J Maxillofac Oral Surg 9(1):9-12

COMPARATIVE STUDY

A comparative study between transbuccal and extra-oral approaches in treatment of mandibular fractures

Tejraj P Kale[1] ✉ · **Baliga SD**[2] · **Nitin Ahuja**[3] · **Kotrashetti SM** [4]

[1] Reader
[2] Professor
[3] Postgraduate Student
[4] Professor and Head

Dept. of Oral and Maxillofacial Surgery, KLE VK Institute of Dental Sciences, KLE University, Belgaum

Received: 09 October 2009 / Accepted: 9 April 2010

Abstract
Background and objectives Mandibular angle fractures continue to be a common type of facial injury. The objectives in treatment are to effect rapid healing by anatomic reduction and fixation and to restore function and appearance with minimal disability and complications.
Traditionally, when open techniques are utilised, the extra-oral approach is performed through a skin incision concealed in the submandibular crease. However, patients develop unsightly scars and there is a risk of injury to the marginal mandibular nerve.
In comparison, the trans-oral approach, performed through an oral mucosal incision, results in minimal external scarring or injury to the marginal mandibular nerve and allows direct visualisation and confirmation of the desired occlusion during the placement of the miniplates. The basic aim of the study was to provide a treatment for the mandibular fractures which results in minimal scarring and fulfills all the functional needs of the patient.
Study design Patients coming to KLES PK Hospital and MRC with mandibular angle fractures requiring open reduction and internal fixation admitted under OMFS were taken for the study. The sample size of the study was 15. In one group, the patients were treated by extra-oral approach and the other group by transbuccal approach.
In patients treated by transbuccal approach, special armamentarium consisting of trocar, cannula, and cheek retractor were used; and in both the groups, semirigid fixation was done using two miniplates with around a distance of 1cm.
Results Total of 15 patients were treated, 10 with transbuccal approach and 5 with submandibular approach. It has been found that both techniques fulfill the functional requirements of the patients. Patients treated with submandibular approach developed obvious unsightly scars, whereas transbuccal approach results in minimal scarring.
Conclusion The results associated with clinical observations suggest that transbuccal approach is a superior and less time consuming approach than extra-oral approach, but it requires special instruments, lots of skill by the operating surgeon in using the armamentarium, and a skilled assistant.

Keywords Transbuccal · Trochar and cannula · Occlusion · Scar

Address for correspondence:

Tejraj P Kale
Reader
Dept. of Oral and Maxillofacial Surgery
KLE VK Institute of Dental Sciences
KLE University
Belgaum, Karnataka, India
Ph: +91 9448472891
Fax: 0831-2470640
E-mail: tejrajkale@yahoo.com

Introduction

The aim of mandibular fracture treatment is the restoration of anatomic form, function with particular care to reestablishment of occlusion and facial aesthetics. The presence of teeth in the maxillofacial region distinguishes the management of maxillofacial trauma as unique, compared to the long bones.

In recent years, close consideration of the biomechanical principles of treatment of mandibular fractures has led to the use of operative as well as conservative methods. The traditional treatment method of mandibular angle fractures involved either closed reduction with MMF or open reduction and internal fixation with or without MMF.

Extra-orally, the traditional approach to open reduction and internal fixation was through a skin incision concealed in a submandibular shadow. It has the disadvantage of leaving an unaesthetic scar

Case 1

Fig. 1 Transbuccal approach trocar in-situ

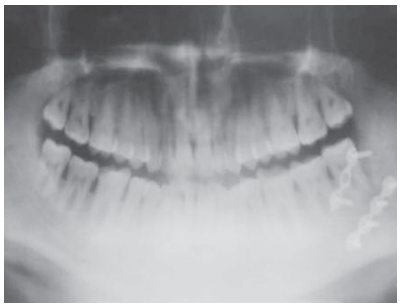

Fig. 2 Postoperative radiograph

Fig. 3 Transbuccal approach postoperative scar

and also puts facial nerve at greater risk, though the advantage are better exposure and direct application of fixation plate.

Another approach called as transbuccal approach was advocated and the main advantage is that it results in no external scarring and also it allows direct visualization and conformation of the desired occlusion during placement of the bone plates.

In the light of these factors, the aim of the present study is to evaluate the efficacy of both the trans-oral and extra-oral approaches.

Material and methods

The study sample consisted of patients (10 patients treated via transbuccal approach and 5 treated in extra-oral approach), who were admitted under OMFS in PK hospital and MRC with mandibular fractures requiring open reduction and internal fixation. All the treated patients i.e. 15 were male, with an average age of 26.9 years.

Inclusion criteria for this study were patients with unilateral or bilateral fractures of mandibular body, ramus, and angle fracture. Patients with mixed symphysis and condylar fractures were excluded from the study. Surgical approach was either through extra-oral or transbuccal approach.

In the extra-oral approach, the skin incision was given about 1.5–2cm below and parallel to the inferior border of mandible, 2–3 cm in length along the skin crease. In case of extra-oral laceration, the fracture was approached through the existing laceration.

Adequate exposure of the fractured segments was obtained. The segments were manipulated and satisfactorily reduced. Intra-operative occlusion was achieved and temporary intermaxillary fixation was done. The fractured segments were then fixed using two miniplates with around 1cm distance. The screws were placed away from the roots of the teeth and inferior alveolar canal.

Once adequate fixation was achieved, intermaxillary fixation was released. After adequate hemostasis the wound was closed in layers with 3–0 vicryl and skin was closed with 4–0 ethilon, and dressing was given over the sutured incision area.

In patients treated via transbuccal approach, the incision was placed beginning on the anterior border of ascending ramus at

Table 1

Case No	Fracture site	Approach	Time taken	Difficulty faced in fixation	Mouth opening achieved	Complication
1.	Rt angle, Lt parasymphysis, Rt ZMC	Extra-oral	50 min	Moderate	42mm	Nil
2.	Lt ZMC, Lt body	Extra-oral	55 min	Moderate	37mm	Infection
3.	Lt angle, Rt parasymphysis	Extra-oral	55 min	Moderate	40mm	deranged
4.	Lt angle	Extra-oral	50 min	Moderate	41mm	Nil
5.	Lt angle, Rt parasymphysis	Extra-oral	1hr 45 min	Difficult	38mm	deranged
6.	Lt angle	Transbuccal	45 min	Moderate	41mm	Nil
7.	Rt angle, Lt parasymphysis	Transbuccal	45 min	Moderate	32mm	Nil
8.	Lt angle, Rt parasymphysis	Transbuccal	50 min	Moderate	40mm	Nil
9.	Lt angle	Transbuccal	50 min	Moderate	42mm	Nil
10.	Lt angle	Transbuccal	45 min	Moderate	41mm	Nil
11.	Lt angle	Transbuccal	55 min	Moderate	40mm	Nil
12.	Rt angle, Lt parasymphysis	Transbuccal	55 min	Moderate	39mm	Nil
13.	Lt angle, Rt parasymphysis	Transbuccal	50 min	Moderate	41mm	Nil
14.	Rt angle, Lt parasymphysis	Transbuccal	45 min	Moderate	40mm	Nil
15.	Rt angle, Rt ZMC	Transbuccal	55 min	Moderate	40mm	Nil

Case 2

Fig. 1 Plating via extra-oral approach

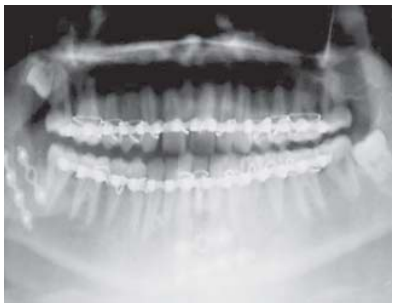

Fig. 2 Submandibular approach postoperative radiograph

Fig. 3 Postoperative submandibular approach scar

the level of maxillary occlusal plane. It was then carried down just along lateral portion of anterior ramus and, following the oblique line, continued forward approximately 5mm from the junction of the attached mucosa and vestibule to extend anteriorly to the level of approximately the mandibular first molar. The mucoperiosteal flap was then raised and fractured site exposed. Fractured ends were reduced under direct vision; satisfactory occlusion was achieved and held in that position by intermaxilllary fixation. A small extra-oral stab incision was given to permit the insertion of transbuccal canula. Location of the extra-oral stab incision was guided by the location of the fracture line and the position of facial vessels. The trocar was advanced into operative site with blunt dissection through the stab incision perforating the periosteum at the area planned for the plate fixation. The cheek retractor was applied which helped to stabilise the trocar assembly during movement towards and away from the fracture site. The titanium plate was then placed in relation to fractured site. Holes were drilled and screws (2mm diameter, 6 or 8mm in length) were threaded into position till proper depth and tightness was achieved. Trocar assembly was removed and the intermaxillary fixation was released, and occlusion rechecked. Intra-oral wound was closed using 3-0 vicryl and extra-oral stab incision with 5-0 ethilon.

Results

All the patients were clinically evaluated for stability of osteosynthesis, post surgical occlusion, healing of extra-oral stab incision, fate of 3rd molar and infection at operative site at the intervals of 7 days, 2 weeks and 3 months postoperatively.

Stability of fracture fragments was evaluated manually at intervals of 2 weeks and 3 months, which was satisfactory.

Occlusion was checked postoperatively at intervals and all patients showed satisfactory centric occlusion in all follow -up reviews.

Postoperative infection was observed in 20% [1] patient. Pus discharge was noted form the sutured CLW, through which fractured site was exposed. But it was resolved with 7 days of antibiotics.

In 85.71% [12] third molar was removed intraoperatively, in 14.92 % [2] it was not removed.

There was satisfactory healing of the extra-oral stab incision 2 weeks postoperatively and scar was inconspicuous at subsequent follow-up appointments 3 months postoperatively in patients treated by transbuccal approach.

Discussion

Fractures of angle mandible can be vertically or horizontally favourable or unfavourable. The extra-oral approach was initially a popular approach for reduction and fixation of angle fractures as it provided a good visibility, accessibility and control of proximal fracture fragments.

But the concern regarding a long cutaneous scar and likelihood of injury to branches of facial nerve i.e. marginal mandibular branch made it less popular, though it still remains a common technique used in the hands of experienced operators.

Use of an intra-oral approach became more popular as it gave the patient no external scar, and injury to marginal mandibular nerve was avoided. But in some fractures of angle of mandible there was difficulty in adapting and positioning of plate and control of proximal fragments especially in unfavourable fractures. Only superior border plating could be done with intra-oral approach without adequate visualization of the reduction of fracture at the lower border of mandible. This becomes even more difficult when a second fracture requires reduction.

Keeping in mind the advantages and disadvantages of both these approaches, a combined approach - 'Transbuccal approach' came into use (Kazanjian 1933).

In transbuccal approach, exposure of fracture site and reduction of fracture was done predominantly via intra-oral approach and a percutaneous stab incision is given extra-orally in the cheek to facilitate the insertion of transbuccal trocar achieving lateral plating for which screw are fixed through the transbuccal canula.

This procedure provided excellent visibility and accessibility as the cheek retractor which was incorporated in the trocar retracted the cheek tissue thereby exposing the fracture site completely.

Despite of all the advantages of this approach, this technique had certain limitations. This approach can be undertaken if complete armamentarium is available, and it is technique sensitive.

Also, the surgeon has to be familiar with the armamentarium and skilled to know how to use trocar canula.

Conclusion

Through this study it was concluded that with the transbuccal approach there is

1. Inconspicuous scar
2. Direct visualization of the occlusion during placement of the bone plates and stable occlusion postoperatively.
3. No injury to facial nerve
4. Short operative time.

It was concluded that transbuccal approach gives promising results in terms of function and esthetics.

Acknowledgements

We would like to thank Dr. Nitesh Motwani for his help and support throughout the process.

References

1. Kroon FH, Mathisson M, Cordey JR, Rahn BA (1991) The use of miniplates in mandibular fractures – An in vitro study. J Craniomaxillofac Surg 19(5): 199–204
2. Choi BH, Yoo JH, Kim KN, Kang HS (1995) Stability testing of a two miniplates fixation technique for mandibular angle fractures. An in vitro study. J Craniomaxillofac Surg 23(2): 122–125
3. Toma VS, Mathog RH, Toma RS, Meleca RJ (2003) Transoral versus extra-oral reduction of mandible fractures: A comparison of complication rates and other factors. Otolaryngol Head Neck Surg 128(2): 215–219
4. Dierks EJ (1987) Transoral approach to fractures of the mandible. Laryngoscope 97(1): 4–6
5. Shira RB (1954) Open reduction of mandibular fractures. J Oral Surg (Chic) 12(2): 95–111
6. Wagner WF, Neal DC, Alpert B (1979) Morbidity associated with extra-oral open reduction of mandibular fractures. J Oral Surg 37(2): 97–100
7. Wittenberg JM, Mukherjee DP, Smith BR, Kruse RN (1997) Biomechanical evaluation of new fixation devices for mandibular angle fractures. Int J Oral Maxillofac Surg 26(1): 68–73
8. Lizuka T, Lindqvist C, Hallikainen D, Paukku P (1991) Infection after rigid internal fixation of mandibular fractures a clinical and radiological study. J Oral Maxillofac Surg 49(6): 585–593
9. Tams J, van Loon JP, Rozema FR, Otten E, Bos RR (1996) Three dimensional study of loads across the freacture for different fracture sites of the mandible. Br J Oral Maxillofac Surg 34(5): 400–405
10. Berg S, Pape HD (1992) Teeth in the fracture line. Int J Oral Maxillofac Surg 21(3): 145–146
11. Chuong R, Donoff RB (1985) Intra-oral open reduction of mandibular fractures. Int J Oral Surg 14(1): 22–28

Source of Support: Nil, **Conflict of interest:** None declared.