Analysis of the retroauricular transmeatal approach: a novel transfacial access to the mandibular skeleton

Francesco Arcuri *, Matteo Brucoli, Arnaldo Benech

Department of Maxillo-Facial Surgery, Azienda Ospedaliera Maggiore della Carità University of Piemonte Orientale "Amedeo Avogadro", Novara, Italy

Abstract

In 2005 experimental work was published about the successful surgical management of fractures of the condylar head through a retroauricular approach. There were two reports in German, and later publications have not mentioned this route to open reduction and internal fixation of such fractures. The approach was studied in Germany but was poorly described and illustrated; later reports in English do not mention this route to the mandible. The aim of this study was to illustrate the retroauricular transmeatal approach, and briefly to review current surgical approaches to the mandibular skeleton and their technical variants. We exposed the mandibular skeleton by a retroauricular transmeatal route with transection of the external ear, dissection of the parotid gland, isolation of the retromandibular vein, and protection of the frontal branch of the facial nerve and the auriculotemporal nerve within the substance of the anteriorly retracted flap. Although we cannot draw any significant conclusions, the retroauricular transmeatal approach ensures extremely low risk of injury to the facial nerve, and leaves an invisible scar. The morbidity is low in terms of facial nerve lesions, vascular injuries, aesthetic deformity, auditory stenosis, salivary fistulas, sialocele and Frey syndrome. We think that further prospective clinical trials are needed better to assess and eventually develop this approach.
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Keywords: Retroauricular transmeatal approach; Mandible; Facial nerve

Introduction

In 2005 Neff et al.,[1] supported by previous experimental work,[2] published a report of successful management of fractures of the condylar head through a retroauricular approach; these two manuscripts were published in German. The retroauricular approach has been well studied in German papers but, to the best of our knowledge, little scientific information has been published in English about this technique or its outcomes other than in the textbook by Eckelt and Loukota.[3,4] In this paper we seek to expand the description and to illustrate long-term outcomes.

We used the retroauricular transmeatal approach to treat high fractures of the condylar head. This route is a relatively simple way of gaining direct access to the mandibular skeleton; it allows an easy and fast anatomical reduction of the fragments and proper osteosynthesis with miniplates and screws, while minimising the risks of injuries to the facial nerve, and leaving an invisible scar.

The aim of the study was to illustrate the retroauricular transmeatal approach and to review the current surgical approaches and technical variants to the mandibular skeleton.

Material and methods

We retrospectively reviewed the surgical records of 14 patients (mean age 33 years; range 17–64) who were operated on for condylar fractures between 1 January 2006 and 1 December 2008 at the Maxillofacial Unit of the Novara

* Corresponding author at: S.C.D.U. di Chirurgia Maxillo-Facciale, Ospedale Maggiore della Carità, Corso Mazzini 18, 28100 Novara, Italy. Tel.: +39 0321 3733893/3733783/3733895; fax: +39 0321 3733893.

E-mail address: fraarcuri@libero.it (F. Arcuri).

Major Hospital. We assessed the retroauricular transmeatal approach adopted for all cases. This new method of access to the mandibular skeleton is clearly divided into eight steps and is followed by illustrations. Our research was approved by our local institutional review board.

Surgical technique

Preparation and draping
With the patient supine, under general anaesthesia with naso-tracheal intubation, and with the head in a neutral position, we mark the mandible, the zygoma, and the glenoid fossa as pertinent landmarks of the face.

We prepare and drape the entire face; the sterile surgical field is separated from the oral and nasal cavities by an adhesive film to prevent bacterial contamination at the surgical site. We shave the preauricular hair and place a cotton bud soaked into antibiotic ointment in the external auditory canal.

Marking the incision and vasoconstriction
We mark the incision before injection of 1% lidocaine 4–8 ml with 1:100,000 adrenaline in the retroauricular area and in the posterior surface of the external ear to decrease bleeding during the operation. Although the occipital area is vascular, and local anaesthesia improves haemostasis, we prefer to infiltrate a small amount to avoid distortion of the tissues.

Incision of skin and soft tissue
We make a vertical incision 2.5–3 cm long in the retroauricular region, about 1–1.5 cm medial to the sulcus, through skin and subcutaneous tissue. The edges of the incision are placed 0.5–1 cm from the base of the auricular lobule and 0.5–1 cm below the insertion of the helix. We raise the anterior and the posterior flaps and excise the muscle fibres and fat from the perichondrium and the mastoid fascia, which gives us direct exposure of the concha (Fig. 1).

Transection of the external ear
We retract the anterior flap and make the first incision through the posterior wall of the external cartilaginous meatus, cutting cartilage and skin. We then make the second incision widely through the anterior wall of the canal to prevent auditory stenosis, sectioning the external auditory meatus completely (Fig. 2).

Dissection of the retromandibular space
We retract the external ear anteriorly to expose the retromandibular space with the parotid gland (Fig. 3). At this depth we advocate blunt dissection. We always isolate the retromandibular vein, which we ligate and transect.

Because of the posterior access, the auriculotemporal nerve and the frontal branch of the facial nerve are protected within the substance of the anteriorly retracted flap, lateral to the retromandibular vein (Fig. 4).
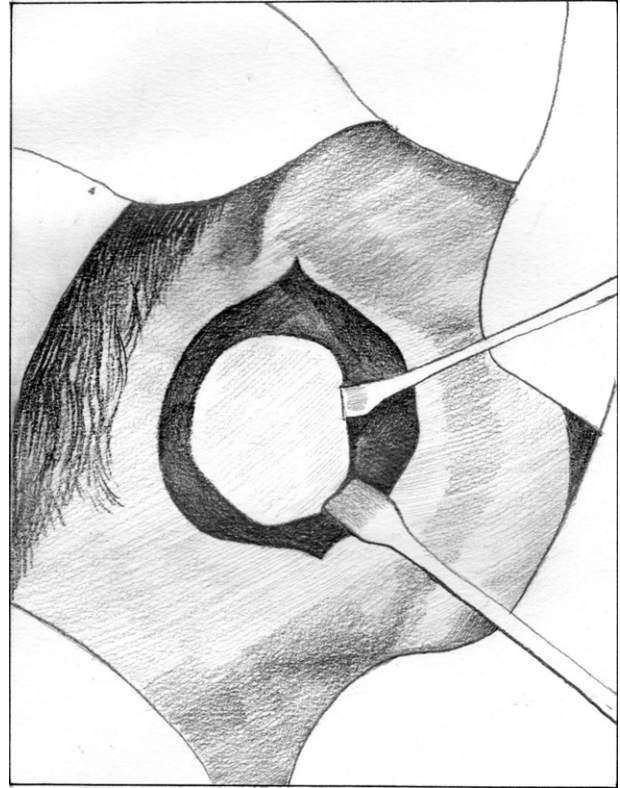

Fig. 1. Incision of the skin and the soft tissue with direct view of the concha.
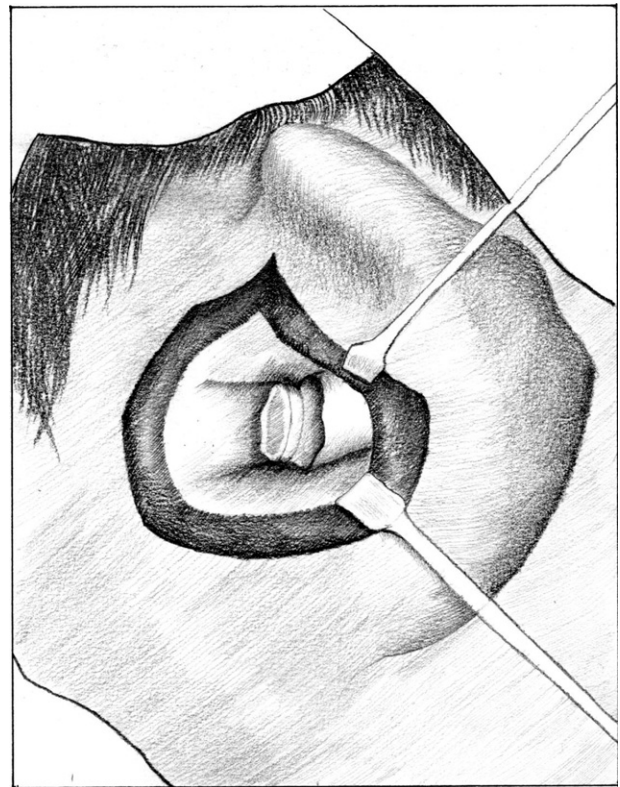

Fig. 2. The incision of the anterior wall of the canal and transection of the entire external auditory canal.
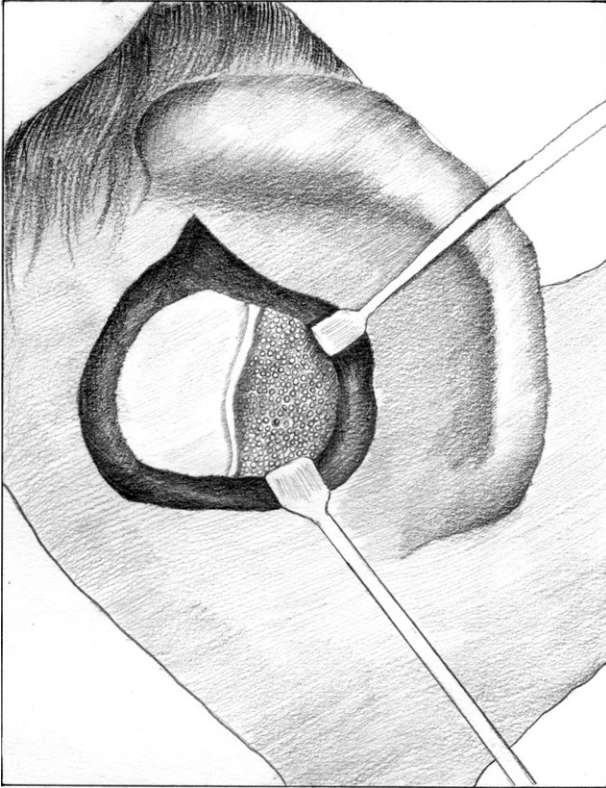
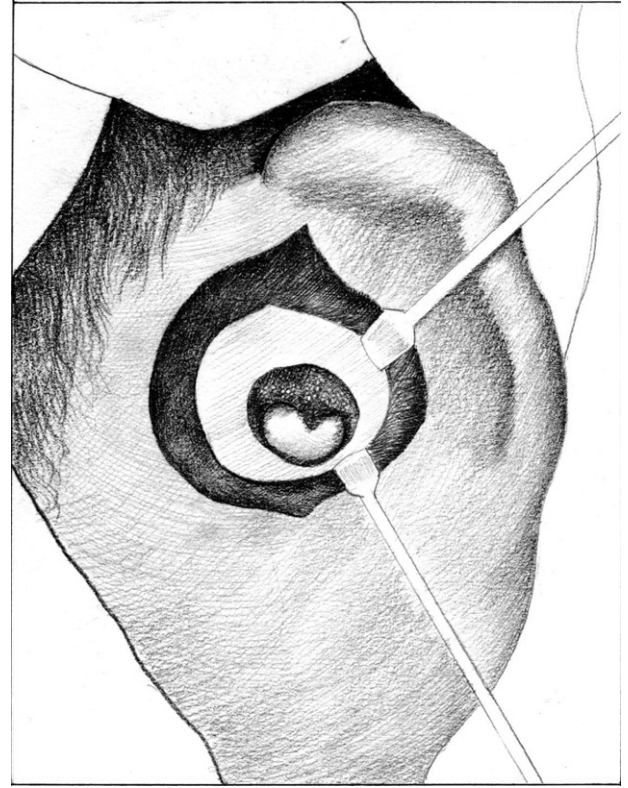Fig. 3. Dissection of the retromandibular space with the parotid gland.
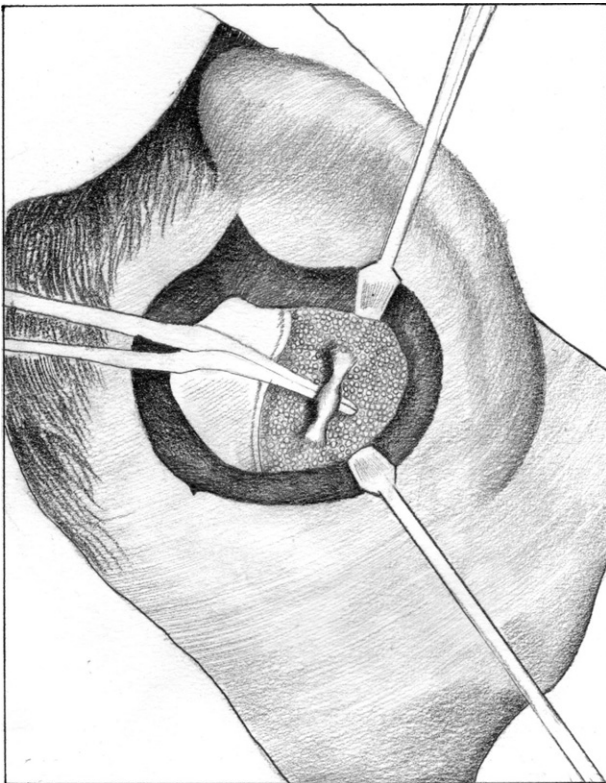

Fig. 5. Exposure of the mandible.

Fig. 4. The isolated retromandibular vein.

The mandibular skeleton

We manipulate the mandible open and closed to find out the location of the condyle and the ramus. When the bony surface is reached, we incise and raise the mandibular periosteum to isolate the mandibular skeleton (Fig. 5).

Closure

We irrigate the site with hydrogen peroxide and any bleeding is meticulously controlled. We close the parotid capsule tightly with an absorbable, running, horizontal mattress suture to avoid a salivary fistula. We then reconstruct the external auditory canal with 3 deep holding sutures to prevent stenosis of the external auditory meatus. Finally, we close the skin and subcutaneous tissue with interrupted absorbable sutures (Fig. 6).

Medication

We always insert a petroleum gauze in the external auditory canal, which is left in place for 10 days and changed every 3 days. We apply a compression dressing for 7 days. We keep the wound moist with antibiotic ointment and hydrogen peroxide applied twice a day for 1 week. We check the ear daily for infection or haematoma during the first 5 days.
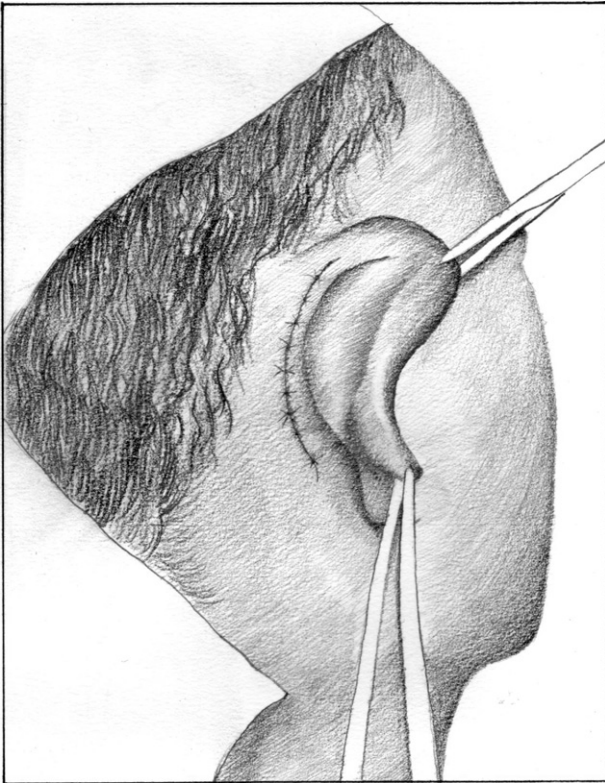
Fig. 6. Closure of the access.

Results

The mean duration of operation was 43 min (range 29–67). At 1-year follow-up the mean maximal interincisal mouth opening was 37.5 (SD ± 3.7) mm and all patients had good occlusion without dysfunctional symptoms; examination by conventional radiography and computed tomography showed acceptable osteosynthesis in all cases except one patient in whom fixation failed but with a satisfactory occlusion: no patient needed to return to the operating theatre for adjustment because of the malocclusion.

The integrity of the external ear was preserved in all cases with no auditory stenosis or aesthetic deformity. No patients reported permanent weakness of the facial nerve or injury to the auriculotemporal nerve. Temporary weakness of the frontal branch of the facial nerve was found in 1 case, but function had returned to normal after 1.6 months. There were no cases of salivary fistula, sialocele, or Frey syndrome, and no infections, haematomas or scarring.

Discussion

Many methods of access to the mandible technical variants have been described, and they can be divided into two main groups: transoral and transfacial.

Transoral access, also called the mandibular vestibular approach,[5] permits the exposure of the entire mandibular skeleton from the symphysis to the condyle. This route is fast and technically easy, and has the great advantage that the scar is hidden in the oral cavity. The disadvantages are that it does not permit safe management of high condylar fractures or comminuted fractures that involve the lower border of the mandible, although the recent development of endoscopic techniques has helped.[6] The risks of this approach are the potential damage to the mentalis nerve and the possibility of malposition of the lower lip as a result of poor technique when repositioning the mentalis muscle during closure.[7]

The three main transfacial approaches are: submandibular, retromandibular, and preauricular, and technical variants and combinations of these have resulted in different routes to gain exposure of the mandibular skeleton.

The submandibular access,[8] also called the Risdon approach, is indicated for many procedures. Its two main disadvantages are potential injury of the marginal mandibular branch of the facial nerve, and the placement of a visible scar. This route does not allow an easy approach to the condylar and symphyseal regions of the mandible. The variants of this approach include posterior extension towards the mastoid region, and anteriorly towards the submental region, with or without a "stepped/zigzag" incision or a lip-splitting approach. Finally, bilateral submandibular accesses can be connected at different levels in the neck with a complete exposure of the mandible.

Retromandibular access permits the exposure of the ramus, condyle, and coronoid process. The route can be retroparotid, transparotid, or preparotid.[9,10] The three main concerns about it are: potential injury to the facial nerve, postoperative salivary complications related to damage to the parotid, and the visibility of the scar.

Preauricular access is mainly indicated for approach to the mandibular condyle. The incision can be placed in different regions related to the tragus, and it can be extended towards the temporal area in different sites depending on the preauricular hair. Apart from the potential injury to the facial nerve and the possibility of a visible scar, postoperative concern is related to the potential development of Frey syndrome.[11,12]

These are the three most commonly used routes to access the mandibular skeleton. The retroauricular transmeatal approach can be considered a technical variant of the preauricular approach, and this method is advocated for high fractures of the condylar head, but it can be a difficult approach for fractures of the condylar base.[2–4] The facial rhytidectomy approach,[13] which allows wide exposure of the mandibular skeleton, can be considered to be associated with the preauricular and the retroauricular approach without a transmeatal route. The classic and modified Blair incisions are made by the preauricular plus the retromandibular approaches.[14] Finally, the association between the submandibular, the retromandibular, and the preauricular or retroauricular approaches, with or without a transmeatal route, is used for wide exposure of the mandible, the infratemporal fossa, and the cranial base.[15]

Although we cannot draw any significant conclusions, the retroauricular transmeatal approach has an extremely low risk of injury the facial nerve, and leaves an invisible scar. The morbidity is negligible in terms of damage to the facial nerve, vascular injuries, aesthetic deformity, auditory stenosis, salivary fistulas, sialocele, and Frey syndrome. We think that further prospective clinical trials are necessary to assess and eventually develop this approach.

Acknowledgement

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