

## Pathologic Tooth Migration of Anterior Teeth in Patients with Aggressive Periodontitis

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### Abstract

**Introduction:** Pathologic tooth migration (PTM) is commonly associated with aggressive periodontitis and is often the motivation for patients to seek periodontal therapy. The aim of this cross-sectional epidemiological study was to determine the prevalence of PTM among patients with aggressive periodontitis and to assess the correlation and degree of association between PTM and periodontal tissue destruction.

**Materials and Methods:** 37 patients with aggressive periodontitis (444 anterior teeth) (31 females, 7 males; mean age = 24, 8 years; age range: 15-54 years) were studied. Mean and standard deviations were calculated and subjected to t-test of student and Chi-square test. The level of statistical significance was set at  $P < 0.05$ .

**Results and Discussion:** The prevalence of PTM was 81.1%, with a percentage of tooth involvement of 29.7%. A positive correlation was observed between PTM, Clinical attachment loss (CAL) ( $p = 0.01$ ) and the severity of CAL ( $p = 0.016$ ). Tooth extrusion and combined forms were associated with higher CAL ( $p < 10^{-4}$ ).

**Conclusion:** The positive correlation between PTM and periodontal tissue destruction may suggest that PTM is more prevalent in more advanced stages of aggressive periodontitis. Hence, diagnosis and treatment of aggressive periodontitis in the early stage may reduce the occurrence of PTM. Consequently, there will be no need for time consuming and complex multidisciplinary therapeutics.

**Keywords:** Epidemiology; Tooth migration; Aggressive periodontitis; Prevalence

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### Abbreviations

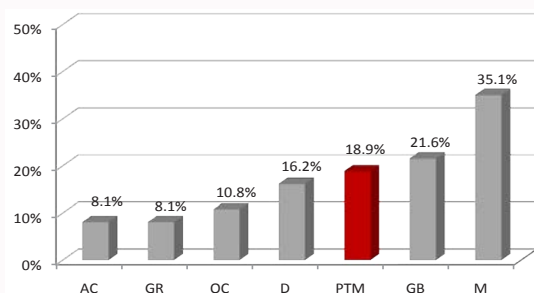
PTM: Pathologic Tooth Migration; CAL: Clinical Attachment Loss; CEJ: Cementoenamel Junction

### Introduction

Pathologic tooth migration (PTM) is commonly associated with aggressive periodontitis and is often the motivation for patients to seek periodontal therapy [1]. These dental displacements may affect them aesthetically as well as functionally and emotionally. PTM is defined as a change in the position of a tooth that occurs when the balance of forces, which maintains it in its normal position, was broken [2]. The aim of this study is to determine the prevalence of PTM in the anterior area in patients with aggressive periodontitis and to assess their correlation to periodontal tissue destruction.

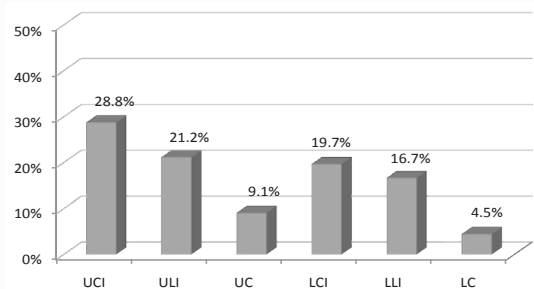
### Materials and Methods

Our cross-sectional epidemiological study involved all patients who consulted the clinic of Periodontology in Casablanca, with an aggressive periodontitis as a positive diagnosis according to the classification of periodontal diseases of the American Academy of Periodontology (1999) [3]. The study protocol was reviewed and approved by the Pedagogic Commission and Research Commission of the faculty of dentistry, University of Hassan II, Casablanca, Morocco. All the participants were informed about the study, and only consenting patients participated in the study. During the investigation period, 113 patients were admitted to our clinic, 37 of them met the inclusion criteria (444 anterior teeth). It was excluded from our study the factors other than the periodontal condition, such as skeletal classes II and III, anterior tooth loss and previous periodontal treatment. Clinical attachment loss (CAL) was measured as the distance between the



**Figure 1:** Chief of complaint prevalence.

\*AC: Addressed by a Colleague; GR: Gingival Recession; OC: Oral Consultation; D: Dolor; PTM: Pathologic Tooth Migration; GB: Gingival Bleeding; M: Mobility.



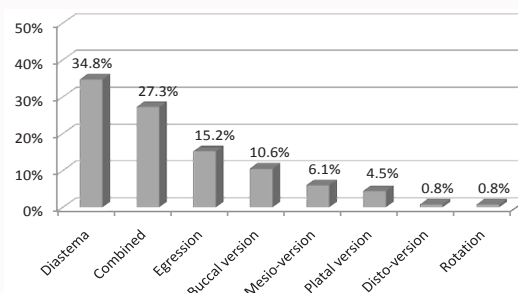
**Figure 2:** Pathologic tooth migration prevalence by tooth category.

\*UCI: Upper Central Incisor; ULI: Upper Lateral Incisor; UC: Upper Canine; LCI: Lower Central Incisor; LLI: Lower Lateral Incisor; LC: Lower Canine

cementoamel junction (CEJ) and the base of the pocket. CAL at 6 points of each tooth was measured by the periodontal probe manually (mesiofacial, midfacial, distofacial, mesiolingual, midlingual, and distolingual). Data were analyzed using Systat 2000 and Epi Info. Mean and standard deviations were calculated and subjected to t-test of student and Chi-square test. The level of statistical significance was set at  $P < 0.05$ .

## Results and Discussion

Among the 37 patients examined (31 females, 7 males; mean age = 24,8 years; age range: 15-54 years) (sex ratio F / M of 4.3), 30 had PTM (81.1%), with a percentage of tooth involvement of 29.7%. For 18.9% of patients, PTM was the most common chief of complaint (Figure 1). The results showed that PTM was significantly more frequent in the maxilla than in the mandible (OR Max / Mand = 1.7) ( $p = 0.013$ ). At the tooth level, the presence of PTM was significantly more likely in the incisors than in the canines (OR CI/LI = 1.5, OR LI/C = 3.7, OR CI/C = 5.5,  $p < 10^{-4}$ ) (Figure 2). Regarding the forms of tooth migration, diastemas and combined forms were the most frequent (Figure 3). A statistically significant difference was observed between tooth mobility index (Muhlemann 1954) [4] and PTM ( $p < 10^{-4}$ ). The tooth mobility was higher in the cases of mesio-version, whereas it was lower in cases of diastema. A positive correlation was reported between the gingival recession depth and the combined forms of PTM; combined forms have deep recessions than other forms ( $p = 0.022$  and  $p = 0.001$ , respectively). However, a positive correlation was observed between PTM, CAL ( $p = 0.01$ ) and the severity of CAL ( $p = 0.016$ ). Tooth extrusion and combined forms were associated with higher CAL ( $p < 10^{-4}$ ). The assessment of the association between CAL and the direction of migration revealed that:



**Figure 3:** Distribution of the anterior teeth according to the type of migration.

- The mesio-version was characterized by significant CAL on the distal site.
- The palatal/lingual version was accompanied by mild CAL located preferentially on the buccal and distal sites.
- Diastema was the least influenced by CAL.

A significant difference was showed between bone loss and PTM ( $p < 10^{-4}$ ). Indeed, deep and advanced bone losses were observed in teeth with PTM. The association of PTM with occlusal factors and oral habits such as bruxism, tooth clenching, lingual interposition or objects nibbling showed a significant difference ( $p = 0.009$ ). In addition, posterior teeth loss was positively correlated ( $p = 0.011$ ) to PTM. This study assessed the prevalence of PTM of anterior teeth in patients with aggressive periodontitis and the results showed a prevalence of 81.1%, which remains very high, compared to the results found in the literature (33.03%, 55.8%, 11,14%) (5,6,7). Several hypotheses can explain this difference, in particular the difference of clinical forms of periodontitis assessed in these studies, their severity or even the moment of diagnosis. In addition, our study included only patients with aggressive periodontitis, which make it distinguished from previous studies. Among 444 anterior teeth examined, 29.7% have PTM. On average, each patient has 3-4 teeth affected by the PTM. This demonstrated that although PTM is not systematic, it is a frequent clinical sign in patients with aggressive periodontitis. The study by Costa et al [8] conducted on patients with chronic periodontitis reported a similar prevalence of PTM (29.9%). For 18.9% of patients, PTM was the most common chief of complaint. Demetriou et al [9] gave questionnaires to 330 periodontal patients asking them about their chief of complaint. PTM was listed by 36.96% of the patients. However, Brunsvold et al [10] found only 9.4% of a group of periodontal patients included PTM as part of their chief of complaint. Regarding the prevalence of PTM forms, it appears that the distribution is random and the data from the literature are very divergent [1,9,10]. Based on the results of the present study, it may be suggested that teeth with PTM are more mobile and have greater clinical attachment and bone losses than those without PTM. The positive correlation between PTM and periodontal tissue destruction found in our study was consistent with other previous studies [6,11-14]. Khorshidi et al [7] reported in their study that the highest prevalence of PTM was seen in the severe form of chronic and aggressive periodontitis. A positive correlation, through weak, between increased tooth rotation and greater bone loss was found also by Peretz and Machtei [13]. Martinez-Canut et al [6] assessed the factors associated with PTM in 852 private practice periodontal patients. The authors concluded that no single factor was clearly associated with PTM, but the main factor was bone loss. The association of PTM with occlusal factors and oral habits was reported

by several authors; which is in perfect agreement with the results found in our study. In addition, as posterior teeth loss increased, the probability of PTM increased [11,15]. Even though, several studies reported that the teeth with PTM were displaced in the opposite direction to the deepest pocket due to the granulation tissue [16-18], this has not been proved by our results.

## Conclusion

The present study showed a high prevalence of PTM in the anterior teeth in patients with aggressive periodontitis. The positive correlation between PTM and periodontal tissue destruction may suggest that PTM is more prevalent in more advanced stages of aggressive periodontitis. Hence, diagnosis and treatment of aggressive periodontitis in the early stage may reduce the occurrence of PTM. Consequently, there will be no need for time consuming and complex multidisciplinary therapeutics.

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