Maxillo Mandibular Fixation in Edentulous Scenarios: Combined MMF Screws and Gunning Splints

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Abstract A fracture of the maxillary or mandibular bone requires the afflicted to undergo a maxillo mandibular fixation for the establishment of pre traumatic occlusion. This process is quite tedious and consumes a considerable period of time before any surgical procedure can commence. Such a situation can be complicated in case the individual with maxillomandibular fracture has sparse or absent dentition; for such cases a splint is fabricated or an erstwhile existing denture is used for maintaining a vertical jaw proportion. Stabilizing such splints to the jaw requires various invasive approaches that can bring into harm's way, adjacent soft tissue vital structures. We describe here an innovative technique combining the time tested method of the "gunning splint" and the advanced minimally invasive MMF screws for obtaining closed reduction in edentulous jaw fractures.

Keywords Gunning splint · Maxillo mandibular fixation · MMF screws · Edentulous jaws

Body

The physical characteristics of the jaws are altered following the loss of teeth, there is resorption of the alveolar process and the resistance to fracture is also reduced due to changes in the structure of the bone due to ageing.

In the bony injuries involving an edentulous maxillofacial skeleton, one of the priorities of many is to restore the vertical

dimension previous to trauma. Such vertical dimension has been managed traditionally by the gunning splint [1]. A new technique using bone plates to maintain the edentulous vertical dimension has also been recently described [2].

The dental splint was originally described by gunning in 1866, they were initially applied for dentate individuals with fracture of the jaws, and these were modified for edentulous jaws with bite blocks in place of molar teeth and a space in incisor area for feeding purposes.

Gunning splints can be stabilized using various techniques such as per alveolar wiring, circummandibular wiring, circumzygomatic wiring or cortical screws. Even through the cortical screw technique of stabilizing gunning splint had been described in literature [3], rarely it has been applied. The concept of the MMF screws arises from a modification of the cortical screws, which were not completely inserted and 4–5 mm were left outside the bone level to pass tie wires around them (Fig. 1) [4].

There are complications associated with the use of per alveolar and circummandibular wiring for the stabilization of the splint. The per alveolar wiring is associated with some morbidities such as puncturing and contamination of the maxillary sinus, or injuring of the palatal vessels during its placement. The circummandibular wiring has complications associated with it such as scarring at the entry site, injury to adjacent soft tissues, the structures at the floor of mouth and entrapment of the wire into the fracture line during the process of tightening of the wire, if located close to fracture site.

Technique

The MMF screws are minimally invasive and the approach of its application is through the buccal cortex. The screw have

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Fig. 1 A partially edentulous patient with poor periodontal health status, with gunning splint stabilized with MMF screws

a diameter of 2.5 mm and a length of 12 mm making them bicortical, hence can provide adequate transverse stability to the splint (Fig. 2).

The ideal locations for their placement would be at the midline of the maxilla or mandible where the bone density is maximal and usually there is minimal chance of encountering any vital structures. Other sites would be the canine region and if the sinus level allows it can be also placed at the premolar molar region.

Arch bars are incorporated onto the splint so that if required elastics can be applied for traction or additional tie wires can be placed. The site of screw penetration is marked on the splint and is predrilled onto it or maybe drilled at the start of the procedure. Once the splint is drilled it is placed onto the ridge and using an appropriate size drillbit and the splint holes as guide, the drill hole is made for the MMF screw to be placed.

Fig. 2 A cross sectional diagram of MMF screw stabilizing a gunning splint

This technique can be applied only in situations where gunning splint can be applied. Such technique cannot be applied in situations of atrophic maxilla or mandible, a bone height of at least 10 mm should be present for its application.

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