

Complications of facial plating: A retrospective study

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Abstract

Background: Trauma is the leading cause of death in the first 40 years of life. WHO Statistics indicate that 1 million people die and between 15 and 20 million are injured annually in road traffic accidents. Facial fractures can be treated conservatively by closed reduction and intermaxillary fixation, or invasively by means of open reduction and internal fixation. **Objectives:** To analyze the possible complications with facial plating in maxillofacial trauma patients and their management. **Methodology:** Out of 103 patients there were 78 Male patients (75.7%) and 25 Female patients (24.3%). Most common etiology was road traffic accident accounting to 88.3 % and others include assault, domestic injuries like cooker burst and fall accounted for other 11.7 %. Out of 22 complications palpability of plates was seen in 13.6% (2.9%), screw loosening in 9.1% (1.9%), fracture site mobility 4.5 % (1%), infection 18.2 % (3.9%), exposure 13.6% (2.9%), parasthesia 27.3 % (5.82 %) and other complications were 13.6 % (2.9%). **Conclusion:** Plating systems for the management of facial trauma have been a tremendous advance over the previous methods that were available such as intermaxillary fixation and suspension wires. Not only do patients recover more quickly with plates, they usually have a more accurate and stable reduction.

Key Word: Facial Plating, Injury, Facial Fractures Maxillofacial

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related trauma^{5,6,7}. Facial fractures can be treated conservatively by closed reduction and intermaxillary fixation, or invasively by means of open reduction and internal fixation^{8,9,10}. With improvement in the design of plating systems and the routine teaching of plating techniques during medical residencies, the incidence of complications has steadily decreased and the recently published series comparing plates and older techniques have shown fewer complications with plates¹¹⁻¹⁶. However, complications do arise with the use of plates and screws.

INTRODUCTION

Trauma is the leading cause of death in the first 40 years of life. WHO Statistics indicate that 1 million people die and between 15 and 20 million are injured annually in road traffic accidents¹. The reported major causes of injury differ among geographical regions. Facial injury related to vehicle accidents has the highest incidence in developing countries^{2,3,4}. On the other hand, developed countries are experiencing an alarming increase in assault trauma, which has become more common than vehicle-

AIMS AND OBJECTIVES

To analyze the possible complications with facial plating in maxillofacial trauma patients and their management

MATERIALS AND METHODS

A retrospective study was conducted at Navodaya Dental College, Raichur, Karnataka from year 2009-2013. A total of 103 patients with maxillofacial fractures were reported to the department of oral and maxillofacial surgery of Navodaya Dental college, Raichur, Karnataka,

India were treated with stainless steel miniplate fixation were analyzed retrospectively for complications and its management. In these 103 patients with facial plating the following complications were analyzed

1. Plate Exposure
2. Palpability Of The Plate
3. Infection
4. Nonunion Of Fracture
5. Screw Loosening
6. Plate Exposure
7. Parasthesia
8. Other

RESULTS

Out of 103 patients there were 78 Male patients (75.7%) and 25 Female patients (24.3%). Most common etiology was road traffic accident accounting to 88.3 % and others include assault, domestic injuries like cooker burst and fall accounted for other 11.7 %. A total of 22 complications were seen among 103 patients who were selected for the study retrospectively.

Table 1: Complications seen among the study subjects

COMPLICATIONS	NUMBER	PERCENT
Palpability	3	13.6%
Screw Loosening	2	9.1%
Fracture Site Mobility	1	4.5%
Infection	4	18.2%
Exposure	3	13.6%
Paresthesia	6	27.3%
Other complications	3	13.6%
Total	22	100 %

Out of 22 complications palpability of plates was seen in 13.6 % (2.9%), screw loosening in 9.1% (1.9%), fracture site mobility 4.5 % (1%) , infection 18.2 % (3.9%), exposure 13.6 % (2.9%), parasthesia 27.3 % (5.82 %) and other complications were 13.6 % (2.9%) of the total complications that were analyzed.

Table 2: Types of fractures seen among study participants.

Types of Fractures	Frequency	Percent
LEFT ZYGOMATIC COMPLEX FRACTURE	11	10.7
RIGHT ZYGOMATIC COMPLEX FRACTURE	4	3.9
LEFT PARASYMPHYSIS	20	19.4
RIGHT PARASYMPHYSIS	9	8.7
LEFT MANDIBULAR BODY FRACTURE	12	11.7
RIGHT MANDIBULAR BODY FRACTURE	6	5.8
LEFT ANGLE FRACTURE	7	6.8
RIGHT ANGLE FRACTURE	7	6.8
LEFT RAMUS FRACTURE	1	1.0
DENTOALVEOLAR FRACTURE	3	2.9
LEFT FRONTO ZYGOMATIC FRACTURE	4	3.9
AMELOBLASTOMA	3	2.9
LEFT ZYGOMATIC ARCH FRACTURE	2	1.9
LT Angle #, RT ParasympHysis	3	2.9
LT Mandibular#, LT Condyle#, RT Condyle#	3	2.9
LT ParasympHysis, RT ParasympHysis	3	2.9
LT ParasympHysis, RT ParasympHysisand LT Zygomatic Complex#	2	1.9
LT Angle#, Symphysis#	1	1.0
LT Zygomatic Complex#,LTParasympHysis, RT parasympHysis	1	1.0
LT ParasympHysis,LT Ramus#	1	1.0

Out of all the complications that were analyzed parasthesia accounted as the largest complication, it was observed in six patients where four of them had pre operatively and two developed post operatively with the plating in the mental region, all the patients recovered over different periods of time.

Table 3: Site of Palpable palates

	Frequency	Percent
Left fronto zygomatic	4	3.9
Right infraorbital	1	1.0
Right buttress	3	2.9
Left parasymphysis	21	20.4
Right parasymphysis	9	8.7
Left mandibular body	14	13.6
Right mandibular body	7	6.8
Left angle	7	6.8
Right angle	6	5.8
Dentoalveolar	3	2.9
Reconstruction plate	3	2.9
Lt frontozygomatic,ltinfraorbital,lt buttress	13	12.6
Lt angle,symphysis	1	1.0
Lt frontozygomatic,ltinfraorbital,ltbuttress,ltparasymphysis,rtparasymphysis	3	2.9
LT Parasymphysis,RTParasymphysis	3	2.9
LT Angle,RTParasymphysis	1	1.0
RT Angle,LTParasymphysis	1	1.0
LT Angle,RT Angle	1	1.0
Total	101	98.1
Missing System	2	1.9

Table 3: Other Complication seen among study subjects

		Frequency	Percent
palpability	Yes	3	2.9
	No	100	97.1
Screw loosening	Yes	2	1.9
	No	101	98.1
Fracture Site Mobility	Yes	1	1.0
	No	102	99.0
Infection	Yes	4	3.9
	No	99	96.1
Exposure	Yes	3	2.9
	No	100	97.1
Parasthesia	Yes	6	5.8
	No	97	94.2

Palpable plates were observed in 3 patients, and it is not uncommon with larger plates and 2mm screws especially in a thin individual and frontozygomatic region. However, with the introduction of thinner plates this complaint has become uncommon and the only solution would seem to be plate removal after allowing sufficient time for the fracture to stabilize. Table Screw Loosening was observed in two cases in combination with infection, removal of the infected screw and appropriate antibiotic coverage solved the problem. Table Fracture Site Mobility was observed in one patient who was put on intermaxillary fixation for 4 weeks to stabilize the fracture. Table Infection was seen in four patients in whom two were in combination with screw loosening where infected screw was removed and was followed by appropriate antibiotics. Table Exposure of plate was seen in three patients, plate exposure may occur for a number of reasons including improper closure

technique, the wound breaking down because of inadequate suture material, or an underlying wound problem. If the plate has been properly placed and the fracture is rigidly fixed, plate exposure is of little consequence and the mucosa will often grow over the exposed mandible and plate or the mucosa may be closed secondarily with the patient under local anesthesia. Table Other complications were three one was maxillary sinusitis where the patient recovered with regular steam inhalation, other was facial disfigurement where we lost the followup and other one was fibrosis over the masseter muscle who is still under follow up. Table

DISCUSSION

The objectives in the treatment of facial fractures are to re-establish lost function and esthetics with minimal disability and complications. Conservative treatment to achieve this is performed by immobilizing the mandible

for the healing period by intermaxillary fixation which is achieved by dental wiring, arch bars, cap splints, and gunning splints. Surgical treatment of mandibular fractures involves intraoral or extraoral opening of the fracture site and direct osteosynthesis with trans osseous wires, lag screws, or bone plates^{17,18}. A number of fixation methods have been advocated for the treatment of mandibular fractures¹⁹. Now-a-days, open reduction with internal fixation is the norm and tiny plates are used to immobilize fragments of the jaw. Morbidity of the procedure is low with the advantage that the patient returns to normal function within days of treatment¹⁸. Intraoral approach is preferred unless indicated otherwise, as it is esthetically accepted, time saving, and less traumatic. Miniplateosteosynthesis was first introduced by Michelet *et al.* in 1973 and further developed by Champy and Lodde in 1975.²⁰ According to them, physiologically coordinated muscle function produces tension force at the upper border of the mandible and compressive forces at the lower border. The plates are applied close to the tension zone of the mandible. The screws are monocortical to prevent injury to dentition and alveolar nerve.^{20,21} The parasthesia rate in our series of cases was 5.82 % where as other studies like Jain *et al.* and Parmar *et al*²² showed 0 % and Guimond *et al*²³ showed 60 % Juergen Z *et al*²⁴ was 25 %, . In this study, malocclusion was not observed in any case and was similar to the other studies^{22,25,26} However, malocclusion recorded was 4.4% in a study by Moreno *et al.*²⁵ which was based on Champy's principle. Infection rate in our case series was 3.9 % whereas other studies the infection rates were: 5.4% in the study of Guimond *et al.*,²³ 0% in Juergen Z²⁴, 10% in Jain *et al*²⁶ and 6.6% in Parmar *et al.*²² Plate exposure due to wound dehiscence was 2.9 % in our study, 0% in a study by Jain *et al.*,²⁶ whereas 6.6% was reported by Parmar *et al.*²² and 2.7% by Guimond *et al*²³. Screw loosening in our study was 1.9% where as Juergen Z²⁴ reported in 5.8 % of the patients. Fracture site mobility accounted to 1% in our study series where as 10% cases in a study series of 20 patients by Jain *et al*²⁶

CONCLUSION

Plating systems for the management of facial trauma have been a tremendous advance over the previous methods that were available such as intermaxillary fixation and suspension wires. Not only do patients recover more quickly with plates, they usually have a more accurate and stable reduction. Complications can arise with the use of plating systems, but they are becoming rarer as the plates improve and more surgeons are fully trained in their use. In experience obtained at our institution a complication related to plating can be traced to a technical error on our part and these are continuing to

decrease as the plating systems improve and experience is gained.

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