

Treatment of Base of Condyle Fracture Using Minimal Access Surgery: Infinitesimal Peri-Angular Pterygomasseteric Transsectioning Approach (IPPTA): A Case Report

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The most common maxillofacial injury is a fractured mandible. The reduction and fixation of the condyle portion of the mandible are the most critical portions because they are connected to numerous significant anatomical landmarks. IPPTA is a minimally invasive method for treating the base of a condyle fracture and there are several other recognized ORIF techniques for treating different portions of condyle fractures. A 20-year-old male visited a clinic's outdoor department, complaining about an inability to close his mouth properly. He stated that he had a road traffic accident nine days prior. An orthopantomogram revealed a unilateral base of condyle fracture and left parasymphysis of the mandible. Apart from the fracture of the mandible, he did not have any additional injuries. We decided to use the intraoral vestibular technique for the parasymphysis fracture and the IPPTA for the base of the condyle fracture because the patient expressed a great deal of worry regarding the aesthetic aspect of the recovery period. A minimally invasive surgical procedure like IPPTA aids in overcoming postoperative recovery periods involving eating, swallowing and mastication, as well as the duration of maxillo-mandibular fixation.

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Key words: Mandible, IPPTA, Mandibular condyle, Maxillofacial trauma, Fracture

Introduction

Mandible fractures involving condyles range from 20.0% to 35.0%. The condyle's shape and narrow neck make it a structurally weak point in the mandibular bone. On rare occasions, a condyle fracture spares more severe outcomes, like a fractured base of the skull, which can cause stress and reduce propulsive force. The position and extent of the damage, the masticatory muscles' posture and movement and the presence of dental components all affect the fracture site¹. In order to improve postoperative quality of life, ORIF should be carried out in cases of base condyle fractures of the mandible. Considering very complex pericondylar anatomy, it would be appropriate to have a safe surgical approach that is minimally invasive and also effective for adequate exposure for reduction and fixation². There are several approaches for managing various areas of condylar area^{3,4}. Here in this case, the intraoral vestibular technique is used for the open reduction and internal fixation of the para-symphysis fracture and the extraoral-IPPTA for the base of condyle fracture⁵. This infinitesimal periangular Pterygomasseteric transectioning approach (IPPTA) gave a satisfactory surgical field without any major vascular bleeds during dissection⁵.

Adequate retraction and planned exposure provide a satisfactory field for surgery for condylar base reduction and fixation following the principles of mini-plate functional osteosynthesis. Post operatively Dietary intake, mandibular movements and pain associated with mandibular movements were assessed using Helkimo's Clinical Dysfunction Index.

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Case Report

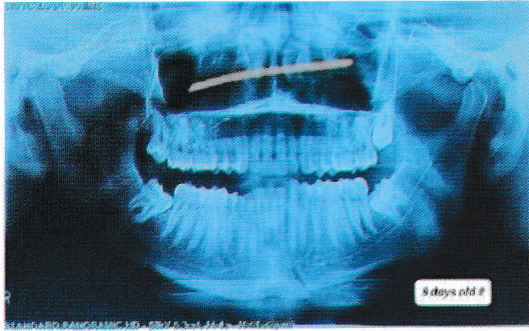
A 20-year-old male made an appointment with the OMFS department of a specialized Dental center Tooth care nine days after the road traffic accident. He had faced an emergency department immediately after the accident for primary treatment and then he was referred for better treatment. On clinical examination, there is mal-aligned occlusion and an open intraoral wound present in between tooth number 32 and 33. The patient cannot close his mouth properly as there is premature contact at the right posterior tooth and a posterior open bite on the opposite side. Medical history and personal history gave no contributory findings. Radiological examination orthropantomogram reveals there are multiple fracture lines present; one is in between tooth number 32 and 33 on left side and another fracture line runs from the deepest point of symgoid notch to lateral ramal border beyond the mandibular foramen (Photograph 1). Routine investigations for pre-anesthesia checkups were done and all were found to be within normal limits. The patient was asked to be admitted to the hospital for ORIF (open reduction and internal fixation).

Surgical procedure

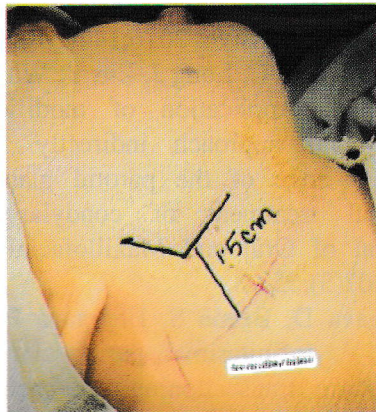
Under general anesthesia, nasal-endotracheal intubation was used during the operation under highly aseptic environments. For this patient, a minimal-access surgical procedure was planned utilizing IPPTA⁵. Local anesthesia solution comprising 2.0% lidocaine with 1:200000 epinephrine had been infiltrated into the surgical site (Jayson, Dhaka, Bangladesh). The periangular incision, approximately 2 cm, was planned 1.5 cm below the mandible's visible bony angle, or gonion (Photograph 2). Following the incision, at first subcutaneous tissue was marked; careful dissection was carried out to identity the marginal mandibular nerve (Photograph 3). The marginal mandibular nerve is a branch of the facial nerve that travels forward over the mandible to supply the muscles of the lower lip⁶. It originates from the anterior border of the lower part of the parotid gland and enters the neck, lying deep into the platysma and the investing layer of deep fascia (Photograph 4). The pterygoid-masseteric sling was located at the lower border of the jaw, between the anterior border of masseter muscle and the posterior part of tail of the parotid gland (Photograph 5). The parotid was pushed posteriorly by transsecting the pterygoid-

masseteric sling⁵. Up until the condylar base is exposed, dissection stays on the submasseteric plane, which divides muscle attachments to the lateral and posterior ramal boundaries (Photograph 6). ORIF was done with titanium miniplate and screws (Photograph 7). Vestibular incision was given at the anterior segment of the lower vestibule, the fracture part was adequately exposed and 2 miniplates with screws (tension and compression zone) were used for the fixation of the parasymphysis fracture (Photograph 8). Satisfactory occlusion was achieved with 4 IMF (intermaxillary fixation) screw-assisted maxillo-mandibular fixations. Closure occurred in layers following the achievement of appropriate hemostasis: the pterygoid- masseteric sling, fascia and platysma, the subcutaneous layer, followed by the skin⁵. Elastic adhesive bandages (Dynaplast) were used to provide sufficient pressure dressing for up to three postoperative days so that there is no need for surgical drainage, especially with this approach, IPPTA. As per regular process, following the hardware implant, injections of ceftriaxone 1 gram twice a day (BD), metronidazole 500 mg/100 ml trice a day (TDS), pantoprazole 40 mg twice a day and ketorolac 30 mg/ml BD were given intravenously for up to 1st postoperative days, followed by tablet cefixime 400 mg BD, tablet metronidazole 500 mg TDS, tablet ibuprofen 400 mg TDS and tablet pantoprazole 20 mg BD per oral up to 5th postoperative day.

Maxillomandibular fixation was discontinued after three days of the postoperative period and the patients were asked to follow soft semisolid diet for three weeks afterwards the procedure. Evaluations of the marginal mandibular nerve dysfunction, wound healing rate, dietary intake, mandibular function and any additional difficulties were documented. Marginal mandibular nerve function was assessed visually by examining the lower lip's symmetry and movement. When the patient smiled or blew on his mouth, there was no weakening of lower lip muscles. There were no infections throughout the post-operative phase and the wound healed satisfactorily. To measure diet intake, a modified Likert-type psychometric scale (MLTPS) was employed⁷. Using Helkimo's Clinical Dysfunction Index, mandibular motion range and pain related to it were evaluated⁸.



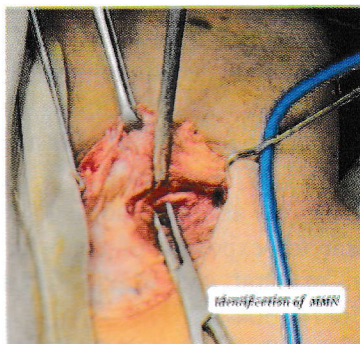
Photograph 1: An orthopantomogram reveals fracture line passes at the left parasymphysis and the right condyle base area



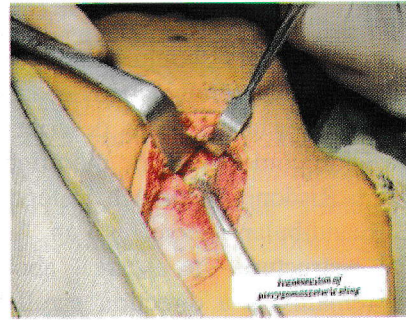
Photograph 2: Peri angular incision



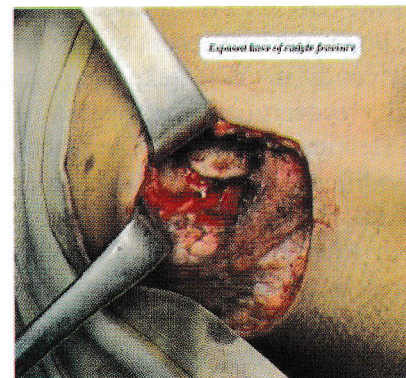
Photograph 3: Elevation of platysma



Photograph 4: Marginal mandibular nerve identification



Photograph 5: Transsection of pterygomasseteric sling



Photograph 6: Exposed Base of condyle Fracture



Photograph 7: Fixation of condylar part with miniplate and screw



Photograph: 8 Fixation of parasymphysis area with miniplate and screw

Discussion

Minimal-access surgery should be adopted where needed. For the mandibular condyle area, many surgical methods have been described; peri-angular incision comes with the modified limited access high Risdon's approach categories⁹. As marginal mandibular nerve is an important anatomical structure to care about, tissue dissection remains in a direction parallel to the nerve fiber (Photograph 4). This modified approach comprises a small curvilinear incision, which is aesthetically well accepted by the patient. The benefits of IPPTA include an avascular operative plane, the best access to the surgical site, adequate condylar base exposure and rapid functional recovery. Eight weeks following surgery, Helkimo's Clinical Dysfunction Index and a modified Likert-type psychometric scale (MLTPS for mandibular trauma) were used for evaluation. After eight weeks, the patient's VAS pain scores were quite satisfactory and he can chew solid food with little discomfort^{7,8}. Another study suggested that various postoperative complications can happen during open surgery due to the trauma to the condyle of the mandible, such as facial nerve palsy, infection, auriculotemporal nerve deficit, Frey's syndrome and an unattractive scar. When treating condylar base fractures, there is a debate continuing, whether using an open or closed technique. Minimal damage to the surrounding critical structures should be taken into consideration in cases of open reduction and fixation of condylar fractures in order to prevent hazards¹⁰. Closed reduction of mandible condyle fracture causes delayed immobilization and functional limitations compared to open reduction treatment. Proper anatomical knowledge is essential to minimize the risk of vital tissue damage, such as marginal mandibular nerve damage in an open reduction procedure^{11,12}. Therefore, appropriate case selection is necessary.

Conclusion

Appropriate case selection is very important in choosing different surgical procedures. A minimally invasive procedure like IPPTA is a well-accepted approach as it is associated with less postoperative morbidity and a favorable treatment outcome.

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