

IMF Screws Alternative to Arch Bar Fixation in Partially Edentulous Patients

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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 edentulous or have compromised dentition using these traditional techniques. To overcome the cumbersome procedure of tooth borne appliances cortical bone screws were introduced in the year of 1989 to achieve IMF which is essentially a bone borne appliance. In this case report a 67 years old partially edentulous patient with left side angle fracture was successfully managed using IMF screws for intermaxillary fixation.

Key words: Mandible, intermaxillary fixation, IMF screws, fracture.

INTRODUCTION

Intermaxillary fixation (IMF) is an age old procedure which is used for treatment of fractures involving maxillomandibular complex. Conventionally various types of tooth mounted devices like arch bars, dental and interdental wiring, metallic and nonmetallic splints are used to achieve intermaxillary fixation. However tooth borne devices are always associated with problems like poor oral hygiene, periodontal health, extrusion of teeth, loss of tooth vitality, traumatic ulcer of buccal and labial mucosa and needle stick injury to the operator.

To overcome these problems, Arthur and Bernado¹ described the technique of IMF with the use of bone screws which is essentially a bone borne appliance, hence achieving dental occlusion by bone to bone fixation while eliminating the teeth related problems. IMF screws were initiated as a means of achieving temporary jaw fixation, as the

only therapeutic method, or prior to internal fixation of certain types of mandibular fractures.

Case report

A 67 years old male patient reported to the Department with complaint of restricted mouth opening and pain in the left side of the face. Patient gave history of trauma due to fall two weeks back. Patient was partially edentulous. On examination patient showed a maximum interincisal opening of 20mm. Orthopantomogram (OPG) revealed displaced angle fracture on the left side of the mandible. There was no associated fracture elsewhere. Treatment plan included open reduction with Intermaxillary Fixation. Use of archbars was ruled out due to lack of teeth and 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 mm



Fig.1: IMF Screws placed



Fig. 2: Fracture site exposed



Fig. 3: Plate fixation done

diameter 12 mm length stainless steel), self-holding screw driver, screw holder, Power driven Micro-motor, plates 2x4 hole with gap and screws 2x8mm.

Procedure

The procedure was done under general anaesthesia. Nasoendotracheal intubation was done for the patient. No incision was placed. A hole was drilled transmucosally in the alveolar bone using drill bit loaded on micromotor. Holes



Fig. 4(a): Pre operative OPG



Fig. 4(b): Post operative OPG

were made in the interproximal spaces between the premolars at the mucogingival junction. Screws were placed and the occlusion was re-established (Fig. 1). The holes were made with safe distance from the root of the adjacent teeth. The drill holes were at 90 degrees from the roots of the adjacent teeth. The IMF screws were loaded and tightened. 26 gauge stainless steel wire was threaded through the heads of the IMF screws in both the jaws and intermaxillary fixation was done. The fracture site was then exposed and plating was done in the left side angle of the mandible (Fig.2, 3). Postoperative OPG was taken to evaluate the placement of the screws (Fig.4b).

DISCUSSION

The ultimate goal of treating mandibular fracture is to restore the mandibular form and function to its pre-traumatic condition. Intermaxillary fixation is an indispensable requirement to achieve temporary dental occlusion during preoperative, operative and postoperative phase of treatment.

Screw insertion is easy and takes about 10 minutes with significant intra operative savings in time and cost and they are equally easy to remove, without anaesthesia. Also, there is a decreased chance of injury to the surgeon due to

sharp-ended wires, with consequently decreased risk of transmission of blood-borne disease to surgeon and patient alike.

In the technique described by Arthur and Berardo (1989), which utilizes at least four self-tapping titanium screws were inserted transmucosally, one for each quadrant². The screws, 8mm long and 2mm in diameter, are inserted at the junction of the attached and mobile mucosa between the canines and first premolars³.

There are many advantages to this procedure, with respect to the use of arch bars. First, insertion is easy and takes about 10 minutes with significant intraoperative savings in time and cost and they are equally easy to remove, without anaesthesia. In addition, the risks of damage to the dental papillae and oral mucosa are considerably reduced; the teeth and dental prostheses are not subjected to traction, and it is easier to maintain dental hygiene⁴. Finally, the method is compatible with rigid fixation using any plating system.

The main risk of using screws is the possibility of damaging dental roots while drilling the hole, especially in patients with dental crowding⁵. There are reports of other complications

such as breakage, or loss of screws, or the screws being covered by oral mucosa, infections associated with their placement, loss of teeth and anaesthesia due to injury to the mental or inferior alveolar neurovascular bundle⁶.

Coburn *et al.* reported iatrogenic damage to the root leading to tooth loss in 4% of cases⁷. Steven Key recommended a thorough clinical and radiographic assessment of the adjacent teeth at the site of screw placement⁸. The alignment of the teeth in three dimensions should be fully appreciated. They recommended placing self tapping screws between the canine and first premolar or the interpremolar region at the mucogingival junction or placing it below the root apices of the mandibular teeth or above the root apices of the maxillary teeth.

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.

REFERENCES

1. Arthur G, Bernado N., A simplified technique of maxillomandibular fixation. *Br J Oral Maxillofac Surg* **47**(11):1234 (1989).
2. Baurmash H, Farr D, Baurmash M., Direct bonding of Archbars in the management of maxillo mandibular injuries. *J Oral Maxillofac Surg* **46**: 813–815 (1988).
3. Thota LG, Mitchell DA., Cortical bone screws for maxillomandibular fixation in orthognathic surgery. *Br J Orthod* **26**(4):325 (1999).
4. Holmes S, Hutchinson I. Letter: caution in use of bicortical intermaxillary fixation screws. *Br J Oral Maxillofac Surg* **8**: 574 (2000).
5. Key S, Gibbons A. Recare in the placement of bicortical intermaxillary fixation screws. *Br J Oral Maxillofacial Surg* **39**:484 (2001).
6. Schneider AM, David LR, DeFranzo J, Marks MW, Molnar JA, Argenta LC. Use of specialized bone screws for intermaxillary fixation. *Ann Plast Surg* **44**:154-7 (2000).
7. Coburn DG, Kennedy DW, Hodder SC., Complications with intermaxillary fixation screws in the management of fractured mandibles. *Br J Oral Maxillofac Surg* **40**(3):241–243 (2002).
8. Stevan K, Gibbons A., Care in the placement of bicortical intermaxillary fixation screws. *Br J Oral Maxillofac Surg* **39**(6):484 (2001).