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Original Article

Fractures of angle of mandible – A retrospective study

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ABSTRACT

Aims: This retrospective study was done to evaluate the efficacy of single miniplate osteosynthesis at superior border of angle of mandible.

Material and methods: In this study 50 patients were treated by single miniplate osteosynthesis according to Champy's principle. Bite force generated was used as a parameter for judging the efficacy of internal fixation. In this article we present our experience over the years in the management of the fractures of angle of mandible based on this model.

Results: Most patients were of 21–30 yrs of age with unilateral angle fracture of mandible except one patient who had isolated bilateral angle fracture. The patients were treated successfully according to Champy's principle of osteosynthesis. There was a progressive improvement in the bite force generated after osteosynthesis.

Conclusions: The angle of the mandible is an anatomically weak and an area susceptible to fracture. The presence of an impacted or partially erupted third molar tooth further weakens it. Angle of mandible is the most common site for fracture however, bilateral angle fracture is very rare and uncommon.
Osteosynthesis according to Champy's model led to an early functional improvement as demonstrated by the bite force generated.

Keywords: *Fracture mandible, Champy's principle, Osteosynthesis, Bite force*

INTRODUCTION

The mandibular angle is fractured in approximately 25%–33% of all mandibular fractures[1] as is the transition area between dentate and edentate regions of the mandible. In fact, according to Moore,[2] a change in the direction of the bone tends to weaken the angle region of the mandible and increases its susceptibility to fracture. This is observed in the area where the horizontal body and vertical ascending ramus meet. Presence of incompletely erupted third molars is associated with an increased risk of angle fracture. However, multiple factors influence fracture patterns in the mandible, such as presence of soft tissue bulk, direction and severity of the forces, impact, and biomechanical intrinsic characteristics of the mandible (e.g., bone density and mass).[3]

Road traffic accidents[4] and assaults[5] are the primary cause of mandibular fractures. Signs and symptoms include pain and edema, change in occlusion, lower lip paresthesia, hematoma, ecchymosis, loose teeth, and crepitation on palpation.[6]

According to Paza et al,[7] displaced angle fractures can rarely be adequately reduced by maxillomandibular fixation alone. Therefore, an open reduction and internal fixation of these fractures should be performed. However, several studies have documented high complication rates after rigid internal fixation of the mandibular angle.[8] The purpose of

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this study was to review cases of fractures of the mandibular angle and their associated complications.

PATIENTS AND METHODS

Information was obtained retrospectively from clinical case sheets, surgical records, and radiographs of 50 patients treated for fractures of the mandibular angle from 2007 until 2011, in the Department of Oral and Maxillofacial Surgery at Darshan Dental College And Hospital, Udaipur. The data recorded included patient age, gender, etiology, method of surgical treatment, medication, and complications. The radiographs were evaluated with respect to the condition of the reduction, dislocation, failure of the fixation, and fracture union. Success was considered if the fracture fixation provided stability, i.e., there was no inter fragmentary mobility, infection, or nonunion of the bone fragments. Follow-up of patients was done up to 6-month post-operatively. Bite force readings were recorded in kilograms, using a locally manufactured bite force recorder. Bite force recording was done pre-operatively before fixing Erich's arch bar and post-operatively at each follow-up (7th, 15th, 21st and 90th day). The mean bite force generated in normal young healthy individuals was used for comparison.

Intermaxillary fixation was maintained for 7–14 days for all patients. Antimicrobial and anti-inflammatory drugs were administered for a week after the surgery. An antiseptic mouthwash, 2.5% povidone iodine, was recommended. Patient was advised functional exercises after removal of intermaxillary fixation for 3 months.

RESULTS

The higher prevalence of trauma was observed in patients of younger age group. 36% of cases belonged to 11–20 years age and 48% cases between 21 and 30 years. The majority of fractures in this study were sustained in motor vehicle accidents (74%), followed by altercation/assault (14%). Patient demographic data is shown in Table 1.

Table 1 Demographic data ($N = 50$).

	Category	N *(%)*
Gender	Males	40 (80%)
	Females	10 (20%)
Etiology	Road traffic accident	37 (74%)
	Interpersonal violence	7 (14%)
	Fall	4 (8%)
	Accidents at work	2 (4%)

Fig. 1 Pre-operative intra-oral photograph fracture bilateral angle of mandible.

Higher prevalence of fracture was on left side, 29 (58%); right side, 20 (40%); and only 1 bilateral angle fracture (2%) (Figs. 1 and 2). No relevant medical history affecting bone healing, notably diabetes, prolonged steroid therapy, compromised immunity, and associated bony pathology were noted in any of the patients.

Of the total 50 patients, 46 underwent surgery under general anesthesia and 4 under local anesthesia. All patients were treated via intraoral approach, open reduction and fixation (Figs. 3–6), using a 4-hole 2.0-mm stainless steel miniplate fixed on the external oblique ridge (Figs. 7 and 8) as per Champy et al[9] Isolated fracture of mandibular angle accounted for 20 patients, and when associated fractures were detected, the mandibular parasymphyseal fracture was the most prevalent (10 contralateral, 3 ipsilateral) followed by body fracture (8 contralateral, 2 ipsilateral).

The mandibular third molar was present in 45 cases (90%). It was extracted in 42 cases where it was involved in the fracture line. The remaining 3 cases, third molar was not involved in the fracture line, hence not extracted.

Fig. 2 Pre-operative OPG fracture bilateral angle of mandible.