

# Prevalence of Pathologic Tooth Migration in Patients with Periodontitis

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## ABSTRACT

**Objective:** The aim of this study was to determine the prevalence of pathologic tooth migration in patients with periodontitis.

**Study Design:** Descriptive / cross sectional study

**Place and Duration of Study:** This study was conducted at the Bacha Khan Medical Complex, Dental Department, Mardan from January 2018 to September 2018.

**Materials and Methods:** This study was conducted on 102 patients. Patients having age from 10 to 70 years, both genders, having chronic or aggressive periodontitis, no medical conditions affecting periodontium were included. Patients with smoking, oral breathing, bruxism, and gingivitis were excluded. Both chronic and aggressive Periodontitis was diagnosed on the basis of clinical examination according to the 1999 American academy of periodontology classification. Data were analyzed by SPP version 20. Descriptive statistics were computed. Chi-square test was applied to compare the frequency of pathologic tooth migration (PTM) among genders, age groups, educational levels and type of periodontitis.  $P < 0.05$  was considered significant.

**Results:** The males ( $n=70$ , 68.6%) were more than females ( $n=32$ , 31.4%). The mean age was  $37.58 \pm 13.34$  years. Of whole sample ( $n=102$ ), the patients affected by chronic localized periodontitis were in highest number ( $n=72$ , 70.59%) followed by chronic generalized periodontitis ( $n=20$ , 19.61%). The least frequency was found for aggressive periodontitis ( $n=10$ , 9.8%). The prevalence of pathologic tooth migration was 32.4% ( $n=33$ ). The most common features of PTM was 'flaring and spacing' ( $n=22$ , 21.6%), followed by 'flaring, spacing and rotation' ( $n=8$ , 7.8%) and least was 'flaring, rotation and extrusion' ( $n=4$ , 3.9%).

**Conclusion:** Our findings showed that prevalence of pathologic tooth migration was 32.4% in patients having periodontitis. PTM was more in aggressive periodontitis and in old ages.

**Key Words:** Pathologic tooth migration, periodontitis, aggressive periodontitis

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## INTRODUCTION

The definition of migrated tooth is "the dentition movement into abnormal positions relative to the basal bone of the alveolar process and the adjacent and antagonistic teeth due to loss of nearby or opposing teeth, interferences of occlusion, abnormal habits, or dystrophic and inflammatory disease of the attaching and supporting structures of the teeth."<sup>1</sup> Pathologic tooth migration (PTM) is defined as occurrence of displacement of tooth when the disruption of balance due to periodontal disease among the factors that maintain the physiologic tooth position.<sup>2</sup> Pathologic tooth migration is a disease of periodontal origin that has esthetic effects.<sup>3</sup>

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The equilibrium responsible for tooth position may be disrupted by several causative factors. These factors are periodontal detachment, inflamed tissue exerting pressure, occlusal forces, noxious habits e.g. tongue thrust and teeth grinding, hypodontia without replacement, gingival hyperplasia, and iatrogenic.<sup>4</sup> Nevertheless, the literature found that damage of dental supporting tissue is the most significant cause in pathogenesis of pathologic migration. Periodontal pathologies in the maxillary anterior area can affect one or more teeth.<sup>5</sup> Periodontal problems and its outcome such as spacing, pathological tooth migration, flaring in labial direction, or tooth loss usually results in functional and aesthetic issue, either in isolation or with restorative needs.<sup>6</sup> The features of advanced periodontitis are severe loss of attachment, decreased support of alveolar bone, increased mobility of teeth, and recession of gingivae.<sup>7</sup>

In 1997 by Towfighi et al.<sup>8</sup> Published a study on the prevalence on PTM for the first time. Their study included only patients with moderate to severe periodontitis. They reported that the features of pathologic migration were spacing, extrusion, rotation, labial flaring, and migration into edentulous saddles. PTM prevalence was 30.03%. Another study conducted on Indian population to determine the

prevalence of pathologic tooth migration and reported 11.4% prevalence.

There is lack of literature on pathologic tooth migration in our country. The periodontal susceptibility may vary in different populations due to level of education and oral hygiene maintenance, genetic and environmental factors. So the aim of this study was to determine the prevalence of pathologic tooth migration in patients with periodontitis.

## MATERIALS AND METHODS

This cross sectional descriptive study was conducted on patients reporting to Bacha Khan Medical Complex, Dental Department, Mardan from January 2018 to September 2018. A total of 102 participants were selected by non-probability consecutive sampling technique. A detailed explanation of the aim and procedure of the study was given. An informed consent was taken from participants/guardians.

Patients having age from 10 to 70 years, both genders, having chronic or aggressive periodontitis, no medical conditions affecting periodontal health like diabetes etc were included. Patients with characteristic or factors of smoking, oral breathing, bruxism, and patients who were simply suffering from gingivitis (without periodontitis) were excluded.

Both chronic and aggressive Periodontitis was diagnosed in the participants on the basis of clinical examination according to the 1999 American academy of periodontology classification.<sup>9</sup> Clinical attachment loss was measured as the distance between the cement-enamel junction (CEJ) and the base of the pocket. Clinical attachment loss at 6 points of each tooth was calibrated using periodontal probe by hand (mesio-facial, mid-facial, disto-facial, mesio-lingual, mid-lingual, and disto-lingual). All measurements were performed by a periodontist.

Data were entered and analyzed by SPP version 20. Mean and standard deviations were calculated for quantitative variables like age. Frequencies and percentages were calculated for qualitative variable like gender, type of Periodontitis (Chronic or Aggressive), pathologic tooth migration, and feature of pathologic tooth migration (flaring, spacing, rotation, and extrusion). Chi-square test was applied to compare the frequency of PTM among genders, age groups, educational levels and type of periodontitis. P<0.05 was considered significant.

## RESULTS

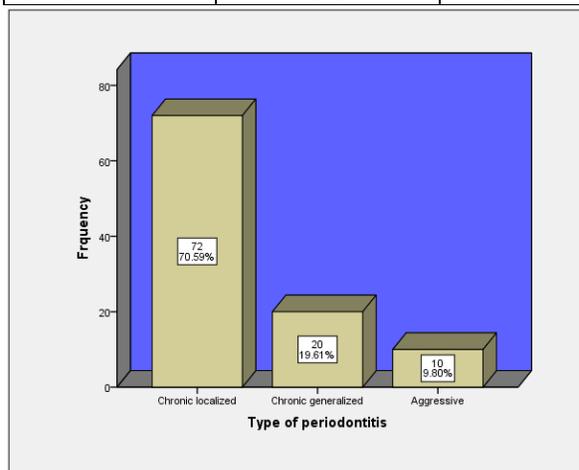
Total participant were 102. The males (n=70, 68.6%) were more than females (n=32, 31.4%). The mean age was 37.58±13.34 years. The age range was from 16 to 60 years.

Most of the participants were illiterate (n=32, 31.4%) followed by matric level of education(n=24, 23.5%). The details are shown in the table 1. Of whole sample

(n=102), the patients affected by chronic localized periodontitis were in highest number (n=72, 70.59%) followed by chronic generalized periodontitis (n=20, 19.61%). The least frequency was found for aggressive periodontitis (n=10, 9.8%). (Fig 1). Among the patients affected by periodontitis the frequency of pathologic tooth migration was 33(32.4%). The detailed frequency for pathologic tooth migration is given in table 2. The most common features of PTM was ‘flaring and spacing’ (n=22, 21.6%), followed by ‘flaring, spacing and rotation’ (n=8, 7.8%) and least was ‘flaring, spacing, rotation and extrusion’ (n=4, 3.9%). (Table 3) All cases of aggressive periodontitis had pathologic tooth migration (PTM). Chronic generalized periodontitis cases (n=14, 70%) were more affected by PTM than chronic localized periodontitis (n=9, 12.5%). These difference were statistically significant (P<0.05). (Table 4) The highest frequency of pathologic tooth migration was found in patients having secondary level of education (63.6%) followed by middle (57.1%). The details are given in the Table 5. Effect of gender on the prevalence of pathologic tooth migration was not statistically significant (P>0.05). The detailed statistics are depicted in table 6. In old ages the frequency of pathologic tooth migration was more than younger ages. These results were statistically significant (P<0.05). Details are given in table 7.

**Table No.1: Frequency of educational level of the participants**

| Educational level | Frequency | Percent |
|-------------------|-----------|---------|
| Illiterate        | 32        | 31.4    |
| Matric            | 24        | 23.5    |
| Secondary         | 11        | 10.8    |
| Bachelor          | 16        | 15.7    |
| Master and above  | 12        | 11.8    |
| Middle            | 7         | 6.9     |
| Total             | 102       | 100     |



**Figure No.1: Distribution of chronic and aggressive periodontitis**

**Table No.2: Frequency of pathologic tooth migration**

| Pathologic tooth migration | Frequency | Percent |
|----------------------------|-----------|---------|
| Yes                        | 33        | 32.4    |
| No                         | 69        | 67.6    |
| Total                      | 102       | 100     |

**Table No.3: Frequency of various features of pathologic tooth migration**

| Features of PTM*                         | Frequency | Percent |
|--|-----------|---------|
| Nil                                      | 68        | 66.7    |
| Flaring and spacing                      | 22        | 21.6    |
| Flaring, spacing and rotation            | 8         | 7.8     |
| Flaring, spacing, rotation and extrusion | 4         | 3.9     |
| Total                                    | 102       | 100     |

\* Pathologic tooth migration

**Table No.4: Frequency of pathologic tooth migration stratified by type of periodontitis**

| Type of periodontitis | Pathologic tooth migration |       |     |       | P-value* |
|-----------------------|----------------------------|-------|-----|-------|----------|
|                       | Yes                        |       | No  |       |          |
|                       | n                          | %     | N   | %     |          |
| Chronic localized     | 9                          | 12.50 | 63  | 87.50 | 0.000    |
| Chronic generalized   | 14                         | 70.0  | 6   | 30.0  |          |
| Aggressive            | 10                         | 100.0 | 0.0 | 0.0   |          |

\*chi square test, P<0.05 is significant

**Table No.5: Frequency of pathologic tooth migration stratified by educational level**

| Educational level | Pathologic tooth migration |      |    |      | P-value* |
|-------------------|----------------------------|------|----|------|----------|
|                   | Yes                        |      | No |      |          |
|                   | N                          | %    | N  | %    |          |
| Illiterate        | 7                          | 21.9 | 25 | 78.1 | 0.002    |
| Primary           | 0                          | 0    | 0  | 0    |          |
| Matric            | 12                         | 50   | 12 | 50   |          |
| Secondary         | 7                          | 63.6 | 4  | 36.4 |          |
| Bachelor          | 3                          | 18.8 | 13 | 81.2 |          |
| Master and above  | 0.00                       | 0.00 | 12 | 100  |          |
| Middle            | 4                          | 57.1 | 3  | 42.9 |          |

\*chi square test, P<0.05 is significant

**Table No.6: Frequency of pathologic tooth migration stratified by genders**

| Gender | Pathologic tooth migration |       |    |       | P-value* |
|--------|----------------------------|-------|----|-------|----------|
|        | Yes                        |       | No |       |          |
|        | N                          | %     | n  | %     |          |
| Male   | 19                         | 27.10 | 51 | 72.90 | 0.096    |
| Female | 14                         | 43.80 | 18 | 56.20 |          |

\*chi square test, P<0.05 is significant

**Table No.7: Frequency of pathologic tooth migration stratified by age groups**

| Age group | Pathologic tooth migration |       |    |       | P-value* |
|-----------|----------------------------|-------|----|-------|----------|
|           | Yes                        |       | No |       |          |
|           | N                          | %     | n  | %     |          |
| 20-10     | 4                          | 25.00 | 12 | 75.00 | 0.016    |
| 21-30     | 4                          | 18.20 | 18 | 81.80 |          |
| 31-40     | 6                          | 21.40 | 22 | 78.60 |          |
| 41-50     | 10                         | 45.50 | 12 | 54.50 |          |
| 51-60     | 9                          | 64.30 | 5  | 35.70 |          |

\*chi square test, P<0.05 is significant

## DISCUSSION

This study was aimed to determine the prevalence of pathologic tooth migration in patients affected by periodontitis. Two factors affect tooth position; healthy normal height of periodontium, and the exerting forces on dentition. In case of imbalance among these factors lead to loss of maintenance of physiological tooth position and as a consequence the pathologic tooth migration.<sup>10</sup> Previous literature showed that the PTM prevalence in patients affected by periodontitis is 30.03–55.8%.<sup>8</sup> Disruption of balance for tooth position can happen by several factors such as loss of periodontal attachment, pressure from inflamed tissue, occlusal factors, un-replaced missing posterior teeth, ectopic attachment of frenum, and oral habits such as tongue thrust, digit sucking, playing with wind instruments.<sup>11</sup>

In this study the males were than females. This may due to lack of awareness and less education among females than males and hence less presentation for dental care. In contrast to our study, the females were more than males in Indian research by Moka et al.<sup>12</sup> This difference in gender ratio may be due to level of awareness and education in females.

Our findings showed that most of the participants were illiterate and had low level of education. We selected only those patients affected by periodontitis, so their periodontal loss may due to lack of awareness for oral hygiene because of low literacy among these participants. Education have prime role in maintenance of oral health.<sup>13</sup>

Our results found that most common periodontitis was chronic localized followed by chronic generalized and least one was aggressive periodontitis. Previous study showed that generalized periodontitis is higher in frequency than localized.<sup>14</sup> However, their study was on elderly population and on general population. On other hand the current study included only patients affected by periodontitis.

The current results showed that the prevalence of pathologic tooth migration was 32.4%. This shows that every third patients affected by periodontitis have PTM. Khorshidi et al.<sup>3</sup> in a cross-sectional epidemiological study determined the prevalence of pathologic tooth

migration among patients with periodontitis and reported that pathologic migration prevalence was 11.4%. This difference in results may due to sample size, educational level of the participants, genetic and environmental variation. Towfighi et al.<sup>8</sup> conducted a research on pathologic migration of anterior teeth in patients with moderate to severe periodontitis and found the prevalence of PTM to 30.03%. These results are in consistent with the current findings.

The features of PTM in our study were flaring, spacing, rotation and extrusion. Flaring and spacing was the most common feature of PTM. Similar results were found by others.<sup>8</sup>

The present study found that the frequency of PTM was more in aggressive periodontitis as compared to chronic periodontitis. In aggressive periodontitis the attachment loss is more aggressive and hence more loss of "stabilizing effect" of periodontal ligament. To our knowledge no such comparison is available in literature.

Our results found that low literacy was not associated with increased frequency of pathologic tooth migration. It may be due the fact we selected all participants having periodontitis; education have a role in maintenance of oral hygiene only. Gender was not a contributory factor for pathologic tooth migration in our study. Khorshidi et al.<sup>3</sup> also found a similar frequency of pathologic tooth migration in both genders.

In our study the age was a significant factor for pathologic tooth migration. The reason for this may that in old ages there is more severe periodontitis and hence more pathologic tooth migration. Khorshidi et al.<sup>3</sup> reported that PTM is more in severe periodontitis as compared to mild and moderate.

## CONCLUSION

Our findings showed that prevalence of pathologic tooth migration was 32.4% in patients having periodontitis. PTM was more in aggressive periodontitis and in old ages.

### Author's Contribution:

Concept & Design of Study: Fareedullah Shan  
 Drafting: Muhammad Naeem  
 Data Analysis: Raham Zaman  
 Revisiting Critically: Fareedullah Shan,  
 Muhammad Naeem  
 Final Approval of version: Fareedullah Shan

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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