



## Unorthodox Change in the Angulation of an Impacted Mandibular Third Molar: A Rare Case Report

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### ABSTRACT

**Background:** Third molars are the most frequently impacted teeth, and extensive research has been carried out delineating their impaction prevalence, classification, and treatment approaches. We present a rare case of an impacted mandibular third molar which went through unprecedented changes in angulation over an eight-year time span with no particular pathologic, traumatic, or therapeutic interference.

**Case presentation:** A 22-year-old female presented with an asymptomatic mesioangular impacted lower right third molar. Upon the patient's next visit (eight years later), the newly obtained panoramic radiograph showed that the tooth's crown has angulated towards the roots of the adjacent tooth, rendering the impaction to be horizontal rather than mesioangular. Given the changing position and angulation, it was decided to surgically extract the tooth.

**Conclusion:** Early extraction of impacted teeth in patients that are candidates for such treatment in terms of age and medical conditions is recommended since changes in the angulation of impacted teeth could make the procedure more difficult.

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## Introduction:

Impaction of mandibular third molars is a common condition, and their extraction is the most commonly performed procedure in oral and maxillofacial surgery.<sup>(1)</sup> The prevalence of impaction of these teeth ranges from 16.7% to 68.6% based on research data from different local regions.<sup>(2)</sup>

Two main classifications have been used to describe impacted third molars including Pell and Gregory's classification and Winter's classification.<sup>(3)</sup> In the Pell and Gregory's classification, impacted third molars are in "level A" if the occlusal surface of the impacted tooth is at the same level as the occlusal plane of the second premolar. These teeth are in "level B" if the occlusal plane is between the occlusal plane and the cervical line of the adjacent tooth. "Level C" is when the occlusal plane of the impacted third molar is below the aforementioned line. Based on the same classification, impacted teeth can be described in class I, II, or III based on the relative position of the impacted tooth and the anterior border of the ramus.<sup>(4)</sup> Class I is labeled to a tooth located mesial to the anterior border of the ramus. Class II is when the tooth is half covered, and class III is when the crown is fully covered by the anterior border of the ramus.<sup>(4)</sup>

The Winter's classification, on the other hand, delineates the inclination of impacted third molars with regards to the long axis of the second molar.<sup>(3)</sup> According to the Winter's classification, an impacted third molar can be mesioangular (Ma), distoangular (Da), vertical (V), horizontal (H), or transverse (T).<sup>(3)</sup>

A change in the position or the angulation of a third molar is common.<sup>(5)</sup> However, the way some impacted mandibular third molars finally erupt after follow-up as well as the patterns to which their position change have not been fully explained.<sup>(6)</sup> It is believed that lower third molars start eruption in a horizontal angulation, and as the tooth develops and the jaw grows, the angulation changes from horizontal to mesioangular and eventually to vertical.<sup>(7)</sup>

The average eruption age of third molars is 20 years, although some mandibular third mo-

lars may not completely erupt until the age of 25 years.<sup>(7)</sup>

In this paper, we present a rare case of a mesioangular impacted mandibular third molar, with its position becoming more horizontal and apical during an eight-year time span with no known causes.

## Case Presentation

A 22-year-old female presented to the oral and maxillofacial surgery clinic at Bu-Ali Hospital, Tehran, Iran, with an asymptomatic impacted lower right third molar. After clinical and radiological examinations (Figures 1 and 2), the impaction was classified as a Pell and Gregory level B class II, and as mesioangular according to the Winter's classification. Since there were no signs of pathology in the follicle and no impacts on the adjacent tooth, it was decided to put the patient on a twice-a-year follow-up program by obtaining panoramic radiographs. The patient, however, did not conform to the recommended plan and did not return for another visit for eight years. Upon the patient's next visit, she was examined clinically and radiologically through obtaining a panoramic radiograph (Figures 3 and 4). In the newly obtained panoramic radiograph, the tooth's crown seemed to have angulated towards the roots of the adjacent tooth, rendering the impaction to be horizontal rather than mesioangular. The position of the tooth had changed to a Pell and Gregory level C class III. The tooth was still asymptomatic, and no pathologic, traumatic, or therapeutic causes for this pattern could be identified, neither clinically nor radiographically. Given the changing position and angulation of the tooth, it was decided for the tooth to be surgically extracted.



**Figure 1: Primary panoramic radiograph of the patient obtained at her first visit (eight years previously)**



**Figure 2: Close-up view of the patient's panoramic radiograph at her first visit, depicting tooth angulation and proximity to the inferior alveolar canal (IAC)**



**Figure 3: Preoperative panoramic radiograph of the same patient, eight years after the first visit**



**Figure 4: Close-up view of the patient's second panoramic radiograph, showing a significant clockwise rotation of the impacted tooth**

## Discussion:

Mesioangular impaction has been shown to be the most common form of impaction in lower third molars by many previous studies.<sup>(2,4)</sup> The primary reason for mandibular third molars to become impacted is the failure in rotation from the mesioangular to the vertical position.<sup>(7)</sup> Another important factor is the inadequacy of space in the alveolar process, mesial to the anterior border of the ramus, not being able to accommodate the mesiodistal dimension of teeth.<sup>(7)</sup> As explained earlier, as the jaw expands anteroposteriorly with age, mesioangular impacted teeth are expected to acquire a more vertical position, even being capable of erupting if enough space is available. In the present case, however, not only the change in angulation did not go as anticipated, it took a reverse course, rotating the tooth to a more horizontal position.

Several other studies have assessed the changes of the position and the angulation of impacted teeth over time.<sup>(5,6,8)</sup> Nance et al showed that 26% of impacted mandibular third molars become subject to such changes.<sup>(5)</sup> In their study on 237 patients, one out of three vertical/distal maxillary and mandibular impacted third molars and 11% of mesial/horizontal lower third molars erupted to the occlusal plane during follow-up from the baseline.<sup>(5)</sup> Also, Hattab et al showed that one of the impacted mandibular third molars, originally presented at 35 degrees or more, became upright; even these teeth had an average decrease of 12 degrees in angulation.<sup>(6)</sup> These studies provide more evidence about how one can expect impacted lower third molars to rotate in a counterclockwise fashion toward the occlusal plane, in contrast to what we have recorded in the present case.

Many theories have tried to explain the exact mechanism of tooth eruption, and although a unanimous verdict on the exact mechanism has not yet been reached, most authors agree that tooth eruption is influenced by the following

three factors: 1) space in the path of eruption, 2) lift or pressure from below, 3) adaptability of the periodontal ligament (PDL).<sup>(8,9)</sup> Hence, one can conclude that if obstacles in the eruption path can be eliminated for a tooth with an intact PDL and root system, the eruption will proceed as expected. Evidence for this statement is provided by studies on the effect of coronectomy of impacted molars on the occlusal migration of the remaining roots.<sup>(10,11)</sup> This could partly help explain the unorthodox change in angulation that we witnessed in this case. We can hypothesize that the ongoing passive eruption of the adjacent second molar has resulted in a different form of contact between the impacted tooth and the second molar and between the impacted tooth and the surrounding bony structure. At the same time, the intact root system and the PDL around the tooth have guided the eruption of the tooth in a path with the least resistance, which happened to be the one requiring a clockwise rotation of the impacted tooth.

### Conclusion

This case provides evidence for the benefits of early extraction of impacted teeth in patients that are candidates for such treatment in terms of age and medical conditions as changes in the angulation of impacted teeth could make the procedure more arduous.

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