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Comparison of intra-oral and extra-oral approaches in mandibular angle fractures

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Abstract

Aims and Objective: The aim of this study was to compare the outcomes of intra-oral and extra-oral approaches to mandibular angle fractures.

Material and Methods: A Retrospective study was conducted in the Department of Maxillofacial surgery, Government Dental College and Hospital, Ahmedabad, India, for 1 year. Total 80 Patients with angle fracture that required open reduction and internal fixation were include in this study. All the Patients were reviewed for age, gender, presence of other fractures, type of surgical approach, OT time, which was calculated from the beginning of the incision till the closure. Length of admission and complications such as malocclusion, non- union, re-operation, post-op infection, neurosensory deficit, facial nerve injury, implant retrieval, scarring and wound dehiscence were also studied.

Result: There were a total of 80 patients with mandibular angle fracture who underwent open reduction and internal fixation, 40 (50%) of them were treated intra-orally and the remaining 40 (50%) of them extra orally. The main etiology of injury was RTA in both the groups 30 (75%) in extra-oral group and 25 (62.5%) in intra-oral approaches. The mean operating room time for intra-oral approach was 81.89 minutes when compared to 99.8 minutes for extra-oral approach ($p < 0.05$). Intra-oral approach had a mean length of stay of 2.1 days and 2.69 days for extra-oral approach ($p = > 0.05$). Malocclusion was seen in 5 (12.5%) subjects of extra-oral group and 8 (20%) subjects of intra-oral approach patients ($p = > 0.05$).

Conclusion: We conclude the use of intraoral approach while clinically favorable with single miniplate along the superior border.

Keywords: Intra-oral, extra-oral, mandibular angle fractures

Introduction

Mandibular Fractures happens roughly two third of all maxillofacial injuries, among which mandibular angle fracture account for 26-35 percent^[1]. The fracture angle of mandible is the 2nd uttermost frequent location of fracture and linked with high risk of complications^[2]. The major explanation of the fracture of mandibular angle are narrower cross-sectional area, the anatomical shift from horizontal to vertical rami and presence of third molar and muscle force present in that location^[2,3].

Road traffic accidents are the leading cause of mandibular fractures, followed by assault and interpersonal violence^[3]. Another cause of fractures among the young population is the lack of law and order and the absence of regulations in the area, which leads to reckless driving, especially on motorbikes. Several additional national and regional-level investigations have produced similar findings. Mandibular angle fractures are prevalent and account for 31% of all mandibular fractures^[4]. Current research indicates that the risk of mandibular angle fracture is enhanced if the lower third molars are impacted^[4]. The unanticipated transition from horizontal to vertical rami is an alternative and significant element that makes the mandibular angle more brittle^[5].

Fractures of the mandibular angle are treated using a number of procedures, including intraoral and extraoral incisions^[5]. Open reduction and internal fixation with plate and screws is the treatment of choice for mandibular angle fractures^[5, 6]. However, the biomechanics of mandibular angle fractures make therapy problematic.^[7, 8]

In the past, open reduction and internal fixation of mandibular angle fractures were done using approaches outside of the mouth. It could leave a scar that doesn't look good and could damage the facial nerve, but it does allow for better exposure and direct plate fixation, which are both pros^[9-11].

The intraoral approach is better because it doesn't leave scars on the outside of the mouth and allows the surgeon to see the occlusion while putting the bone plates in place. This means that less damage is done to other parts of the face and body [10, 13].

In our study, the ease of approach to the site in relation to time taken for the surgery, visualization of fracture site, ease of fracture reduction and post-operative complications involved were compared for intra oral and extra oral approaches.

Material and Methods

The present retrospective study was conducted in the Department of Maxillofacial surgery, Government Dental College and Hospital, Ahmedabad, India for one year.

Inclusion criteria

- Patients with angle fracture that required open reduction and internal fixation
- Age between 18-65 years

Exclusion criteria

- Patients with pre-existing medical conditions
- Infected fracture site
- Patients who were treated by closed reduction

Methodology

Charts of patients were reviewed for age, gender, presence of other fractures, type of surgical approach, number of plates, OT time, which was calculated from the beginning of the incision till the closure.

Length of admission and complications such as malocclusion, non-union, re-operation, post-op infection, neuro-sensory deficit, facial nerve injury, implant retrieval, scarring and wound dehiscence.

Intraorally the fixation was done with four whole centrally spaced 2.5mm miniplate placed anteriorly on the external oblique ridge. For extra oral approach skin incision was given in the submandibular region followed by layered dissection and fixation of fracture with two mini plates. Preop and postop radiographs were taken and the patients were followed up for 4 months.

Statistical analysis

The data was collected and put into a spreadsheet (Microsoft Excel 2010), and then it was sent to the data editor page of SPSS version 19. (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages and means. Test applied for the analysis was chi-square test. The level of confidence interval and p-value were set at 95% and 5%.

Result

There were a total of 80 patients with mandibular angle fracture who underwent open reduction and internal fixation, 40 (50%) of them were treated intra-orally and the remaining 40 (50%) of them extra orally.

Male patients formed the majority of mandibular angle fractures 30 (75%) in extra-oral group and 25 (62.5%) in intra-oral approaches ($p > 0.05$). the mean age of patients in intra-oral group was 30.01 years and 32.59 years in the extra-oral group.

The main etiology of injury was RTA in both the groups 30 (75%) in extra-oral group and 25 (62.5%) in intra-oral approaches. 8 cases in intra-oral group and 10 in the extra-oral group were bilateral angle fractures ($p > 0.05$).

Of the cases approached intra-orally, 20 cases had multiple fractures, whereas 29 cases of the extra-oral cases were

associated with other fractures ($p > 0.05$).

The mean operating room time for intra-oral approach was 81.89 minutes when compared to 99.8 minutes for extra-oral approach ($p < 0.05$).

Intra-oral approach had a mean length of stay of 2.1 days and 2.69 days for extra-oral approach ($p > 0.05$).

Malocclusion was seen in 5(12.5%) subjects of extra-oral group and 8 (20%) subjects of intra-oral approach patients ($p > 0.05$).

Post-op infection was observed in 10 (25%) subjects of intra-oral group and 15 (37.5%) subjects of extra-oral group ($p > 0.05$). Neurosensory disturbance occurred in 5 (12.5%) subjects of extra-oral group and 18 (45%) subjects of intra-oral group ($p > 0.05$). Facial nerve injury occurred in 15 subjects of extra oral group and none in the intra-oral group, ($p > 0.05$). Which is found to be significant. Extra-oral scarring occurred in 10 subjects of extra-oral group and none of intra-oral group ($p > 0.05$).

Discussion

The ideal approach for the treatment of mandibular angle fractures continues to be a topic of research and debate [14]. We intended to compare the intraoral and extraoral approaches for the treatment of angle fractures in terms of outcomes.

Male patients formed the majority in our study as appeared in other studies. In our study age was statistically non-significant among group. Although this difference in age is not clinically significant, it may indicate that the age of the patient may influence the surgeon's approach choice. As it represents the surgeon's intention to minimize excessive oral scarring in younger patients or a presumption that younger patients would recover more quickly, this is the case [15].

Extramandibular repair was modestly linked with the presence of further mandibular fractures. This might indicate that complex mandibular fractures were treated extraorally. The rate of problems in this research was equivalent to or somewhat greater than in previous trials, particularly with the extraoral method. This may be the result of the study's tiny sample size.

The most common complication with mandibular fractures is infection, especially angle region. Intra oral infection rate was 25% versus 37.5% for the extra oral group as compared with the other studies ranging from 1.5% to 28% [16] increased extra oral infection rate could be attributed to increased OT time and improper patient maintenance and wound dehiscence as seen in our study.

Neurosensory disturbance was seen in 45% of intraoral group when compared to 12.5% of extraoral group. A rate ranging from 3.3%-20% is reported in the literature [15, 18] in 34% of extra oral cases unfavourable scarring was reported, as compared with reports ranging from 3.3% to 6.15% [15, 18].

12.5% of the extraoral cases experienced transient malocclusion when compared to 20% of intraoral cases. This may contribute to the difficulties encountered during anatomic reduction of the fracture and intraorally accessible surgical site accessibility. A range of 3.3%-8.3% is reported in the literature [18]. Both the methods of fixation are comparably successful for the treatment of mandibular angle fractures.

The mean operating room time for intra-oral approach was 81.89 minutes when compared to 99.8 minutes for extra-oral approach ($p < 0.05$), Which is in contrast to Toma *et al.* [9] who's study showed an additional 20 minutes of operating time for intra oral approach. Length of hospital stay was slightly higher in the extra oral group compared to the intra oral groups.

One of the limitations of our study is that it is a retrospective review, it is not possible to compare intra oral versus extra oral

approaches without randomization.

Why a surgeon picks a certain angle fracture technique cannot be rationalized accurately. Some of the deciding considerations are the patient's age, the severity of the fracture, patient desire, and the surgeon's comfort and training. Other studies, including Ellis, show that the intraoral approach of treating angle fractures with a single miniplate along the superior border is linked with the fewest problems. Future prospective studies of angle fracture repair will provide light on the optimal treatment method for angle fractures.

Conclusion

Both the methods of fixation are useful in the treatment of angle fractures of the mandible. On the basis of our results we recommend to use intraoral approach while clinically favorable with single miniplate along the superior border.

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