Journal of Clinical and Nursing Research, 2025, Volume 9, Issue 9
http://ojs.bbwpublisher.com/index.php/JCNR
Online ISSN: 2208-3693
Print ISSN: 2208-3685

Clinical Effect of Improved Incision in Extraction of Impacted Mandibular Wisdom Teeth

Shanshan Ren

Department of Stomatology, Maojian District People's Hospital, Shiyan 442000, Hubei, China

Abstract: Objective: To explore the clinical effect of improved incision in the extraction of impacted mandibular wisdom teeth. Methods: 160 patients who were treated in our hospital from October, 2024 to April, 2025 and had their mandibular impacted wisdom teeth removed according to the doctor's advice were randomly divided into observation group and control group. The observation group used modified incision, while the control group used traditional triangular incision. The operation time, intraoperative visual analogue scale (VAS) pain score, pain VAS score on the 1st, 2nd and 3rd day after operation, facial swelling on the 2nd day after operation, mouth opening limitation on the 2nd day after operation and the incidence of dry socket after operation were recorded and compared between the two groups. Results: There was no significant difference in operation time between the two groups ($p > 0.05$). The VAS score of pain in the observation group was significantly lower than that in the control group at each time point during and after operation ($p < 0.05$). On the second day after operation, the facial swelling and mouth opening limitation in the observation group were significantly lighter than those in the control group ($p < 0.05$). The incidence of dry socket in the observation group was 1.25% (1/80), which was significantly lower than that in the control group (8.75%, 7/80), and the difference was statistically significant ($p < 0.05$). Conclusion: The application of modified triangular incision in the extraction of impacted mandibular wisdom teeth can effectively relieve the pain during and after operation, reduce postoperative facial swelling and mouth opening limitation, and reduce the incidence of dry socket. Keywords: Mandibular impacted wisdom teeth; Tooth extraction; Surgical incision; Improved triangular incision

Online publication: Oct 17, 2025

1. Introduction

Mandibular impacted wisdom teeth are one of the most common diseases in oral surgery. Due to factors such as the eruption position of wisdom teeth, the influence of adjacent teeth, and the resistance of bone tissue, they often cause a series of complications including pericoronitis, caries of adjacent teeth, root resorption, malocclusion, and even cysts and tumors, which seriously affect patients' quality of life. Therefore, the extraction of mandibular impacted wisdom teeth is also one of the most common oral surgeries [1].

However, mandibular impacted wisdom tooth extraction is an invasive procedure. Due to unavoidable

factors such as special anatomical location, difficulty in exposing the surgical field, and limited operating space, most patients often experience postoperative pain, facial swelling, and mouth opening limitation. In severe cases, complications such as dry socket and nerve injury may occur, which seriously affect the patient's recovery process [2,3].

In the extraction of impacted wisdom teeth, the design of the surgical incision is a key step. It is not only related to the adequate exposure of the surgical field and the smooth operation of surgical instruments, but also directly affects the degree of soft tissue injury, postoperative blood supply recovery, and the healing quality of the wound [4]. The traditional mandibular impacted wisdom tooth extraction mostly adopts the "triangular incision", which is made by cutting forward from the distal buccal side of the mandibular second molar to its mesial side, then turning to the distal side and cutting backward along the alveolar ridge crest to form a triangular flap.

Although this incision can provide good exposure, its distal incision often extends to the vicinity of the retromolar pad and pterygomandibular ligament, cutting off the rich vascular network, resulting in large trauma, severe postoperative tissue reaction, difficulty in restoring the shape of the interdental papilla during healing, and increased risk of postoperative food impaction [5].

At present, domestic and foreign researchers are committed to designing an improved incision characterized by minimal invasiveness, aiming to maximize the protection of soft tissues, avoid key anatomical structures, maintain local blood supply, and thereby accelerate postoperative healing [6,7]. Based on the concept of minimally invasive surgery, this study designed an improved triangular incision.

Through a comparative study with the traditional incision, this study aims to systematically evaluate its clinical effect and provide a reference for clinical practice.

2. Materials and methods

2.1. General information

Patients who visited our hospital from January 2025 to July 2025 and required extraction of mandibular impacted wisdom teeth were selected as the research subjects.

2.1.1. Inclusion criteria

(1) Aged 18–40 years
(2) Diagnosed with unilateral mandibular mesial by clinical examination and orthopantomogram (OPG)
(3) Diagnosed with horizontal impacted wisdom teeth by clinical examination and orthopantomogram (OPG)
(4) Wisdom teeth with fused roots or double roots with small bifurcation, and no close contact with the inferior alveolar nerve canal
(5) Patients provided informed consent and signed the consent form.

2.1.2. Exclusion criteria

(1) Acute episode of pericoronitis
(2) Presence of severe systemic diseases and surgical contraindications
(3) Pregnant or lactating women
(4) Allergy to the anesthetic drugs used or postoperative medications
(5) Inability to cooperate with follow-up.

A total of 160 patients were finally included and divided into the observation group and the control group using a random number table method, with 80 patients in each group. There were no statistically significant

differences in general information such as gender, age, and impaction type between the two groups ($p > 0.05$). Details are shown in **Table 1**.

Table 1. Comparison of general data between the two groups of patients (n = 80, mean ± SD/n (%))

Group	Gender (Male/Female) (n)	Age (Years)	Impacted type (Mesial/Horizontal)
Observation	42/38	25.6 ± 4.2	45/35
Control	45/35	26.1 ± 3.9	48/32
χ^2/t-value	0.225	0.721	0.256
p-value	0.635	0.472	0.613

2.2. Surgical methods

All surgeries were performed by the same senior attending physician. Before the operation, patients took the same antibiotics for infection prevention, and 2% lidocaine (containing 1:100,000 epinephrine) was used for inferior alveolar nerve, lingual nerve and buccal nerve block anesthesia. For patients in the control group, a traditional triangular incision was adopted. Starting from approximately 0.5 cm on the distal buccal side of the second molar, the incision was made forward to the mesial side of the second molar, then extended backward along its gingival sulcus to the distal side, and then turned posterolateral, with a total length of about 1.5–2.0 cm, forming a triangular flap. The mucoperiosteal flap was reflected, and after bone removal, tooth sectioning and space creation, the affected tooth was extracted. The dental follicle was thoroughly curetted, the alveolar socket was curetted, and rinsed with normal saline. The mucoperiosteal flap was repositioned and sutured with 4-0 silk thread using 3–5 interrupted stitches.

For patients in the observation group, a modified triangular incision was used. First incision: starting only from the middle of the distal surface of the second molar, it was made forward along the gingival sulcus to the mesial surface of the second molar. Second incision: instead of making a long incision turning posterolateral from the distal side of the second molar, a short oblique auxiliary incision was made at an angle of approximately 45° toward the distal buccal side starting from the distal end of the first incision (distal surface of the second molar), with a length of about 0.5–1.0 cm, ending at the buccal vestibular sulcus and avoiding extension to the pterygomandibular ligament. This incision formed a smaller triangular flap. The subsequent steps of bone removal, tooth sectioning, tooth extraction and debridement were the same as those in the control group. After repositioning the flap, suturing was performed with 4-0 silk thread, usually requiring only 1 stitch for the distal auxiliary incision and 1–2 stitches for the mesial gingival sulcus incision.

2.3. Evaluation indicators

Postoperative evaluation of patients in the observation group and the control group was conducted based on operation time, pain score, facial swelling degree, mouth opening limitation degree, and incidence of dry socket.

(1) Operation time: The total time from mucosal incision to completion of suturing was recorded (in minutes)
(2) Pain score: The Visual Analogue Scale (VAS, 0–10 points) was used to record the patients' pain intensity during the operation and on the 1st, 2nd, and 3rd days after the operation
(3) Facial swelling degree: Measured on the 2nd day after the operation. A soft ruler was used to measure the distances from the tragus to the midpoint of the ipsilateral corner of the mouth, from the tragus to the ipsilateral submental point, and from the outer canthus to the ipsilateral mandibular angle point. The average value of the differences between these measurements and the preoperative ones was taken as the swelling degree (in mm) [8]

(4) Mouth opening limitation degree: On the 2nd day after the operation, the vertical distance between the incisal edges of the upper and lower central incisors when the patient opened the mouth to the maximum was measured (in mm)

(5) Incidence of dry socket: Patients were followed up for 1 week after the operation. Dry socket was diagnosed according to clinical criteria including severe radiating pain occurring 2–3 days after the operation, with decomposition and disappearance of the blood clot in the alveolar socket, exposure of the bone wall, and foul odor [9].

2.4. Statistical methods

Data analysis was performed using SPSS 25.0 software. Comparisons between groups were conducted using the independent samples *t*-test. Categorical data were expressed as rates (%) and compared between groups using the χ^2 test or Fisher's exact test. A p-value < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of operation time and intraoperative VAS score between the two groups

There was no statistically significant difference in the operation time between the two groups ($p > 0.05$). However, the subjective pain VAS score of the observation group during operation was significantly lower than that of the control group ($p < 0.05$). See **Table 2**.

Table 2. Comparison of operation time and intraoperative VAS scores between the two groups of patients (n = 80)

Group	Operation time (min)	Intraoperative VAS score (points)
Observation Group	18.5 ± 3.2	3.1 ± 0.8
Control Group	19.2 ± 3.8	4.3 ± 1.1
t-value	1.258	7.429
p-value	0.210	0.000

3.2. Comparison of VAS scores between the two groups of patients at various time points after surgery

On the 1st, 2nd, and 3rd days after surgery, the pain VAS scores of patients in the observation group were significantly lower than those in the control group, and the difference was statistically significant ($p < 0.05$). See **Table 3**.

Table 3. Comparison of VAS scores between two groups of patients at different time points after surgery (n = 80, points)

Group	1st Day after surgery	2nd Day after surgery	3rd Day after surgery
Observation	4.5 ± 1.2	3.2 ± 0.9	1.8 ± 0.6
Control	5.8 ± 1.5	4.6 ± 1.3	2.7 ± 0.8
t-value	6.258	8.142	7.833
p-value	0.000	0.000	0.000

3.3. Comparison of postoperative swelling degree and mouth opening degree between the two groups

On the 2nd day after surgery, the facial swelling degree of the observation group was significantly lower than that of the control group, while the maximum mouth opening degree was significantly larger than that of the control group, with statistically significant differences ($p < 0.05$). See **Table 4**.

Table 4. Comparison of postoperative swelling degree and mouth opening between the two groups of patients (n = 80)

Group	Facial swelling degree (mm)	Maximum mouth opening (mm)
Observation Group	4.8 ± 1.1	30.5 ± 3.2
Control Group	6.9 ± 1.7	25.8 ± 4.1
t-value	9.213	8.076
p-value	0.000	0.000

3.4. Comparison of the incidence of dry socket between the two groups

Within one week after surgery, patients were followed up by telephone by the same doctor to inquire about the occurrence of complications. Among them, 1 patient in the observation group developed dry socket, with an incidence rate of 1.25%; 7 patients in the control group developed dry socket, with an incidence rate of 8.75%. The difference between the two groups was statistically significant ($p < 0.05$).

4. Discussion

The main cause of complications after extraction of mandibular impacted wisdom teeth is the acute inflammatory response of the body induced by surgical trauma. The surgical incision, which can be manually controlled by dentists, is the primary link in managing surgical trauma. In this study, the modified triangular incision could reduce patients' postoperative reactions in multiple aspects, improve their postoperative experience, and shorten the hospital stay.

Firstly, in this study, the main content of the modification was to preserve the soft tissue in the retromolar area. The distally extended incision of the traditional approach inevitably severs the arteriovenous vascular network in the retromolar pad area, which is rich in blood supply, leading to significant bleeding and severe edema after injury [10]. This modified protocol drastically shortens the distal incision and changes it to a short incision obliquely directed toward the buccal side, effectively avoiding the main vascular area and reducing intraoperative bleeding and soft tissue damage. This serves as the anatomical basis for the significant reduction in postoperative swelling and pain in the observation group. Pell-Gregory's study suggested that preserving the soft tissue attachment in the retromolar area is crucial for postoperative healing [11]. Secondly, the modified incision better maintains the integrity of the interdental papilla. The traditional incision requires incising the gingival sulcus on the distal and buccal sides of the second molar and dissecting the interdental papilla, which often leads to postoperative gingival papilla atrophy and formation of a distal periodontal pocket around the second molar [12]. The first incision of this modified protocol is strictly limited to the distal surface of the second molar, avoiding excessive damage to the buccal and lingual interdental papillae, which is conducive to the physiological recovery of gingival morphology after surgery and reduces the risk of long-term food impaction. Thirdly, dry socket is the most common complication after tooth extraction, which is essentially a localized osteomyelitis of the bone wall and the detachment and dissolution of the blood clot [13]. Its occurrence is related to various factors such as surgical trauma, infection, and local blood supply disorders. The results of this study showed that compared with the

control group, the observation group had a significantly lower incidence of dry socket due to the modified incision: 1 case of dry socket occurred in the observation group with an incidence of 1.25%, while 7 cases occurred in the control group with an incidence of 8.75%. The difference between the two groups was statistically significant ($p < 0.05$). The main reasons are as follows: First, the smaller tissue trauma surface reduces bone exposure, thereby lowering the risk of bacterial infection in the patient's wound. Second, by avoiding key locations, the modified incision better preserves the local blood supply of the patient, ensuring sufficient and healthy blood filling in the alveolar socket to form a stable blood clot. Third, due to the smaller wound in the observation group, the corresponding sutures are reduced, thus lowering the body's foreign body reaction and potential changes in the microenvironment. Studies by Nitzan et al. have also confirmed that minimally invasive surgical procedures are one of the most effective measures to prevent dry socket.

However, the modified triangular incision used in this study is mainly applicable to mesial or horizontal impacted wisdom teeth with mild to moderate difficulty. For complex cases diagnosed with completely bony impaction, low horizontal impaction, or extremely high apical resistance, traditional incisions or more extensive incisions can provide a clear surgical field of view and operating space. Therefore, dentists should carefully evaluate the depth, position, root morphology of the impacted tooth and its relationship with adjacent teeth and nerve canals through imaging before surgery to select the most appropriate incision.

5. Conclusion

In summary, compared with the traditional triangular incision, the use of the modified triangular incision in patients with mandibular impacted wisdom teeth can significantly improve the patients' postoperative recovery, remarkably reduce adverse reactions such as postoperative pain, swelling, and limited mouth opening, and shorten the hospital stay. Its core lies in that the modified incision reduces soft tissue damage and protects local blood vessels by optimizing the intraoperative incision path. Therefore, this modified method can achieve certain application effects in clinical practice.

Disclosure statement

The author declares no conflict of interest.

References

[1] Liu J, Hu K, 2020, Prevention and Management of Complications After Extraction of Impacted Mandibular Third Molars. Chinese Journal of Practical Stomatology, 13(1): 4–8.

[2] Wang Q, Zhang W, 2019, Research Progress on Inferior Alveolar Nerve Injury Complicating Impacted Mandibular Third Molar Extraction. International Journal of Stomatology, 46(4): 445–449.

[3] Bouloux G, Steed M, Perciaccante V, 2007, Complications of Third Molar Surgery. Oral Maxillofac Surg Clin North Am, 19(1): 117–128.

[4] Xu P, Jia Z, 2020, Oral and Maxillofacial Surgery. 8th ed. Beijing: People's Medical Publishing House, 85–90.

[5] Zhang Z, Yu G, 2012, Oral and Maxillofacial Surgery. 7th ed. Beijing: People's Medical Publishing House, 102–105.

[6] Kirk D, Liston P, Tong D, et al., 2007, Influence of Two Different Flap Designs on Incidence of Pain, Swelling, Trismus and Alveolar Osteitis in the Week Following Third Molar Surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod, 104(1): e1–e6.

[7] Zhao J, Cai Y, 2018, Incision Design and Suture Technique for Extraction of Impacted Mandibular Third Molars. West China Journal of Stomatology, 36(3): 237–241.

[8] Grossi G, Maiorana C, Garramone R, et al., 2007, Effect of Submucosal Injection of Dexamethasone on Postoperative Discomfort After Third Molar Surgery: A Prospective Study. J Oral Maxillofac Surg, 65(11): 2218–2226.

[9] Blum I, 2002, Contemporary Views on Dry Socket (Alveolar Osteitis): A Clinical Appraisal of Standardization, Aetiopathogenesis and Management: A Critical Review. Int J Oral Maxillofac Surg, 31(3): 309–317.

[10] Hu K, 2011, Minimally Invasive Extraction Technique. International Journal of Stomatology, 38(3): 249–252.

[11] Pell G, Gregory B, 1933, Impacted Mandibular Third Molars: Classification and Modified Technique for Removal. Dent Dig, 39: 330–338.

[12] Karaca I, Şimşek S, Uğar A, et al., 2015, Review of Flap Design Influencing the Periodontal Status of the Second Molar After Impacted Third Molar Surgery. J Oral Maxillofac Surg, 44(8): 1019–1024.

[13] Kolokythas A, Olech E, Miloro M, 2010, Alveolar Osteitis: A Comprehensive Review of Concepts and Controversies. Int J Dent, 2010: 249073.