Use of Mono Cortical Screws as an Aid to Zygomatic Complex Fracture Reduction

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Abstract

Introduction Zygomatic complex fractures by virtue of its anatomic area poses a great challenge in reduction of the fracture. Uses of various methods have been mentioned in English literature.

Method A new technique describing the use of reduction screw with a self-holding screwdriver in reduction of the zygomatic complex fracture.

Conclusion We found the method to be simple and effective and recommend its application in daily practice.

Keywords Zygomatic complex fracture · Fracture reduction · Mono cortical screw

Introduction

Proper anatomical reduction of the fracture segments is the key step in fracture management. Proper alignment results in healing of the fracture, good cosmesis and improved function of the involved bone. Many instruments and devices are designed and used for this purpose. Zygomatic complex fracture by virtue of its anatomic area poses a great challenge

in reduction of the fracture. Traditional fracture reduction forceps are difficult to use as it can crush the anterior wall of maxilla, also presence of the orbit in the vicinity further reduces the applications of many instruments. Zygomatic hooks and elevators can be used but we suggest a simpler method by mere use of monocortical screw.

Technique

Expose the infraorbital rim in zygomatic complex fractures and in Lefort fractures for reduction. Surgeon can use a suitable approach to expose the fracture. After proper dissection and exposure of the fracture site, a hole is drilled on the fractured bone where it does not interfere with positioning the plate across the fracture line. Reduction screw is inserted into this hole monocortically so as to have the screw projected out into the mobile segment of the fracture. The reduction screw is an 8–10 mm long 2 mm diameter screw. It is anchored usually to the mobile segment i.e. the distal segment in zygomatic complex fractures and medial segment in Lefort fractures. Avoid placing the screw in the line of osteosynthesis so as to facilitate rigid fixation when the reduction screw is still in position. Engage a self-holding screwdriver to the projecting part of the reduction screw (Fig. 1). Fracture segment should be mobilized and reduced by manipulation of the self-holding screwdriver that holds the reduction screw. While the self-holding screwdriver is still held in the reduced position, a suitable flat elevator may be used to ascertain the reduction of lateral wall of the orbit. Once clinically acceptable reduction is achieved, suitable bone plates are used to fix the fracture along the lines of ideal osteosynthesis (Fig. 2). The reduction screw is removed and the surgical site closed.

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Fig. 1 Self-holding screwdriver engaged to the projecting part of the reduction screw

Fig. 2 Plate fixation across the fracture while the bone being reduced

Discussion

Attempts to treat fractures dates back to 25–30 centuries BC. The Smith Papyrus is likely the first document in which treatment of several types of zygomatic fractures are described. Du Verney (1751) described the advantage of the mechanical forces of the masseter and temporalis muscles on the zygoma in his approach to closed reduction technique, Lothrop (1906) described trans antral approach, Keen (1909) approached intraorally through the gingivobuccal sulcus,

Gillies (1927) described the temporal approach and Dingman and Natvig described supra orbital approach [1].

Various zygomatic hooks were used in reduction of zygomatic bones in the past [2, 3]. But the present day basis of management emphasising early ambulation and anatomic reconstruction for better cosmesis limits the use of these appliances. On the contrary the method of reduction and fixation using the reduction screw provides a good anatomic reduction, as it is an open reduction with better control over the fractured segments.

Proper reduction of the lateral wall of the orbit is important for the proper reconstruction of the orbital volume and for the antero-posterior projection of the zygomatic bone [4]. This can be achieved effectively in our method as the operator can feel the reduction by passing a flat instrument with the fractured bone held firmly in the reduced position. Kim et al. [5] proposed use of intermaxillary fixation screws with wires to reduce the fractured malar bone. In our experience use of screw with a rigid self-holding screwdriver gives a better anchorage and control over the fracture reduction.

Anticipated complications for this procedure may be avulsion of bony fragment if the screw is not placed on a firm bony segment, slippage of the screw into the maxillary sinus mainly due to the thin anterior wall of maxilla; and if the bony segments are small, multiple screw osteotomy points can compromise the vascularity of the bony segment. However we encounter any of these problems in our experience.

References

1. Cohen AJ, D N Zygomatic Complex facial fractures In: <http://emedicine.medscape.com/article/1284142-overview>
2. Chidzonga MM (1989) Reduction of the isolated fracture of the zygomatic arch using a bone hook. *Odontostomatol Trop* 12(2): 65–67
3. Poswillo D (1976) Reduction of the fractured malar by a traction hook. *Br J Oral Surg* 14(1):76–79
4. Yonehara Y, Hirabayashi S, Tachi M, Ishii H (2005) Treatment of zygomatic fractures without inferior orbital rim fixation. *J Craniofac Surg* 16(3):481–485
5. Kim MG, Yoo RE, Chang H, Kwon ST, Baek RM, Minn KW (2009) An intermaxillary fixation screw traction wire: an aid for facial bone fracture repair. *Ann Plast Surg* 63(1):71–73