolar bone length between these Groups i.e Group II (3.25) and Group IV (2.78) showed no significant reduction in alveolar bone length in Group III compared to Group I as shown in Table I.

## IV. Discussion

Many systemic diseases sometimes manifests first in bone like leukemia, sickle cell anemia, thalassemia, hyperparathyroidism etc..(2) With the advancement of age alveolar bone level decreases as a physiologic phenomenon but hormonal changes in Post menopausal women also in addition results in decreased mineral content of bone and thereby decrease in alveolar bone density.

Women mostly neglect their health and this negligence in postmenopausal years leads to systemic disease like Osteoporosis in majority, which is often complicated by severe bone and joint pain and pathological fractures.(4)

Now-a-days RVG is widely used in everyday dental practice and is easily available. It requires less exposure – the most important. Also measurements of: Density; Length of Root, implant and alveolar bone can be done. Images can be altered in terms of contrast and allows dental offices to transfer images electronically and making referrals simpler. Images can be stored on a computer, can be enhanced and zoomed, aiding

diagnostics, easier patient communication, eliminates chemical processing, hazardous waste are avoided and so it can be used as a routine procedure mostly in risk group individuals as it is simple.(5,6 &7)

For a clinician to calibrate different variables likes density, length etc., digital radiography comprising of RVG is very helpful as compared to manual IOPA in which standardized and accurate calibration is difficult. A.R. Talaiepour in his study showed that alveolar bone length measurements with help of RVG gives accurate results.(5)

When diagnosed at initial stage a proper treatment can be initiated and therefore constitutional symptoms of generalized bone pain, back ache, knee pain and joint pains can be minimized or reduced in postmenopausal women . So, a Dental physician plays an important role in diagnosis of Osteoporosis if radiographs are observed carefully.

## V. Conclusion

In this study it was concluded that there is definite reduction in Alveolar bone density in Post menopausal women due to hormonal changes which could be due to osteoporosis which is undetected. But, comparison of periodontal cases of Post menopausal women with Premenopausal women, there was decrease in Alveolar bone density but not its height suggesting that there exists no relation between decreased BMD and reduction in alveolar bone level .

RVG can be used to measure alveolar bone density as it is easy, convenient and cost effective method which is routinely used by the dentist.

Also, a clinician should have a habit of interpreting radiographs properly so that no radiographic finding of systemic disease manifested in jaws could be missed, as in case of Post menopausal women – early detection of osteoporosis can help in avoiding pathologic fracture.

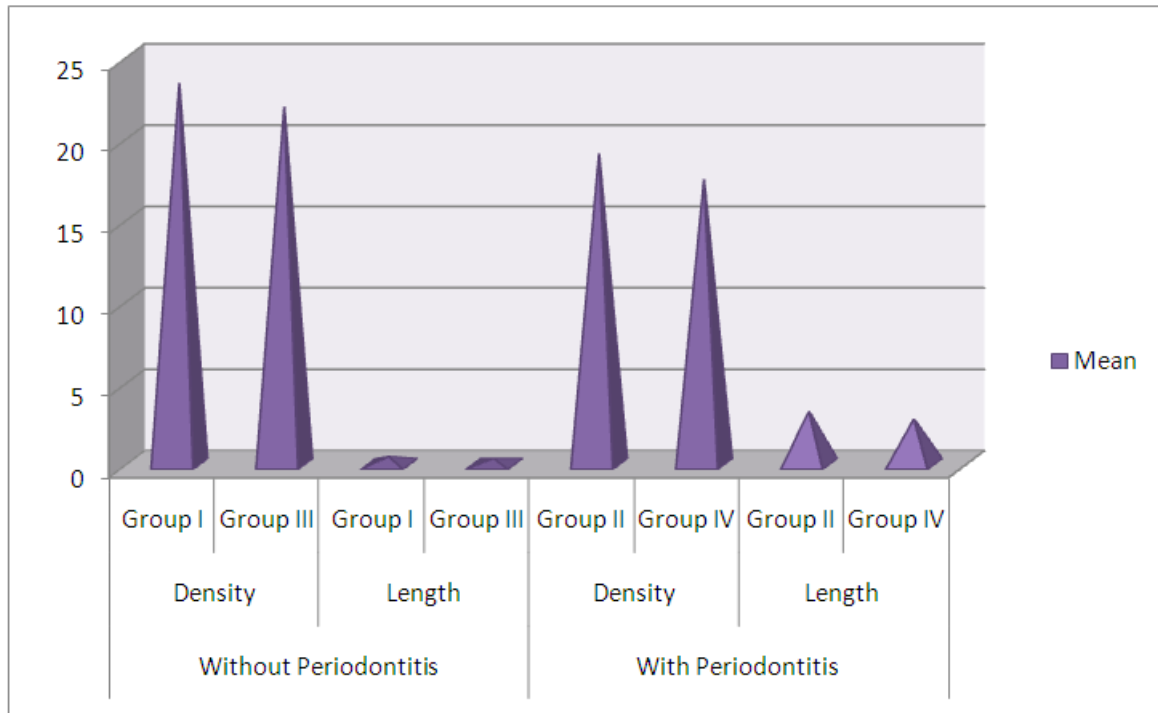
Large sample is required to evaluate more accuracy of the RVG and comparison with a standard Bone Density Measurement Tests e.g DEXA scan can justify our results....

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**Table 1: Comparison of Alveolar bone Density and length in Study groups by Wilcoxon Signed Ranks Test**

Variables	N	Mean	Std. Deviation	z-value	p-value	
Density	Pre-menopausal Normal	20	23.43	123.35	-3.398	0.001**
	Post-menopausal Normal	20	21.97	86.75		
Length	Pre-menopausal Normal	20	0.34	2.38	-2.054	0.040*
	Post- menopausal Normal	20	0.46	2.75		
Density	Pre-menopausal Periodontitis	20	19.94	103.40	-3.661	0.000**
	Post-menopausal Periodontitis	20	17.50	66.45		
Length	Pre-menopausal Periodontitis	20	3.25	7.54	-.934	0.350
	Post-menopausal Periodontitis	20	2.78	6.18		

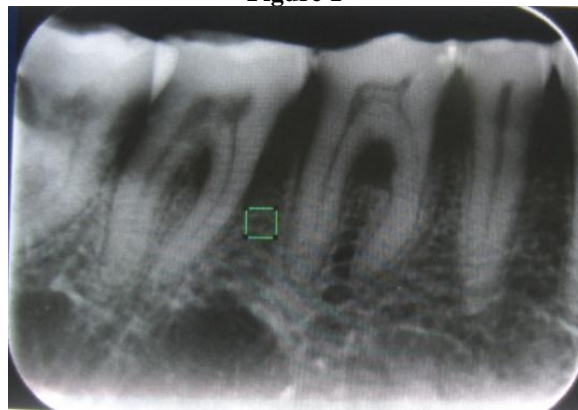


**Legends-**

**Fig 1:** Calibration of alveolar bone length

**Fig 2:** Measurement of alveolar bone Density

**Figure 1**



**Figure- 2**

