Int. J. Oral Maxillofac. Surg. 2016; 45: 284–291
http://dx.doi.org/10.1016/j.ijom.2015.11.005, available online at http://www.sciencedirect.com

International Journal of Oral & Maxillofacial Surgery

Clinical Paper

Trauma

Clinical and radiological outcomes of transoral endoscope-assisted treatment of mandibular condylar fractures

H.-J. You, K.-C. Moon, E.-S. Yoon, B.-I. Lee, S.-H. Park
Department of Plastic Surgery, Korea University College of Medicine, Seoul, Republic of Korea

H.-J. You, K.-C. Moon, E.-S. Yoon, B.-I. Lee, S.-H. Park: Clinical and radiological outcomes of transoral endoscope-assisted treatment of mandibular condylar fractures. Int. J. Oral Maxillofac. Surg. 2016; 45: 284–291.

Abstract. Fractures of the mandibular condyle are one of the most common craniofacial fractures. However, the diagnosis and treatment of these fractures is controversial because of the multiple surgical approaches available. The purposes of this study were to identify surgery-related technical tips for better outcomes and to evaluate the results as well as complications encountered during 7 years of endoscope use to supplement the limited intraoral approach in the treatment of mandibular condylar fractures. Between 2005 and 2012, 50 patients with condylar fractures underwent endoscope-assisted reduction surgery. Postoperative facial bone computed tomography and panoramic radiography demonstrated adequate reduction of the condylar fractures in all patients. No condylar resorption was detected, and most patients displayed a satisfactory functional and structural recovery. There was no facial nerve damage or transitory hypoesthesia, and there were no visible scars after the surgery. Transoral endoscope-assisted treatment is a challenging but reliable method with lower morbidity and a rapid recovery.

Key words: condyle; mandible fracture; endoscopy; radiology.

Accepted for publication 3 November 2015
Available online 28 November 2015

Fractures of the mandibular condyle are one of the most common craniofacial fractures. However, there are differing opinions among surgeons regarding the optimal treatment and management of these fractures. Although closed reduction is the most useful method, it can be more difficult to achieve an anatomical reduction compared with the use of open reduction and internal fixation (ORIF). In most cases, ORIF provides good alignment, establishes facial symmetry, and restores function and the anatomical environment; however, it does not always provide sufficient operative exposure.

The pre-auricular, submandibular, intraoral, and retromandibular approaches are the most commonly used routes of

access for ORIF of condylar fractures. Most surgeons prefer to treat condylar fractures by extraoral approaches rather than intraoral approaches because extraoral approaches provide good visualization of the operative field. However, extraoral approaches are associated with a high rate of surgical complications, such as salivary fistula formation, visible scarring, and facial nerve injury, compared with intraoral approaches.[1] The intraoral route is a good approach because it prevents facial scarring; however, it offers limited exposure and a worse visual field compared to the other surgical approaches. More recently, endoscope-assisted transoral approaches have been performed to overcome the limited visibility of intraoral approaches and have led to satisfactory results.[2] Although excellent visibility in areas of limited exposure can be obtained using an endoscope, the technique is technically challenging and there is a steep learning curve.[3]

The purpose of this study was to identify surgery-related technical tips for better outcomes of mandibular condylar fracture treatment using endoscopy. Refinements of the endoscopic transoral technique are reported, along with the postoperative results obtained over a 7-year period.

Materials and methods

Patients

The records of 50 patients who underwent the surgical repair of condylar fractures by endoscope-assisted reduction between 2005 and 2012 at a university medical centre in Korea were reviewed retrospectively.

The following indications were the inclusion criteria required for endoscopic treatment: adult patients with displaced unilateral condylar fractures, malocclusion and/or inability to achieve adequate occlusion with closed reduction, and vertical shortening of the ascending ramus. Patients with high condylar fractures such as intracapsular and condylar head fractures, non-displaced fractures, or fractures without functional impairment were treated by means of ORIF with an extraoral approach or closed reduction with intermaxillary fixation (IMF).

Radiological imaging, which included facial bone computed tomography (CT) and panoramic radiography, was performed prior to the surgery. IMF using an arch bar was performed in all patients under local anaesthesia on admission day 2, prior to the reduction. One surgeon performed all of the surgical procedures.

Surgical technique

A preoperative injection of 2% dental lidocaine was administered along the intraoral incision line for haemostasis. A 5-cm intraoral S-shaped incision was made from the ascending ramus to the vestibular mucosa, lateral to the second molar region. Dissection using Bovie electrocautery was performed before exposing the periosteum of the anterior border of the ramus. After achieving sufficient dissection, an endoscope was inserted to identify the fracture site. However, visualization was often difficult as the mandibular bone is not flat. For better visualization, the convex area of the mandibular angle was shaved with a burr or a rasp (Fig. 1).

After adequate visualization of the fracture line was achieved using endoscopy, the reduction was performed (Fig. 2A). Reduction was facilitated by releasing the IMF and pulling downward on the angle of the mandible. The surgeon used a trocar to reach the angle of the mandible for wire fixation, which facilitated a better reduction. A 0.5-cm stab incision was made in the nearby submandibular skin; the trocar was inserted percutaneously, and drilling of the mandibular angle was performed (Fig. 2B). An 8-mm screw was fixed through the trocar, and a double-folded 1–0 wire was inserted to hang on the fixed screw (Fig. 2C). Once the wire was hanging on the screw, the wire was twisted through the trocar. After removing the trocar, the wire was pulled downward to move the distal mandibular segment while an endoscope enabled visualization of the fracture site. Other options to access the mandibular angle for placement of a screw included an angulated drill and screwdriver system. The use of an 18-gauge needle inserted through the skin over the angle will allow placement of a wire without the need for the submandibular trocar; the wire is then hooked over the screw and pulled inferiorly.

After the distal mandibular segment was pulled downward, the proximal condylar segment was positioned in the correct place or manipulated into position using a bone hook. This is a good time to position the transbuccal trocar that is used for drilling and screw placement. Improper placement of this trocar made screw placement extremely difficult. A stab incision was made through the skin parallel to the anticipated direction of the facial nerve. Extraoral dissection is

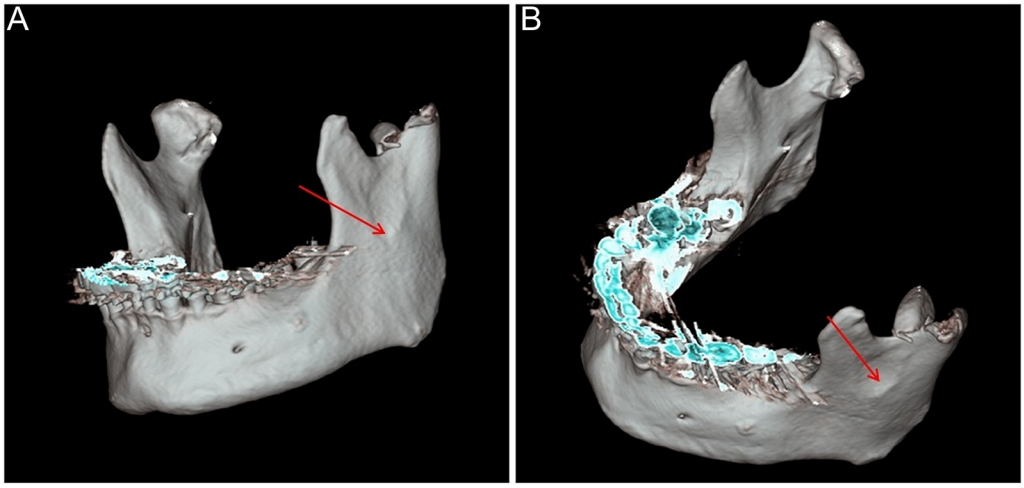

Fig. 1. A three-dimensional reconstructed CT image of the mandible illustrating a left-side condylar neck fracture. The red arrow points to a prominent area that interferes with the visualization of condylar fractures using an endoscope. For a better operative field via an intraoral endoscopic approach, surface shaving using a burr is needed.