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Original Research Article

Analysis of facial nerve function after open reduction of mandibular condylar fracture via a retromandibular approach

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ABSTRACT

Mandibular condylar fractures account for a sizeable segment amongst facial fractures. Previously most of these fractures were managed conservatively with periods of Intermaxillary fixation(IMF). Shortcomings of such an approach such as prolonged pain, Tmj dysfunction and delayed return to function has shifted the discourse to open reduction and internal fixation of the fractured mandibular condyle.ORIF is the universally accepted and mainstay of intervention. Numerous extra oral approaches have been employed with various modifications. The retromandibular transparotid approach is a relatively simple and direct approach to the posterior mandible, enabling the surgeon to deal with sub condylar and condylar neck fractures with relative ease. This approach is a safe approach and does not result in permanent palsy of any of the branches of the facial nerve.

Aims: To analyse facial nerve function after ORIF of mandibular sub condylar fractures through the retromandibular transparotid approach.

Materials and Methods: 25 patients reporting with unilateral condylar fractures, sub condylar (16) and neck fracture (9) (Ellis classification)consenting for the study were taken up. All patients were followed up for 8 months. Post-operative nerve function was evaluated at 24 hours after surgery, 1,4,12 weeks and at the end of 8 months.

Results: 4(16%) patients presented with weakness of the facial nerve. Buccal branch (3) and zygomatic branch (1). In all cases the weakness was temporary and no permanent deficit was noted.

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1. Introduction

Open reduction and internal fixation of the fractured mandibular condyle is a widely accepted modality of treatment in mandibular condylar fractures and can consistently provide good functional outcomes.[1] The safety of the facial nerve is of paramount importance and since time immemorial has been the focal point of debates which in turn influenced the choice of treatment (Open vs Closed). Refinement and modifications in various surgical approaches have largely negated the issue of facial nerve damage and most approaches if carried out meticulously protects the facial nerve from permanent neural deficit.

Numerous approaches have been described such as submandibular, rhytidectomy, pre auricular and even the recent ones such as transmassetric anterior parotid approach.[2] We chose the retromandibular transparotid approach owing to its direct and simple access to the mandibular sub condylar region. This approach was first reported by Hinds and Girotti[3] in 1967. The placement of the incision also results in an inconspicuous scar and the added advantage of sufficient exposure to the fractured site.

2. Materials and Methods

25 patients presenting with unilateral condylar fractures, sub condylar (16) and neck fracture (9) (Ellis classification)[4] were selected after pertinent ethical clearance.

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Adult patients with fractures involving the condylar neck and subcondylar region was included. Bilateral cases were excluded. Functional evaluation was carried out based on the scale mentioned below (Table 1). No patient had pre-existing conditions affecting the facial nerve and pre op status of the facial nerve was normal in all patients.

Table 1: Tests patient asked to perform

Expression/movement	**Branch assessed**
Elevate and wrinkle forehead	Temporal branch
Closure of eyes	Zygomatic branch
Whistle, puff cheeks, blow cheeks	Buccal branch
Everet lower lip, move lower lip	Marginal mandibularis

2.1. Surgical technique

All the patients were operated by a single surgeon. A vertical incision was placed about 0.5 cm beneath the ear lobe parallel to the posterior border of mandible after palpating the same.(Figure 1) Skin and subcutaeonus tissue was undermined to aid closure and facilitate retraction. Scant platysma was incised with the help of bipolar cautery to expose the parotid fascia. Parotid fascia was carefully incised and either ends of this layer was tagged using 4-0 vicryl to aid in closure. The parotid gland was dissected anteriorly to expose the pterygomassetric sling (Figure 2) and the location of the posterior border of mandible was reconfirmed by palpation prior to incising the sling. Once the sling had been incised cleanly up to bone, sub periosteal dissection was carried out to expose the fractured site (Figure 3). The assistant would help distract the mandible inferiorly in order to reduce/locate medially displaced fractures. Alternatively a screw was placed at the angle region to help distract the mandible inferiorly. Only medially displaced fractures required these manoeuvres and minimally displaced segments required minimal manipulation.

Fractures were stabilised using a titanium 2.0 mm 4 hole plate with 2mm screws (6 mm length) all the layers were meticulously closed with 4-0 vicryl. Extra care was taken to achieve a watertight closure of the parotid fascia to prevent sialocele. Skin was closed using 5-0 prolene.

3. Results

All 25 patients were evaluated and no patients were excluded. Healing was satisfactory and none developed excessive scarring, infection of the hardware.3 patients developed temporary weakness of the buccal branch and 1 of the zygomatic branch.

All the 3 cases of buccal branch weakness were medially displaced condylar neck fracture. The average time from skin incision to closure after reduction and plating was 60 mins in all cases except medially displaced condylar neck fracture (3 cases which resulted in buccal branch weakness) in which the average time take for completion was 90-120 mins 2 cases of buccal branch weakness resolved completely within 8 weeks and one patient by the end of 11 weeks.

Fig. 1:

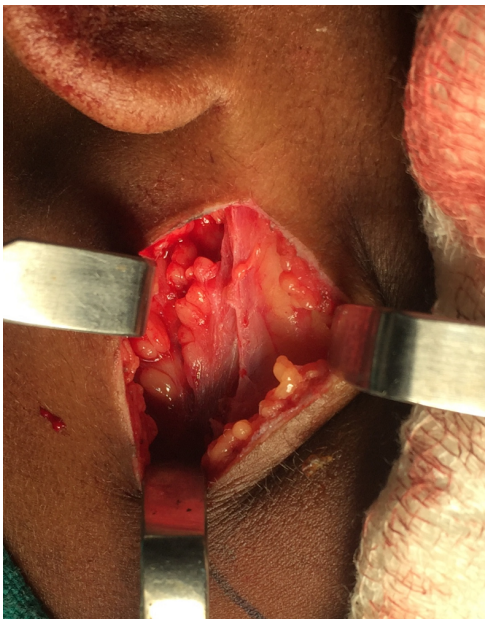

Fig. 2:

In 1 patient we encountered weakness of the zygomatic branch. This was a case of sub condylar fractures. All these cases recovered within 7 weeks.

All cases had stable occlusion and normal mouth opening post surgery. 3 cases had the formation of sialocele which responded to local treatment. The buccal branch of the facial nerve took more time to recover than the zygomatic branch.

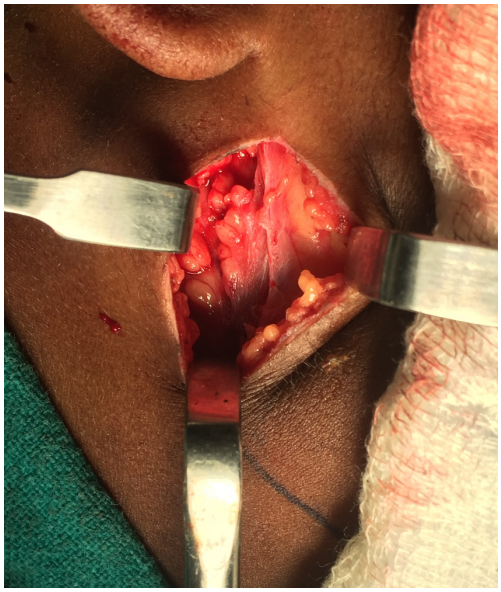

Fig. 3:

Fig. 4:

Fig. 5:

4. Discussion

Condylar fractures are extremely common (25-50%)[5] and Maxillofacial surgeons routinely encounter these fractures. Open reduction and internal fixation forms the cornerstone in the management of these fractures.

4 patients (16%) developed temporary palsy of the facial nerve. 3 patients reported with weakness of the buccal branch. The cases which resulted in buccal nerve palsy were all medially displaced condylar neck fracture which required considerable retraction in a superior and medial direction in order to grasp the displaced condylar fragment and then reposition it. It's also important to note that these fractures required considerable time to reduce and fix. This played a role in prolonged retraction of soft tissue leading to neuropraxia of the buccal branch. The retromandibular approach relies on the small window of anatomic space that exists between the buccal and the marginal mandibular branches. This anatomic window often is extremely small and often encounter the buccal branch which needs to be retracted and safeguarded away from the surgical site (Figure 6). This adds to the stress on the nerve leading up to weakness.

In cases involving weakness of the zygomatic branch we encountered brisk bleeding, probably from the retromandibular vein or its tributary which needed to be clamped and ligated. The optical area available to arrest such a bleeding is tiny and considerable retraction had to be done to effectively achieve hemostasis. These maneuverers would have added additional retractive forces on the nerve leading to its temporary palsy. Literature suggests a temporary damage to facial nerve between 12-25%.[6,7] Our results 16% is consistent with same.Mecobalamin 1500mcg

Fig. 6:

was prescribed for period of 3 weeks(once daily) in all these cases of neural injury to aid in recovery.

Various extra oral approaches to the mandibular condyle have been described such as the submandibular approach and preauricular approach. But the retromandibular transparotid approach offers the best access o sub condylar fractures and even neck fractures owing to its close proximity to the fracture site and direct acess. Intra oral access mediated by the use of an endoscope[8] has been advocated, but the costs involved in acquiring such an expensive set up override its marginal benefit.

Upon experiencing neuropraxia in cases of condylar neck fractures we have modified our approach to these fractures by utilising a transmassettric anterio parotid approach with a preauricular extension. This provided better field of vision and no incidence of facial nerve palsy. Further research into this approach is warranted and can serve to reduce incidence of temporary palsy.

Our study towards the use of the retromandibular tranparotid approach clearly showed us that this approach is safe, provides adequate and quick access to the mandibular condylar neck/sub condylar area and most importantly the facial nerve remains protected and may only result in temporary palsy which resolves completely leaving no permanent neural deficit.

5. Source of Funding

None.

6. Conflict of Interest

The authors declare that there is no conflict of interest.

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