# Removal of Horizontally Impacted Mandibular Third Molar through Buccal Plate Extirpation and Replacement - An Evaluative Study

#### Abstract

Background: An impacted lower wisdom tooth is a common condition encountered in oral surgery. A horizontally impacted lower third molar is associated with more bone removal compared to mesioangular and distoangular impactions. Objective: The goal was to minimize overall bone removal without compromising the function of the inferior alveolar nerve. Materials and Methods: Twenty-five patients, between 18 and 46 years old, participated in the study-20 females and five males. All patients attended a private clinic with the intention of having their impacted teeth removed. A portion of the buccal cortex, with specific dimensions, was removed from a position lateral to the horizontally impacted wisdom tooth. This was preserved in a sterile wet pack and refixed after tooth removal to minimize bone loss. Results: A majority of cases involved females (80%) and males (20%). The primary assessment criterion was the viability of the buccal cortex and the presence of any associated complications. One male patient was found to have lost the buccal cortex (accounting for 4% of cases). Two patients complained of temporary paraesthesia, which resolved within 4 months. Statistical Analysis: The data were collected and compiled in Microsoft Excel. The Mann-Whitney U test for nonparametric data was used to analyse descriptive data. The level of statistical significance was set at P < 0.05. Conclusion: The removal of a small part of the buccal cortex lateral to a horizontally impacted lower third molar is highly predictable when conducted with precision. This is particularly true when the tissue is secured properly, which can subsequently reduce the amount of bone removed.

**Keywords:** Asymptomatic inferior alveolar nerve paraesthesia, postoperative infection, wisdom tooth horizontal impaction

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# Introduction

Mandibular wisdom teeth typically erupt between the ages of 17 and 24. Those that fail to emerge by this age are considered impacted. These teeth are referred to as 'wisdom' because their eruption usually coincides with the age at which individuals are deemed wiser and more mature.<sup>[1,2]</sup> Interestingly, the wisdom tooth is the most impacted in humans. According to Winter's classification, the most prevalent type of impaction is mesioangular, occurring in 41.8% of cases. Pell and Gregory's classification. however. suggests that Class IIB impaction is the most common, accounting for 26.4% of cases.<sup>[3,4]</sup> There are clear indications for the removal partially erupted teeth including of pericoronitis, root resorption of the lower second molar, and cystic lesions. However, consensus on the surgical removal of

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The main point of contention is the risk of complications associated with surgical intervention, such as alveolar osteitis, postoperative infection, mandibular fractures, and temporary or permanent damage to the lingual and/or inferior alveolar nerve.<sup>[10]</sup> Therefore, a careful risk-benefit analysis is mandatory when considering such interventions. Horizontally impacted wisdom teeth are particularly challenging to remove

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due to the significant amount of bone cover, unfavourable angulation, and proximity to the inferior alveolar nerve.<sup>[11]</sup> The objective of this study is to remove as little bone as possible without compromising the function of the inferior alveolar nerve, by using the removal and subsequent fixation of the buccal cortex overlying the impacted lower third molar.

# **Materials and Methods**

This retrospective study was conducted at the College of Dentistry's private practice in the Sader Teaching Hospital in Basrah, Iraq, between the years October 2020 and October 2024. A total of 25 patients, both female and male, aged above 18 with a horizontal impaction of the lower third molar were included in this research. Patients with impaction associated with pathologies like cysts or tumours, or those with systemic conditions that precluded surgery, were excluded. The inclusion criteria included patients with horizontally impacted lower third molars, over 18 years of age, attending a private outpatient clinic in Basrah. The exclusion criteria included patients with any medical condition that prevents surgery (such as coagulopathy and uncontrolled diabetes), frail elderly patients, and impacted teeth with other pathologies like cysts or tumours. Criteria for evaluating the reliability of such interventions included survival of the buccal cortex and maintaining integrity of the inferior alveolar nerve.

Twenty-five patients, aged between 18 and 46 years, participated in the study. The group comprised 20 females and five males, all of whom attended a private clinic in Basrah, Iraq, seeking removal of their impacted teeth due to potential future complications. Some of these patients were referred by orthodontists before proceeding with orthodontic treatment. All patients were thoroughly informed about the benefits and potential complications of the procedure. This briefing included risks such as mandibular fracture, injury to the inferior alveolar nerve (which could be either temporary or permanent), swelling, pain, and trismus. They were then referred for a panoramic radiograph for further assessment [Figure 1].<sup>[12]</sup>

The typical surgical set used for any impaction includes tools such as a periosteal elevator, a blade no. 15, a scalpel, 0.3 nylon suture, a fissure bur, a Langenbeck retractor, a suction system, a needle holder, tissue forceps, fine osteotomes, a mallet, a centrifuge, glass tubes for blood collection, a disposable syringe for the aspiration of blood, and others for irrigation and normal saline. A Piezo device from the session was used for making the buccal plate osteotomy, and a surgical handpiece was utilized for tooth sectioning before delivery.

This procedure is performed under local anaesthesia, specifically 2% lidocaine with 1:100,000 epinephrine, through an inferior alveolar nerve block with infiltration of the lingual and buccal tissue. We use a two-sided flap

with an extension on the external oblique ridge to ensure adequate exposure of the buccal bone at the proposed site of impaction. The initial osteotomy is performed near the alveolar crest, with a length ranging between 1.5 cm-2 cm, and is followed by two vertical osteotomies at both ends of this initial osteotomy. The lower osteotomy lies about 1.5 cm from the superior one, forming a window leading directly to the impacted tooth, as illustrated in Figures 2 and 3. We used a fine osteotome and mallet to separate the buccal plate, which we then preserved in a saline wet pack. We sectioned the exposed tooth with a finely fissured bur under copious irrigation. After dividing the crown from the roots, the two roots were separated into an upper and lower section and were removed with a chisel elevator. Once removed, any remnants of the tooth follicle in the empty cavity were cleaned out and the cavity was irrigated with saline. We prepared platelet-rich fibrin from the patient's own blood, aspirating 20 ml from the median cubital vein and then centrifuging it at 2,500 rpm for 10 min [Figure 4]. The bone substitute and the platelet-rich fibrin were mixed and used to fill the emptied space. We then replaced and secured the buccal cortex using either one-as was the case in one instance-or two screws, and the wound was closed without tension. Patients were prescribed amoxicillin-plus-clavulanic acid, 625 mg three times daily; acetaminophen, 1000 mg three times daily; and ibuprofen, 400 mg as needed. After 3 months, a follow-up panoramic view was taken and the screws were removed by making a small incision, and the cortex was checked for engraftment. None of the patients exhibited signs or symptoms of an inferior alveolar nerve injury, such as anaesthesia or paraesthesia. One patient experienced a loss of the buccal cortex, which was in turn removed during the time of the second surgery [Figure 5].<sup>[13]</sup>

# Statistical analysis

The data was gathered and organized in Microsoft Excel. After suitable coding, this data was introduced into statistical software and analysed statistically using SPSS version 26.0 (Statistical Package for the Social Sciences, IBM Corp.) (IBM Corp., New York, USA). Descriptive statistics were implemented. The Mann-Whitney U test



Figure 1: Panoramic image of a horizontally impacted right lower third molar

for nonparametric data was applied to analyse descriptive data. Associations between Oral Health-related Quality of Life (OHRQoL) and independent predictors were analysed employing the loglinear Poisson model regression method. Multivariate logistic regression analysis was performed and the odds ratio (OR) was computed for the association between various variables. The level of statistical significance was established at P < 0.05. The study protocol was reviewed and approved by the Scientific Ethics Committee at College of Dentistry, University of Basrah, Iraq (*IECHR20225311*). Informed consent was obtained from the adults screened to participate in this study.

## Results

A total of 25 patients participated in this retrospective study at a private clinic in Basrah, with 20 females (80%) and five males (20%) included from the period of February 2020 to April 2024. The assessment criteria included the integrity of the buccal plate 3 months post-surgery and paraesthesia of the inferior alveolar nerve. Paraesthesia was experienced by two of our patients, both of whom were female. In both cases, the paraesthesia was temporary and resolved within 4 months [Table 1]. The integrity of the buccal plate was examined 3 months after the removal of the impaction, with only one loss. Significantly, this was the only plate affixed using a single screw [Table 2]. One patient reported experiencing pain at the surgical site, but this did not impair his quality of life. Notably, this was the same patient who had the lost plate. The overall success rate of the procedure stood at 96%.

## Discussion

An impacted wisdom tooth is not a pathology, but rather a tooth that fails to erupt at the expected time. Concerns are related to the consequences of this impaction, such as the



Figure 2: Mandibular osteotomy shape lateral to the impacted tooth



Figure 4: Platelet rich fibrin

development of cysts or tumours, or even bone destruction behind the second molar. Mandibular third molar impaction is much more common than maxillary impaction, and the percentage of horizontal impaction is relatively low among different patterns.<sup>[14]</sup> As not all impactions lead to pathologies, there is known controversy between those who recommend the removal of asymptomatic impacted teeth and those who advocate for monitoring only.<sup>[15]</sup> The major concerns pertain to the potential surgical complications, including nerve damage and the amount of bone removal required for asymptomatic teeth. In our sample, females outnumbered males, a trend which is consistent with many other studies.<sup>[16]</sup> This study detected nerve injury symptoms in two patients (8%), despite the surgery being more invasive compared to the removal of mesioangular and distoangular impactions. This concurs with the existing literature, which indicates a low incidence of nerve injury, even with close root proximity (0.4%-22%).<sup>[17]</sup> Of the total 25 patients, only one experienced a loss of the buccal cortex (4%), which was temporarily removed. This was the only case in which a plate was fixed with a single screw, possibly explaining the devitalization. The cause of this loss remains unclear, but the author believes it may be related to inadequate fixation and undetected bone mobility during the healing period.<sup>[18]</sup> Despite this setback, there was a high success rate (96%) with the preservation of as much bone as possible. This method is considered predictable and successful with careful bone manipulation, extracorporeal preservation, and the use of necessary tools. Researchers recommend careful evaluation and replacement of the buccal cortex for the removal of horizontally impacted third molars, as this approach may be highly beneficial to both the patient and the operator.[19,20]

# Conclusion

The technique utilized in this study is both highly



Figure 3: Horizontally impacted tooth after the plate removal



Figure 5: Piece of bone lost after 3 months from the first surgery

Table 1: Percentage of paraesthesia among sample		
	Females	Males
Number	20	5
Temporary paraesthesia	2 (8%)	0 (0%)
Permanent paraesthesia	0 (0%)	0 (0%)

Table 2: Percentage of lost cortical plate after fixation		
	Females	Males
Number	20	5
Lost buccal plate	0	1 (4%)
Pain at time of second surgery	0	1 (4%)

predictable and safe. With careful case selection and meticulous handling during the removal and fixation of the bone plate, this method aids in preserving the bone contour and strength during horizontal impaction. The technique minimizes the amount of bone removal, thus reducing subsequent undesirable defects.

#### **Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### **Conflicts of interest**

There are no conflicts of interest.

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