A New and Easy Technique of Maxillomandibular Fixation in Treatment of Mandibular Fractures

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ABSTRACT

The present work evaluated the success of maxillomandibular fixation (MMF) by a new and simplified technique in management of minimally displaced mandibular fractures. A total of 20 patients who sustained various types of mandibular fractures were treated at the Government Dental College, Rohtak, India by a new MMF technique. The patients were evaluated by preoperative and postoperative radiography, and clinical testing was performed to assess the degree of tooth mobility adjacent to the site of MMF. The time required for MMF was also noted. Patient recovery was uneventful in all 20 cases, and the period of MMF ranged from 2 to 4 weeks (mean 21 days). The outcome was good. The mean time for performing MMF was 12 minutes (range, 10 to 15 minutes). It is a simple, quick, economical, and minimally invasive technique. Its mechanical principle provides an advantage in preventing postoperative periodontal problems.

KEYWORDS: Fracture, maxillomandibular fixation, mandible

One of the most basic concepts in the treatment of facial fractures is that the dental occlusion can be used as a guide to fracture reduction and as a therapeutic tool. Thus, maxillomandibular fixation (MMF) is important in the treatment of maxillofacial fractures and in orthognathic surgery, and is usually applied by wiring together the fixed upper and lower arch bars. Many kinds of MMF methods, including an Ivy loop wiring, a wired arch bar, an acrylated arch bar, the Gottingen quick arch bar, a bonded arch bar, Dimac wire, thermoforming plates, and a bone screw system, have been reported.¹⁻⁴ However, these techniques are time and cost intensive, involve a complicated technique, and require laboratory support, extended operating time, and surgical interven-

tion. Here, we report on a retrospective study designed to evaluate a new and simplified technique for treatment of mandibular fractures.

PATIENTS AND METHODS

Twenty cases of jaw fracture (14 men and 6 women, age range 19 to 36 years) were selected, and the MMF was done. All patients were treated via closed reduction at our institution between May 2010 and November 2010. Of the 20 cases, 7 were mandibular body fractures, 5 were condylar process and mandibular body fractures, and 8 were mandibular angle fractures. The fractures were all minimally displaced (Fig. 1), and manual

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Figure 1 Minimally displaced fractures in panoramic radiograph.

reduction could be performed in all cases. All patients gave informed consent regarding participation in the study.

TECHNIQUE

In this technique, a wire is passed around the neck of the upper first molar tooth; both ends of the wire go from buccal to palatal, one along the mesial surface and other end along the distal surface of tooth above the maxillary contact (Fig. 2). Then both ends of the wire are passed back around the lower first molar from lingual to buccal aspect in a similar manner below the mandibular contact (Fig. 3). A similar procedure is repeated on the second molar and premolar teeth and on the contralateral side (molar and premolar region). After achieving the occlusion, the ends of the wire are twisted together on the buccal surface of the lower premolar and molar teeth on both sides (Figs. 4, 5, 6). At the end of treatment, wires can be easily removed with minimal trauma to patient.

RESULTS

The posttreatment course was uneventful in all cases. Dentition, occlusion, and periodontal tissue were within

Figure 2 Step 1 of the technique.

Figure 3 Step 2 of the technique.

Figure 4 Final step and achievement of occlusion.

normal clinical ranges. The period of MMF ranged from 2 to 4 weeks, with a mean of 21 days. The mean time for performing MMF was 12 minutes (range, 10 to 15 minutes).

DISCUSSION

Currently, the most common technique of fixating the jaw after a facial fracture is MMF, which can be achieved by various methods as described in the literature. The

Figure 5 Dotted lines represent the palatal and lingual aspect of the wire.

Figure 6 Achievement of occlusion in the patient.

factors affecting the ideal design for an MMF technique should include easy and quick application, minimal cost, need to securely hold the lower jaw tight to the upper jaw, avoidance of forces on front teeth as they are easily moved out of alignment; such a technique should also be minimally invasive, be safe for the patient during application and healing, and have an emergency quick-release system.

From our clinical experience, we feel the present design incorporates most of these ideal requirements. It is a simple, economical, and minimally invasive technique. It firmly holds the two jaws together, and forces are avoided on the anterior teeth. No specialized instrument or laboratory work is necessary. The total cost of this design is about \$0.22. The greatest advantage of this technique is that it only requires 10 to 15 minutes (mean 12 minutes) for MMF. Laurentjoye et al⁵ showed the mean time required for MMF was 13 minutes (range 5 to 30 minutes) while using intraoral cortical bone screws. In our opinion, the present technique is the quickest method of MMF, and it requires the least armamentarium as compared with other MMF techniques in the literature; it also has a quick release if needed in case of emergency. Another advantage is that the force vector in the upper molar tooth is neutralized by the force vector in the lower molar tooth, as they are equal and opposite to each other. This mechanical principle helps reduce postoperative periodontal problems. Engelstad and Kelly⁶ in their retrospective study compared embrasure wires and arch bars for intraoperative stabilization of mandible fractures. They concluded that for intraoperative MMF, embrasure wires offer significant advantages compared with arch bars by reducing application time

and possibly reducing the risk of disease transmission by decreasing the number of wires required for MMF. In the embrasure technique, the disadvantage is that it can be utilized only intraoperatively and thus is not suitable for prolonged MMF. Thus, it is limited in providing postoperative occlusal guidance such as in cases of closed treatment of condylar fractures.

The current MMF technique can be used either as an intraoperative aid to keep the mandible in the desired reduced position while the plates are being fixed, or as the only therapeutic regimen to immobilize the mandible for some time to ensure bone healing. Typical indications for its use are minimally displaced fractures, orthognathic surgeries, and tumor resection surgeries. However, it has some limitations for partially edentulous patients because premolars and molars are necessary for application and for patients with open interdental contacts and median mandibular fractures because it risks further displacement of fracture segments. As no specialized instrument or laboratory work is required, we believe that this technique could also help provide rapid MMF to stabilize maxillofacial fractures during mass casualties such as war injuries or natural calamities.

In conclusion, we found the present technique to be an easy, convenient, and quick alternative to other MMF techniques in management of minimally displaced mandibular fractures.

REFERENCES

1. Hönig JF. The Göttingen quick arch-bar. A new technique of arch-bar fixation without ligature wires. *J Craniomaxillofac Surg* 1991;19:366–368
2. Terai H, Shimahara M. Closed treatment of condylar fractures by intermaxillary fixation with thermoforming plates. *Br J Oral Maxillofac Surg* 2004;42:61–63
3. Otten JE. [Modified methods for intermaxillary immobilization]. *Dtsch Zahnarztl* 1981;36:91–92
4. Baumash HB. Bonded arch bars in oral and maxillofacial surgery. An update. *Oral Surg Oral Med Oral Pathol* 1993;76:553–556
5. Laurentjoye M, Majoufre-Lefebvre C, Siberchicot F, Ricard AS. Result of maxillomandibular fixation using intraoral cortical bone screws for condylar fractures of the mandible. *J Oral Maxillofac Surg* 2009;67:767–770
6. Engelstad ME, Kelly P. Embrasure wires for intraoperative maxillomandibular fixation are rapid and effective. *J Oral Maxillofac Surg* 2011;69:120–124