

# PATTERN OF BONE LOSS BETWEEN SMOKER AND NON SMOKER PATIENTS

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## ABSTRACT

*The aim of this study was to evaluate the pattern of bone loss found between smoker and non smoker patients who attended dental OPD. Pattern of bone loss was evaluated on the basis of horizontal, vertical and angular defect by taking OPG and peri-apical radiographs. 1500 patients were examined and treated from February 2008 to January 2009 by completing periodontal evaluation forms and measuring pocket depth. It was noted that patients who were smokers developed more bone loss in comparison to non smokers, but it was found out that both smoker and non smoker patients developed more horizontal pattern of bone loss in contrast to other bony defects.*

**Key words:** Smoker, Non-Smoker, Horizontal bone defect, Vertical bone defect, Angular bone defects.

## INTRODUCTION

Smoking increases the risk for gum disease. Smokers have a higher chance of having gum disease throughout their mouths than nonsmokers. Patient may not have symptoms of bleeding or swollen gums because the normal bleeding immune response is affected by tobacco use.<sup>1</sup>

Periodontal disease is characterized by plaque accumulation, calculus formation, pockets formation, inflammation of the periodontium with loss of alveolar bone.

Researches showed that there was no difference of age or level of plaque scores between smokers and non smokers. Smokers had more periodontal inflammation, attachment loss and increased periodontal pocketing and bone loss when compared to non-smoker patients.<sup>2</sup>

Another research showed smokers have more periodontal problem compared to non-smokers

in regards to inflammation and periodontal problem.<sup>3</sup>

Multiple cross section and longitudinal studies have demonstrated that pocket depth, attachment loss and alveolar bone loss are more prevalent and severe in patients who smoke compared with nonsmokers.<sup>4</sup>

It was found that smokers had significantly higher levels of Bacteriodes forsythus and that smokers were 2.3 times more likely to harbor B. forsythus than nonsmokers and former smokers.<sup>5</sup>

Smoking has been shown to impair the chemotaxis and phagocytosis and neutrophils obtained from the oral cavity. In vitro studies of the effect of tobacco products on neutrophils have shown detrimental effect on cell movement and the oxidative burst. In addition, the production of antibody essential for phagocytosis and killing of bacteria specifically IgG<sub>2</sub> levels to periodontal pathogens has been reported to be reduced in smokers versus non smokers with periodontitis sug-

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gesting that smokers may have reduced protection against periodontal infection.<sup>4</sup>

Study done on pattern of periodontal destruction in smoker patients showed that maxillary anterior sextants showed significantly higher periodontal pocket depth and clinical attachment loss than other sextants, similarly the maxillary palatal area showed higher probing and clinical attachment loss than compared to the facial sites and the mandibular regions.<sup>6</sup>

Numerous studies have indicated that current smokers do not response well to periodontal therapy as non smokers or former smokers. The majority of clinical research supports the observation that pocket depth reduction is more effective in non smokers than in smokers using non surgical periodontal therapy (phase 1 therapy) including oral hygiene instructions, scaling and root planning.<sup>7-11</sup> In addition, gains in clinical attachment as a result of scaling and root planning are less pronounced in smokers than in non smokers.

In a study of patients with previously untreated advanced periodontal disease, scaling and root planning plus oral hygiene resulted in significantly greater average reduction in pocket depth and bleeding on probing in non smokers than in smokers when evaluated 6 months after completion of therapy.<sup>11</sup>

In view of the above mentioned information, this study was undertaken to investigate and compare the progression of bone loss seen in smokers and non smoker patients.

## METHODOLOGY

Data were collected from February 2008 to January 2009 and the results have been classified into three group's i.e. angular pattern of bone loss, vertical pattern of bone loss and horizontal pattern of bone.

A total of 1500 patients were evaluated at the periodontal department. A self administrated questionnaire was used which recorded patients medical history, dental history, clinical evaluation along with complete periodontal health status. Out of 1500 patients 332 patients were smokers.

Periodontal evaluation form was used in this study which recorded patient's oral health index. Periodontal probe was used in this research as a tool which looks tapered, rod like instrument calibrated in millimeters with blunt rounded tip to measure pocketing. Patients were selected randomly and the study was based on quantitative analysis.

Radiographs were taken for each patient, where OPG and peri apical x-rays were taken to learn the pattern of bone loss.

Inclusive criteria for the research were patients attending Periodontology department who were having periodontal problem. Exclusive criteria were patients under the age group of 14 years old, patients who were medically compromised, patients with oral submucose fibrosis as they had limited mouth opening therefore it was difficult to check pocketing of the lingual and palatal surfaces and female patients who were pregnant so that they are not exposed to x-rays radiation.

## RADIOGRAPHIC IMAGES

Figures shown are the periapical radiographs showing different pattern of bone loss. Figure 1 shows the horizontal pattern of bone loss which is demarcated with an arrow pointing to the bone loss in the lower anterior region. Fig 2 shows angular pattern of bone loss which is shown with an arrow pointing to the angular pattern of bone loss mesial to mandibular first molar of the lower left quadrant. Figure 3 shows vertical pattern of bone loss over the furcation areas of first and second mandibular molars of the lower right quadrant.



Fig 1

Fig 2

Fig 3

## ETHICS

The study was conducted in compliance with declaration on the rights of the patient and Altamash Dental Hospital.

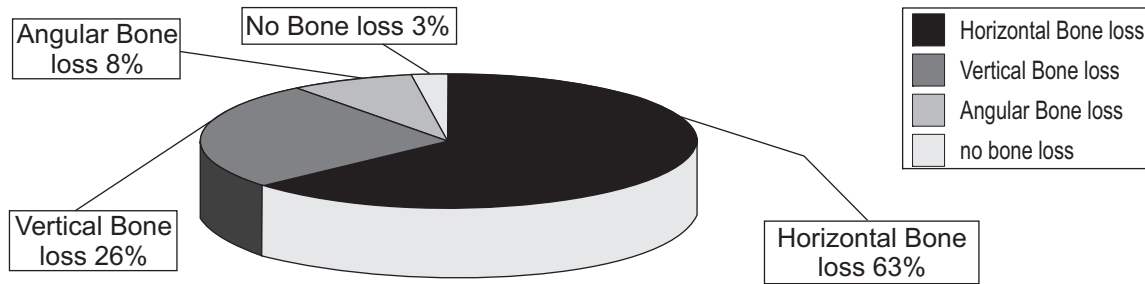


Fig 4: Habit Smoking

## RESULTS

The results were evaluated and calculated using Survey Crafter Marketing and Research software along with Microsoft Excel. The study is completely based on quantitative analysis.

The results obtained from the data collected show (Fig 4) that smoker patients had 63% horizontal pattern of bone loss.

TABLE 1: SHOWS VALUE OF EACH PATTERN OF BONE DEFECT FOR SMOKER PATIENTS

Horizontal Bone loss	Vertical Bone loss	Angular Bone loss	No bone loss
0.243316	0.0989305	0.0306952	0.01

TABLE 2: SHOWS THE VALUE OF EACH PATTERN OF BONE LOSS FOR NON SMOKER PATIENTS

Horizontal Bone loss	Vertical Bone loss	Angular Bone loss	No bone loss
0.243316	0.0989305	0.0106952	0.68

Twenty six percent of patients were suffering from vertical pattern of bone loss, and 8% showed angular pattern of bone loss. 3% of patients were not suffering from any bone loss.

Fig 5 shows that 65% non smoker patients developed no bone loss. But 24% of patients showed horizontal pattern of bone loss. 10% patients showed vertical bone loss and 1% non-smokers suffered Angular Bone loss.

## DISCUSSION

Clinical studies have shown association between smoking and alveolar bone loss. The increased risk of tooth loss may be attributable to the direct effect of tobacco smoking on periodontal tissues. In general people who are smokers develop more bone loss compared to non smokers.<sup>13, 14, 15</sup>

Mahuca and colleagues<sup>16</sup> evaluated the degree of periodontal disease and its relationship to the smoking habits. They reported higher probing depths and attachment loss in smokers. Smokers diagnosed with sever form of periodontitis were shown to

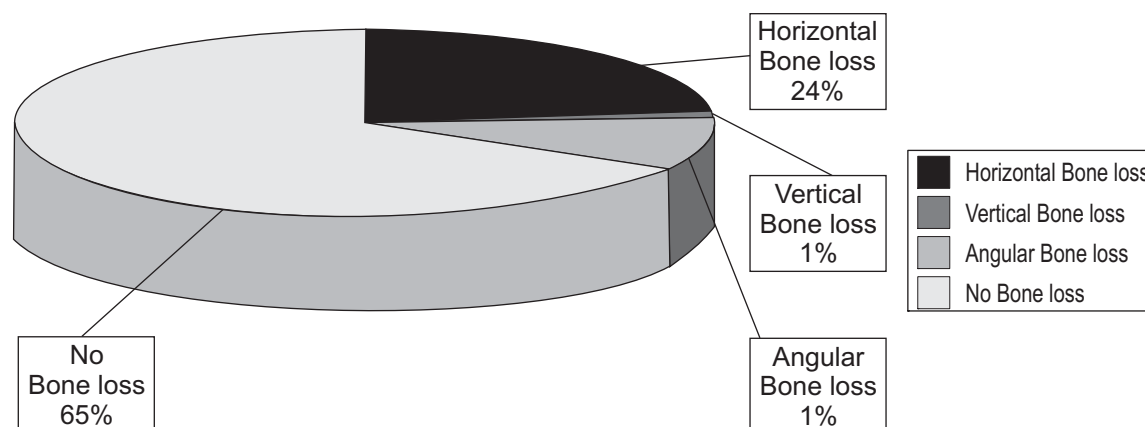


Fig 5: Habit Non Smoker

have more attachment than non-smokers with these conditions.

The difference in pattern of periodontal destruction in smokers as studies by Haber and Kent<sup>17</sup> was suggestive of a local effect of smoking. Preber and Gergstrom<sup>18</sup> suggested that higher local exposure to cigarette smoke of the palatal maxillary surface as compared to the other areas could lead to a significant increase in pocketing.

The results of present study showed that smoking leads to 63% of horizontal pattern of bone loss. Vertical pattern of bone loss is 26% in comparison to 8% angular bone loss. Patient with no bone loss were smokers who have recently started smokings Fig 4.

From Fig 5, it was astonishing to see 65% percentage of patients with no bone loss but still the percentage of horizontal pattern of bone loss was more when compared to angular and vertical bone loss.

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