IMF Screws as an Alternative to Arch Bar Fixation in Management of Mandibular Fracture
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Abstract
Intermaxillary fixation (IMF) is used for management of jaw fracture. Some of the commonly used technique of IMF include arch bar and various dental wirings. However IMF may not be efficiently attained in patients who are edentulous, partially dentulous or have compromised dentition using these traditional techniques. The purpose of this article is to report a case of condylar fracture managed successfully by IMF screws and to highlight its merits and demerits.

Key Words: IMF Screws; Arch Bar; Mandibular Fracture

Introduction
Intermaxillary fixation (IMF) is a basic and fundamental principle in the management and treatment of the patients with maxillofacial injuries. Traditionally arch bar and various dental wiring techniques are commonly used for management of various jaw fractures.(1) While arch bars provide an effective and versatile means of IMF, their use is not without consequences. This article is to report a case of condylar fracture managed successfully by IMF screws.

Case Report
A 38 years old patient reported to our department with complaint of restricted mouth opening and pain in left preauricular region. Patient gave history of fall one week back. On examination deranged occlusion with open bite was noted on the right side. Maximum inter-incisal opening was about 20 millimeters. Patient had fixed partial dentures in mandibular and maxillary posterior regions. Orthopantomogram (OPT) revealed an undisplaced subcondylar fracture on left side of the mandible (Fig. 1). There was no associated fracture elsewhere. Treatment plan included closed reduction with IMF. However lack of posterior teeth ruled out the possibility of use of Arch bars. Hence the use of IMF screws was chosen for this particular case.

Armamentarium: Instruments used for the procedure included, surgical drill bit, IMF Screws (2.5 mm diameter 8-12 mm length stainless steel), self-holding screw driver, ordinary screw driver, Power driven Micro-motor.

Procedure: The procedure was carried under local anesthesia. No incision was required. A hole was drilled transmucosally in the alveolar bone using drill bit loaded on power driven micro-motor. Holes were drilled in the inter-proximal spaces between the premolars at the mucogingival junction. The Screw insertion site was decided preoperatively based on clinical and radiographic information. Screws were placed in locations that provided appropriate vector to reestablish the premorbid occlusion, and afforded maximal safe distance from root prominences as well as mental foramina. The drill holes were oriented 90 degrees from the roots of the adjacent teeth. The IMF Screws loaded on self-holding screw driver was threaded and tightened in place. 26 gauge stainless steel wires was threaded through the heads of the IMF Screws in both upper and lower jaws and intermaxillary fixation attained (Fig.2). Post-operative orthopantomograms were used to evaluate screw placement (Fig.3). Follow up examinations were performed weekly or biweekly until the fracture healing was complete.

Figure 1: Pre-operative radiograph showing undisplaced left subcondylar fracture

Figure 2a and 2b: IMF attained using IMF screws
Discussion

Intermaxillary Fixation is a basic principle in treatment of maxillofacial injury. It provides a stable foundation to reconstruct facial form and function. Various modalities of IMF have been described in literature, including Erich arch bar, Eyelet loops, skeletal suspension wires. Arch bars are time-proven method of applying IMF with well-recognized advantages. However the disadvantages with use of arch bar includes:

1) Risk of penetration injury to the surgeon and assistant
2) Increased operative time in placement and removal
3) Soft tissue trauma to the periodontium, gingiva and buccal mucosa
4) Compromised oral hygiene
5) Requires usual component of healthy teeth for its placement

Arthur and Berardo first described the use of IMF screws for treatment of mandibular fracture.(1) Since their introduction they have been met with both enthusiasm and criticism. Many clinicians elect their use based on decreased risk of penetration injury, ease of placement, and decreased operating time. However its use is not free of complications. The commonly reported complications with use of IMF include(2):

1) Screw loosening
2) Wire loosening
3) Root Fracture/penetration
4) Ingested and aspirated hardware
5) Screw shearing (breakage) during placement.

Future trends: The conventional IMF screw (1st generation) used are simply modified monocortical self-tapping screws. They require preparation of drilled holes before their placement. Domenick and Andrew reported use of second generation self-drilling IMF Screws.(1) Advantage with second generation screw includes:

1) Power equipment not needed for preparation of drill holes. Hence the system can be used out-side operating room; eg, in ICU or emergency department.
2) Self-drilling feature provides a greater degree of tactile feedback during placement, allowing operator to change insertion location before root damage occurs.

Conclusion

Overall IMF screws have been shown to be a useful modality for establishing IMF. It is safe and time-sparing technique. However the surgeon must evaluate the potential benefits and limitations of IMF screws in order to provide safe and effective treatment.

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