

Reduction of isolated zygomatic arch fractures using dental instrument: Report of 2 cases and review of the literature

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Abstract

To assess the effectiveness of a dental instrument for reduction of isolated zygomatic arch fractures. Two patients were admitted to our clinic representing isolated unilateral zygomatic arch fracture. The common presenting complaints were pain, swelling and difficulty in mouth opening. Fractures were confirmed with plain radiography and computerized tomography. The fractures were reduced with upper buccal sulcus approach by dental instrument. Patients achieved satisfactory maximum mouth opening within 10 days. At follow up after 6 months, there was complete healing without any complication. This procedure is cost effective, time saving, safe and effective to manage isolated zygomatic arch fractures under local anaesthesia with satisfactory outcomes.

Keywords: Zygomatic arch, dental instrument, forceps, treatment, trauma, prognosis.

Introduction

Isolated zygomatic arch fracture is rare in zygomaticomaxillary complex fracture, representing approximately 10% of all cases in the literature.¹⁻³

There are several conventional techniques that can be used for reducing isolated zygomatic arch fractures such as: the Gillies temporal approach, hook elevation, upper buccal sulcus technique, intranasal transantral approach, and open reduction.^{2,4,5} Besides, many devices such as; elevators, towel, curved mosquito, different types of hooks, aqua splint and percutaneous wire suture technique were defined to immobilize the repositioned fragments.^{6,7} Although these techniques are noninvasive, treatment of zygomatic arch fractures depends on aesthetic and functional defect and the degree-types of displacement.^{1,3,5,6} However, there is limited information about the effectiveness of extraction forceps in reducing

zygomatic arch fractures in the literature.

The purpose of documenting this case is to present the simplicity and outcomes of reduction of isolated zygomatic arch fractures using extraction forceps as a reduction instrument through upper buccal sulcus technique.

Case Report

Two patients were admitted to our clinic for facial trauma along with isolated zygomatic arch fractures. Two cases were performed in the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Karadeniz Technical University from January 2012 to May 2013. The first one had unilateral isolated zygomatic arch fracture on the left side because of interpersonal assault the week before and the second one had unilateral zygomatic arch fracture on the right side because of industrial accident ten days ago. The common complaints of the patients were pain, swelling, difficulty in mouth opening and zygomatic arch region sensitiveness on palpation. However fracture mobility was not observed in both patients. The zygomatic arch fractures were confirmed with a plain radiograph and computerized tomography (CT) images (Figure-1 A,B,C,D) and classified according to Yamamoto classification system² into Type II (displacement with bone contact at all fracture lines). Each patient was informed about the possible risks and benefits of the procedure and signed a

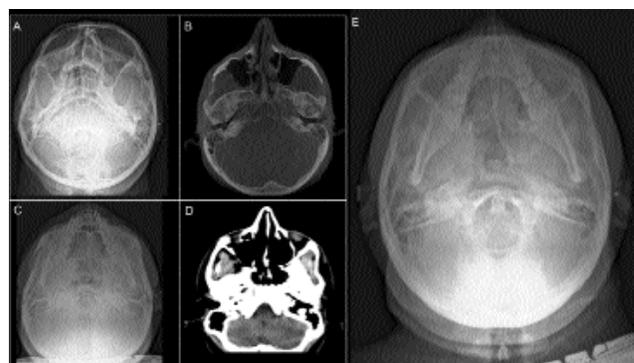


Figure-1: Preoperative plain radiographs showing the depressed zygomatic arch fractures (A, right side and C, left side). Preoperative Axial CT images showing the type of the fractures (B, right side and D, left side). Plain radiography was taken immediately after the operation (E, left zygomatic arch).

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Figure-2: Minimally horizontal incision on the zygomatic buttress (A). Settling the extraction forceps in to the fractured area (B). Using the extraction forceps with lower force for reduction of the fracture (C).

detailed consent form.

The patients with isolated zygomatic arch fractures were treated with upper buccal sulcus technique by using dental instrument (extraction forceps) for internal reduction. After local anaesthesia, a horizontal incision was made in the free gingiva for a distance of approximately 2 cm over the zygomatic buttress extending through the mucosa, submucosa, and any buccinator muscle fibers (Figure-2A). After the mucoperiosteal elevation, zygomatic arch was felt and one handle of a extraction forceps was inserted into the wound under the fractured area and advanced posteriorly, as well as superiorly (Figure-2B). The depressed zygomatic arch was elevated into its proper anatomical position by the forceps with controlled force while the reduced area was palpated by the surgeon's other hand extraorally (Figure-2C). And then, the forceps were moved back and forth to check whether the arch was in the correct position. The wound area was closed with 3/0 silk suture after the symmetry of two zygomatic arches had been confirmed.

Postoperative radiographs were taken immediately to confirm the adequacy of zygomatic arch reduction (Figure-1E). The patients were then discharged after the operation and suggested avoiding direct force on the operated site and not to sleep on the affected side for a period of 8 weeks. All of the patients gained satisfying mouth opening within 10 days and no complications such as infections, trismus and nerve damage were observed. The patients were followed up for the following 6 months and no additive operation was necessary.

Discussion

Different techniques and devices have been described by

many authors concerning the evaluation and treatment of zygomatic arch fractures.³ Besides, it is important to select the adequate technique and instrument in treatment of zygomatic arch fracture because inadequate stabilization and reduction of zygomatic arch may result in malunion or asymmetry.^{1,8} In the present study, we used extraction forceps for reduction of depressed zygomatic arch fracture by upper buccal sulcus approach as closed reduction due to minimal displacement with bone contact at all fracture lines (Class II). As a result, the patients were treated with satisfactory results without any complication.

Temporal approach by Gilles widely used for the treatment of zygomatic arch fracture due to several benefits such as; easy to achieve under local anaesthesia, little risk of nerve damage or direct trauma to globe exists.³ But it has more complications risk and needs large forces to reduce the fragments.¹ Recently, the upper buccal sulcus technique of Keen has become quite an effective technique in the management of zygomatic arch fractures because of advantages of no visible scar and minimal surgical procedures over the Gilles temporal approach.^{2,3,9}

Courtney⁹ was of the opinion that upper buccal sulcus technique using Bristow's or Rowe's elevator was succesful in elevating the depressed zygomatic complex and arch regardless of the time lag between injury and surgical reduction. Krishnan B et al⁸ treated twenty five patients with unilateral isolated zygomatic arch fractures by reduction of fractures by using a dental forceps through an upper buccal sulcus approach with pleasant results. They stated that performing this procedure under sedation or local anaesthesia in clinic setting or an emergency department makes it a highly cost-effective and time-saving tool in the armamentarium of an oral and maxillofacial surgeon.

Researchers proposed the use of a towel for reducing depressed zygomatic arch fractures as a quick, simple and effective technique.¹⁰ They stated that this technique is also minimally invasive, has little risk of infection or neurovascular injury. Mezitis et al⁵ described the use of a curved mosquito for reducing isolated zygomatic arch fractures as a less invasive method. However it requires an experienced and skillful surgeon and has a limitation of using force to reduce the fractures.

Different types of hooks have also been used for the reduction of those fractures.^{5,7} J shaped curved hook elevator, most frequently used, can be performed intraorally and extraorally, but it needs a preauricular stab incision and general anaesthesia and it may damage the

facial nerve branches.⁷

Dong-Kyu Kim et al³ informed aqua splint and suture technique for isolated zygomatic arch fractures with good facial contour and functional results. In addition, percutaneous reduction using a wire suture extraorally was described as a minimally invasive and excellent reduction method.⁶ However these techniques have a risk of weakness of facial nerve by pressure and may be more complicated compared to the other techniques.^{3,10}

Our method has notable advantages in the management of isolated zygomatic arch fractures. Using of extraction forceps as a reduction instrument allows reduction of the fracture effectively without requiring any other special instrument. Extraction forceps is a blunt equipment so there is low risk of damage to soft tissues and less force is required for elevation of depressed fragment compared to using the elevators. The surgeon can control the force and feel the reduction of fracture easily. However, this technique may not be used for reduction of comminuted arch fractures.

Conclusion

Reduction of isolated zygomatic arch fractures using extraction forceps is a simple, quick and cost effective technique. The patients had good functional, aesthetic and radiological outcomes. So this technique can be preferred for surgical treatment of isolated zygomatic arch fractures instead of complex procedures.

Conflict of interest: The authors declare that they have no conflict of interest.

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