A modified approach from the edge of the tragus in the surgical treatment of mandibular condyle fractures

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ABSTRACT

INTRODUCTION We present our experiences using a modified surgical approach from the edge of the tragus for mandibular condyle fractures, to reduce the risk of postoperative complications and visible scars.

MATERIALS AND METHODS Thirty-two patients presenting with mandibular condyle fractures were treated through a modified approach on the edge of the tragus. The age of the patients ranged from 6 to 62 years. All mandibular condyle fractures were fixed. The patients were asked to start open-mouth training one week postoperatively, undergoing a cone-beam computed tomography examination and clinical follow-up. Postoperative complications were evaluated after surgery.

RESULTS Mouth opening was normal (average 39.5 mm) in all the patients during the operation and the occlusion improved significantly compared with preoperatively. No cases of damaged facial nerves were observed during the final follow-up at six months and postoperative scars were less noticeable.

CONCLUSIONS The modified surgical approach from the edge of the tragus for mandibular condyle fractures provides a good view of the operative field, reduces the risk of facial nerve damage and produces a less noticeable postoperative scar.

KEYWORDS

Modified approach – Edge of tragus – Mandibular condyle fractures – Complications

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Introduction

Surgery performed on the temporomandibular joint (TMJ) area is a challenge because it must be done in a confined space, which is filled with important nerves and blood vessels. The procedure must guarantee maximum safety for the facial nerve yet provide a good cosmetic outcome. Several different approaches to the TMJ have been advocated, all of which pursue facial nerve protection and an aesthetically acceptable scar.^{1,2} In recent years, the most common and conventional approach is preauricular or submandibular, through the parotid, gaining access to condylar fractures of the mandible, which leaves a visible scar and carries a risk of facial nerve injury.^{3–5} We present a modified approach, which is from the edge of the tragus and through the posterior border of the parotid to expose the TMJ. This provides sufficient space for TMJ surgery and enables hiding of the scar and facial nerve protection. This study presents experiences using the modified surgical approach.

Materials and methods

Patients

A total of 32 patients who had mandibular condyle fractures, presenting with restriction of mouth opening and occlusal derangement, were admitted to the Oral and Maxillofacial Surgery Department of the College of Stomatology, Guangxi Medical University, from February 2014 to August 2016. The average age of patients was 29.5 years and ages ranged from 6 to 62 years. There were 6 women and 26 men. Diagnoses were made from clinical signs and spiral cone-beam computed tomography (CBCT). All surgeries were performed by a same surgical team. Inclusion criteria were condylar fractures, intracapsular or condylar neck; and unilateral or bilateral fractures. Exclusion criteria were patients with intracapsular fracture without displacement, those without a change in the vertical height of the mandibular ramus, those without restriction of mouth opening, and those with condylar base fractures. All patients signed informed consent. The study protocol was

approved by the Internal Review Board of the Department of the College of Stomatology, Guangxi Medical University.

Surgical procedure

All surgery was performed under general anaesthesia with nasotracheal intubation. The skin incision design is marked on the edge of the tragus, which starts at the incisura anterior auris, passing the edge of the preauricular tragus and ends at the incisurae intertragica. According to the requirements of the operative visual field, the incision could continue for another 1–1.5 cm from the incisura anterior auris to the partes temporalis, with an angle of 45 degrees upwards (Fig 1). A skin incision is then made along the mark (Fig 2). Each layer of tissue is dissected. Then, at the anterior edge of superficial temporal vein, on the articular capsule surface, the deep temporal fascia flap and the parotid sheath are viewed as a whole flap to turn over forward. The zygomatic and temporal branch of the facial nerve was wrapped in this flap for effective protection. It is important not to cut into the parotid gland, to decrease the probability of salivary fistula postoperatively. When the periosteum of the zygomatic arch and the capsule of the temporomandibular joint is cut, the condyle is exposed (Fig 3). The surgical exposed field ranges from the zygomatic process to the mandibular notch, including the coronoid process and the whole posterior border of the mandibular condyle. Thus far, the operating area is clearly visible and the complete condyle is exposed. Searched for the fractured condylar bone block, and after the occlusion was checked, The fractured condyle is fixed in its original position by titanium plates or titanium wire (Fig 4). The articular disc is sought and sutured on to the deep temporal fascia. Drainage is established and a layered suture performed (Fig 5). One week after the operation, patients were asked to start open-mouth training and undergo a CBCT examination and were followed up clinically.

Figure 1 The relationship between incision and facial nerve.

Figure 2 Incision design.

Figure 3 Exposing the mandibular condyle fractures behind the deep temporal fascia flap and the parotid sheath (red arrow, condylar bone).

Figure 4 Fixing the mandibular condyle fractures (red arrow, condylar bone).

Results

The demographic and clinical characteristics of the patients are listed in Table 1. There were 18 patients with bilateral mandibular condyle fractures and 14 patients with unilateral mandibular condyle fractures. Among the 32 patients, 17 had simple mandibular condyle fractures and 15 had associated maxillary or mandibular fractures. The therapeutic effect was evaluated by occlusion correction, mouth opening, scar visibility, facial palsy and parotid fistula. The mean surgery time was approximately two hours. All patients were followed up for six months. Excellent occlusions were shown in all 32 patients and CBCT showed condylar fixing in the correct position (Fig 6: preoperative images; Fig 7: postoperative images). No symptoms, such as pain or mandibular function disturbances, were reported by any patient during follow-up. Limited mouth opening was improved in all patients during surgery and postoperatively. Patients' mouth-opening reached an average of 39.5 mm. No complications, such as salivary fistula, salivodysphagia syndrome or haemorrhage, were observed. There were no symptoms of facial nerve injury (Table 1). As revealed in the CBCT examination, the

Figure 5 Sutures.

condyles were in the normal position in all cases. All patients obtained normal mandibular movements and had invisible scars at 3 months' follow-up and all patients with the modified incision were satisfied with the outcomes.

Discussion

The usual conventional extraoral approaches, such as from the preauricular, submandibular or retromandibular area, make a clear surgical field and are convenient for operation but also have the disadvantages of greater trauma on tissue and greater risks of facial nerve injury, salivary fistula, noticeable facial scar and other complications.⁶⁻⁹ The intraoral approach has some advantages, such as no transcutaneous incisions and a low incidence rate of facial nerve injury. However, since it uses an endoscope, the procedure requires specific instruments and training to use the endoscope, which is often difficult because this technology is relatively uncommon and the training is time-consuming.^{10,11} Open treatment is also often reported to have a certain proportion of surgical complications, such as encountering branches of the facial nerve and facial nerve weakness.^{7,12,13} In the present 32 mandibular condyle fractures, we did not expose the facial nerve during the dissection on the tissue from the edge of the tragus.

Table 1 Patients' demographic and clinical characteristics (preoperative and postoperative).

Case number	Sex	Age (years)	Aetiology	Uni- or bilateral	Associated fracture	Preoperative mouth opening (mm)	6-month postoperative mouth opening (mm)	Postoperative complications
1	male	52	fall	unilateral	malar	14	38	none
2	male	60	fall	unilateral	maxillary, mandible body	5	37	none
3	male	62	fall	bilateral	mandible body	10	39	none
4	male	46	fall	unilateral	none	7	41	temporary malocclusion
5	male	17	traffic accident	bilateral	none	15	37	none
6	male	36	traffic accident	bilateral	none	8	40	none
7	male	14	fall	unilateral	maxillary, mandible body	7	39	light infection
8	male	52	traffic accident	unilateral	mandible body	12	42	none
9	male	20	traffic accident	unilateral	none	14	40	none
10	male	53	fall	unilateral	mandible body	9	39	none
11	male	53	fall	unilateral	symphysis	11	42	temporary malocclusion
12	male	10	traffic accident	bilateral	none	12	37	none
13	male	35	traffic accident	unilateral	mandible body	11	41	none
14	male	10	fall	bilateral	none	14	40	none
15	male	35	personal violence	unilateral	none	13	38	none
16	male	35	fall	unilateral	none	8	43	none
17	male	11	traffic accident	bilateral	mandible body	16	40	none
18	male	25	traffic accident	unilateral	none	14	37	none
19	male	18	traffic accident	unilateral	malar	12	39	none
20	male	27	fall	unilateral	none	14	43	temporary malocclusion
21	male	47	fall	bilateral	mandible body	10	41	none
22	male	40	traffic accident	unilateral	symphysis	9	38	none
23	male	11	fall	bilateral	none	7	37	none
24	male	14	fall	unilateral	mandible body	11	42	none
25	male	18	personal violence	unilateral	none	10	41	temporary malocclusion
26	male	41	traffic accident	bilateral	none	17	37	light infection
27	female	23	traffic accident	unilateral	none	13	39	none
28	female	6	fall	unilateral	none	9	41	none
29	female	6	fall	unilateral	mandible body	10	43	none
30	female	23	fall	unilateral	none	12	39	none
31	female	23	fall	unilateral	none	13	38	none
32	female	23	traffic accident	unilateral	symphysis	14	39	none

With the approach from the edge of the tragus, it is not usually necessary to dissect the parotid tissue and facial nerve, which is significantly different from most other approaches, and this approach also clearly exposes the condyle fracture. There is a gap of 2 cm from the temporal branch of the facial nerve to the front edge of the auditory canal, which means that the approach from the edge of the tragus is safe. When the deep temporal fascia are opened

and the parotid tissue flap is pushed forward to reveal the condyle, there is no need to open the parotid gland for the separation of the temporal and zygomatic branches of the facial nerve. In the modified approach, the deep temporal fascial flap and parotid sheath were viewed as a whole flap and were turned over towards the front. The flap thus wraps the facial nerve so it is not exposed. The parotid is pushed forward, which decreases the risk of facial nerve

Figure 6 A 28-year-old male patient with left condylar fracture seven days after trauma (red arrow, condylar bone).

Figure 7 Open reduction and condylar fixation with stainless steel wire (red arrow, condylar bone).

damage and the incidence of salivary fistula. In our study, by using the modified approach from the edge of the tragus incision, no patients had symptoms of facial nerve injury and salivary fistula. Owing to congenital limitations, other types of approach often need a long incision to get a clear view, which also produces an obvious, long scar. The approach from the tragus edge provide a clear operative view in a much shorter length. Not including the additional incision, the length of the main incision on the tragus edge could be less than 2 cm. This narrow approach can fully meet the needs of the high condylar fracture treatment by providing adequate access for the fracture, so it can replace the preauricular approach for a high condylar fracture. A long incision is not necessary.

Conclusion

To summarise, the modified approach from the edge of the tragus can be a more safe and effective method in the surgical treatment of mandibular condyle fractures compared with conventional approaches, in terms of nerve protection and scar reduction.

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