

# Correctional repositioning of pathologically migrated maxillary premolars through periodontal therapy

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## ABSTRACT

Pathological tooth migration (PTM) is the displacement of teeth as a balance among forces that maintain the position are disrupted. It is a common occurrence in a patient suffering from periodontitis. Its treatment includes periodontal therapy followed by a complex interdisciplinary approach to rectify the tooth position. However, it has also been observed that in certain cases periodontal therapy alone can cause a corrective repositioning of the teeth leading to a closure or a reduction in the displacement.

Present case report depicts a nineteen-year-old, healthy nonsmoker male patient with generalized Stage IV Grade C periodontitis. Deep periodontal pockets in #24 and #25 were observed along with a pathological migration of 1.6mm. The patient underwent conventional periodontal surgical intervention. It was noted that the therapy resulted in a reduction of the gap from 1.6 to 0.2mm and distal migration of #24 and a bucco-mesial migration of #25 in the course of one year of follow up.

Thus, an early diagnosis and treatment of PTM through the restoration of periodontal health at the right time can cause a corrective repositioning of the teeth in a predictable direction.

## Keywords

Periodontitis, bicusps, pathologic tooth migration, root Planing, spontaneous reposition.

## INTRODUCTION

Periodontitis is one of the most common oral diseases with an estimated prevalence of 50% in the adult population,<sup>1</sup> while the global burden of severe periodontitis is observed to be at 11.2% approximately.<sup>2</sup>

The disease culminates in loss of clinical attachment and the supporting bone which may predispose the teeth to move from their positions. Pathologic migration refers to tooth displacement that results when the balance among the factors that maintain a physiologic tooth position is disturbed by periodontal disease.<sup>3</sup>

The primary forces that maintain a stable position of the tooth are the intrinsic forces generated by opposing resting pressure of tongue and lip, the extrinsic forces caused by various habits, forces of dental occlusion such as the occlusal contact or inclinations and the force from the periodontal ligament.<sup>4</sup> In periodontitis the anomaly in pathological migration of teeth (PTM) resides with the weakened state of the periodontium.

In studies conducted by Martinez- Canut et al.<sup>5</sup> and Towfighi et al.<sup>6</sup> it was found that incidence and proportion of PTM rise with an increase in the severity of the periodontal disease. In cases of moderate to severe periodontitis a prevalence of 30.03% was observed and an association with incremental bone loss, tooth loss, gingival inflammation, and attachment loss was ascertained. PTM may present itself as facial flaring, a diastema, rotation, extrusion or tipping.

The progressive movement of teeth in abnormal positions with a resultant unpleasant change in esthetics compels the patient to seek dental therapy, which can involve a complex multidisciplinary approach. However, it has been recognized that developing mild to moderate pathological movements in the maxillary anterior may respond with a corrective repositioning after the conventional periodontal therapy alone. The present case report is an illustrative depiction of the possibility of spontaneous repositioning of PTM even in maxillary premolars after periodontal surgical therapy.

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## Author contributions:

1. **Karuna Joshi:** Principal author, clinical case treatment, data collection, scientific writing - 50%
2. **Chandrababu S Baiju:** Co-author, conceptualisation and design manuscript, proof reading - 25%
3. **Sumidha Bansal:** Co-author, scientific writing, revision - 25%

## Footnotes:

- \*mm- millimeter
- #11- maxillary right central incisor
- #21- maxillary left central incisor
- #23- maxillary left canine
- #24- maxillary left 1<sup>st</sup> premolar
- #25- maxillary left 2<sup>nd</sup> premolar

## CASE REPORT

A nineteen-year-old male patient reported to the Department of Periodontology, with the main complaint of bleeding gums and perceivable rotation in upper front teeth. The patient was a systemically healthy nonsmoker, while the medical and familial history was found to be non-contributory. The intra-oral examination on the 1<sup>st</sup> visit revealed an insufficient oral hygiene maintenance with an abundance of supra and subgingival calculus (Fig.1A). Therefore, before the initial recording of periodontal status, the patient was educated regarding the etiology of periodontal disease, was subjected to supragingival scaling and provided with instructions for the measures of adequate plaque control.

The initial periodontal inspection was conducted on second visit. On examination, the case was diagnosed as generalized Stage IV Grade C periodontitis. It was noted that the gingiva was soft and edematous with a tendency to bleed when probed and exhibited a presence of periodontal pocket in 73% of the sites in the range of 5 to 9 mm. A periodontal pocket depth of 9mm distally and 7mm mesially was found at #24 and #25 respectively. While there was an absence of mobility with regards to the same teeth, a presence of pathological migration between them was observed.

The maxillary central incisors were non-vital, presented with severe loss of attachment, bone loss and grade III mobility in conjunction with the rotation of #11 and flaring of #21 further creating an occlusal hindrance. The individual periodontal prognosis for #11 and #21 was considered hopeless, however, the patient refused to undergo extraction before the completion of the periodontal intervention.

The patient was subjected to a rigorous regime of quadrant wise scaling and root planing. After the completion of non-surgical mechanical therapy (Fig. 1B), the patient was recalled for periodontal re-evaluation after 1 month and the diagnostic cast was made. The sites that displayed no further improvement and presence of deep periodontal pockets and an absence of further improvement were considered for surgical interventions. Open flap debridement with meticulous degranulation, followed by interrupted sutures was performed. Periodontal dressings were placed and post-operative instruction was provided.



Figure 1A. Oral hygiene status as seen during the 1<sup>st</sup> visit.



Figure 1B. Status after the completion of non-surgical therapy.



Figure 1C. Completion of periodontal therapy and prosthetic rehabilitation.

The patient was recalled after 7 days for the removal of sutures. 6 months post the completion of periodontal surgeries #11 and #21 were extracted followed by immediate placement of bi-cortical implants in the Department of Prosthodontics (Fig. 1C).



Fig. 2A



Fig. 2B

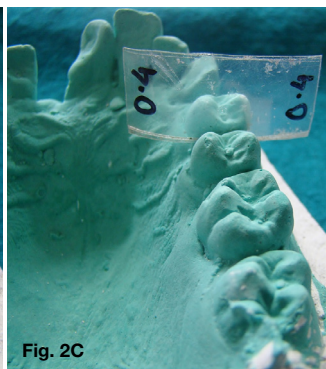


Fig. 2C

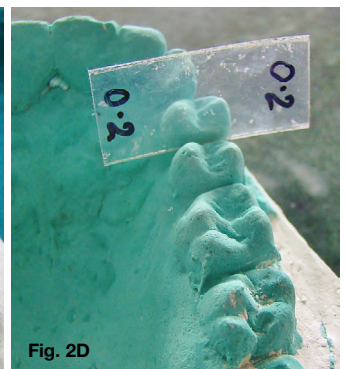


Fig. 2D

Figure 2A. A diastema of 1.6mm as measured by gauge.

Figure 2B. Gap closure from 1.6 to 0.5mm in 1 month, leading to a reduction of diastema by 1.1 mm.

Figure 2C. A remaining gap of 0.4mm, 6 months after the therapy.

Figure 2D. Diastema reduced to 0.2mm, 1 year post the therapy.



### Clinical outcome

The patient was recalled after 1 month, 3 months, and 6 months and 1 year after the periodontal surgical interventions in which the oral hygiene was checked, maintained and instructions were reinforced. The diagnostic cast was fabricated at 1month, 6 months and 1-year recall visits.

On the dental cast and photographic records, it was retrospectively noted that #24 and #25 depicted a measure of pathological migration of 1.6mm [as measured by standardized cello tape gauges<sup>7</sup>] between the two teeth (Fig. 2A) along with a disto-palatal placement of #25 (Fig. 3A).

One month after the surgical intervention, a reduction in diastema from 1.6 to 0.5 mm (Fig. 2B) in conjunction with distal migration of #24 and a bucco-mesial migration of #25 was noted (Fig. 3B). Six months after the treatment, repositioning culminated in minor correction further reducing the gap to 0.4mm (Fig. 2C). A recall visit after one year depicted a closure of 0.2mm between #24 and #25 (Fig. 2D) and change in the occlusal relationship of bicuspids.



Fig. 3A

**Figure 3A.** A disto-palatal placement of teeth.



Fig. 3B

**Figure 3B.** Corrective occlusal repositioning after periodontal therapy.

A corresponding visible increase in the gap between the canine and 1<sup>st</sup> premolar was also noted from the initial of 0.6mm to 0.9mm after one month, 1mm after six months and 1.2mm one year after periodontal intervention.

### DISCUSSION

Pathological migration of teeth can be multifactorial but its presence has consistently shown a positive correlation with loss of attachment, alveolar bone loss and gingival inflammation.<sup>5,6,8</sup> According to the equilibrium theory tooth in dentition remains in position of stability when the natural environmental forces acting on the crown produce a net resultant as zero.<sup>9</sup> However, periodontal disease causes a weakening of attachment apparatus which may change the capacity for dissipation of applied external forces causing the tooth to migrate. It has been observed that reestablishment of periodontal health can result in a corrective movement of light to moderately pathologically migrated single-rooted teeth.

The present case is a reporting on the spontaneous correction of maxillary premolars. In this it was observed that during a course of one year, restoration of periodontal health of the premolars precipitated into a gap reduction from 1.6mm to 0.2mm. A correction of 1.1mm occurred one month post the surgical intervention and of 0.1mm after six months and 0.3mm in the course of the next six months. A similar observation has been reported by Gaumet et al.<sup>10</sup> where they noted that a considerable amount of tooth repositioning occurred during the initial phase of the therapy. Further it was proposed that fibroblastic wound contraction during healing after periodontal treatment can generate enough forces that can lead to a corrective repositioning of the tooth.

It was also noted that after periodontal therapy, the premolars #24 and #25 moved in a distal and mesiobuccal direction respectively with a corresponding increase in the gap between #23 and #24. This observation can be attributed to the opinion that pathological migration of teeth usually occurs in a direction opposite to the deepest pocket due to the expansive pressure of granulation tissue.<sup>11</sup> Consequently, upon establishment of health and reduction of granulomatous tissue, the teeth move back in the direction of deepest probing depth.

The phenomenon of spontaneous repositioning of pathologically migrated teeth after the periodontal therapy has been known for quite some time. The few studies and reports that have been conducted on this have mainly focused on the repositioning of single rooted anterior teeth, while no reporting on the effect or movement of teeth adjacent to the pathologically migrated teeth has been done. The present report indicates that a prompt restoration of periodontal health in nascent cases of PTM can generate enough forces to induce a repositioning predictably. It depicts a possibility of movement even in premolars and also reports on the corresponding movement of adjacent teeth leading to an adjustment of space with an overall increased occlusal harmony.

### Conflict of interest

Authors declare no conflict of interest.

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