ORIGINAL RESEARCH

A Comparative Evaluation of Conventional and Staircase Modification of the Intraoral Mandibular Vestibular Incision Approach in Symphysis and Parasymphysis Fractures

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Abstract

Aim: The aim of this study was therefore to evaluate the conventional intraoral mandibular vestibular incision approach in symphysis and parasymphysis fractures and compare prognosis of the incision site, fracture healing, and associated complications with the staircase modification of the intraoral mandibular vestibular incision approach for symphysis and parasymphysis fractures.

Materials and methods: This study was conducted on 34 healthy individual of age 18–60 years, reporting to the department with a history of trauma having mandibular symphysis or parasymphysis fractures and underwent open reduction and internal fixation under either local or general anesthesia. The treated patients were prospectively followed and examined for the postoperative complications such as pain, swelling, infection, dehiscence, sensory disturbances, and nonunion/malunion of the fracture site. Patients were followed up at the intervals of 2nd postoperative day, 1 week, 2 weeks, and 6 weeks postoperatively and were evaluated for any of the above complications.

Results: There was no statistically significant difference in the assessment parameters between the conventional intraoral mandibular vestibular approach and the staircase modification of the same.

Conclusion: The conventional method and the staircase modification of the intraoral mandibular vestibular approach have similar treatment outcomes in terms of osteosynthesis and soft tissue healing but the staircase modification fairs better in terms of healing till the 6th week.

Clinical significance: This study contributes to the understanding of the comparatively treatment outcomes of the conventional and staircase modification of the intraoral mandibular vestibular approach with respect to postoperative complications such as pain, swelling, infection, dehiscence, sensory disturbances, and nonunion/malunion of the fracture site, which may influence the choice by the dental surgeon.

Keywords: Fractures, Internal fixation, Osteosynthesis, Parasymphysis, Symphysis, Vestibular incision.

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Introduction

Mandible fracture is the commonly occurring fracture in the facial skeleton, which in turn causes functional and esthetic disfigurement. It needs early intervention for better posttreatment results. Mandible fractures may be simple, compound, or complex fractures. Any kind of fracture needs the anatomical reduction and bringing the dentate fragment into its previous occlusion. Sometimes, it may leads to an airway obstruction due to the bilateral parasymphysis fractures of the mandible, which in turn need an immediate reduction and fixation in the casualty.

The human face constitutes the first contact point in several human interactions, thus injuries and/or mutilation of the facial structures may have a disastrous influence on the affected person.[1] The facial area is one of the most frequently injured parts of the body, and the mandible is one of the most commonly fractured maxillofacial bones. The position, prominence, anatomic configuration, mobility, and less bone support of the mandible make it one of the most frequent facial bones to be fractured. The mandibular fracture accounts for 36–54% of all fractures in the maxillofacial region, followed by the maxilla (46%), the zygoma (27%), and the nasal bones (19.5%).[2] Since the mandible plays a major role in the mastication, speech, and deglutition, its fractures result in severe loss of function and disfigurement.[3]

The aim of the maxillofacial trauma treatment is the restoration of the anatomic form and function with particular care to reestablish the occlusion; traditionally, this has been achieved by immobilizing the jaws using the teeth. Using different methods of direct or indirect interdental wiring, the teeth are placed into normal occlusion and immobilized in that position by intermaxillary fixation (IMF); unfavorable displaced fractures require open

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reduction and internal fixation. This method is also indicated when IMF is undesirable. There are many situations in which IMF is contraindicated or relatively contraindicated. These include the treatment of epileptics, alcoholics, and others with drug addiction; those with chronic obstructive airways diseases; and any condition in which the airway is compromised or potentially compromised. Williams and Cawood have shown that tidal volume may be reduced by up to 40% in patients whose teeth are wired together.[4] Cawood has also demonstrated improved mouth opening after treatment of mandibular fractures with small plate osteosynthesis.[5]

In the past, many oral and maxillofacial surgeons have primarily used interosseous wiring and IMF as preservation treatment methods for the mandibular symphysis. Subsequently, rigid internal fixation was introduced by Michelet et al.,[6] which was later modified by Champy et al.[7] and Cawood[5] and has been in widespread use. With the advent of monocortical miniplates, both the occlusion of patients and accurate mandibular reduction have become feasible, raising questions over the necessity of IMF.

The technique of rigid internal fixation was developed and popularized by Arbeitsgemeinschaft fur Osteosynthesefragen/Association for the Study of Internal Fixation (AO/ASIF) in Europe in the 1970s. The basic principles of the AO, outlined by Spiessl, call for primary bone healing under conditions of absolute stability. Champy revolutionized intraoral fixation by innovating and modifying the Michelet technique of osteosynthesis.[6,7] It consisted of monocortical, juxta-alveolar, and subapical osteosynthesis without compression and IMF using miniaturized malleable plates. Small size of the plate, easy adaptability, easy placement, and use of the intraoral approach led to increased use of monocortical plates in maxillofacial surgery.

The mandibular vestibular approach is useful for exposure of mandible. It allows relatively safe access to the entire facial surface of the mandibular skeleton, from the condyle to the symphysis. An advantage of this approach is the ability of constantly access the dental occlusion during surgery. The greatest benefit to the patient is the hidden intraoral scar. The approach also is relatively rapid and simple, although access is limited in some regions, such as the lower border of the mandible at the angle and parts of the ramus. Complications are few but include mental nerve damage and lip malposition, both of which are minimized with a proper technique.[8]

The aim of this study was therefore to evaluate the conventional intraoral mandibular vestibular incision approach in symphysis and parasymphysis fractures and compare prognosis of the incision site, fracture healing, and associated complications with the staircase modification of the intraoral mandibular vestibular incision approach for symphysis and parasymphysis fractures.

Materials and Methods

This study was done in Department of Oral and Maxillofacial Surgery, with permission from the ethical committee. A total of 34 patients reported to the department with a history of trauma having mandibular symphysis or parasymphysis fractures and underwent open reduction and internal fixation under either local anesthesia (LA) or general anesthesia (GA). All patients subjected to this study were healthy individuals between 18 years and 60 years of age. All patients were studied from the time of their admission till they were discharged, and up to the 6th week postoperatively. All the subjects gave an informed consent after explaining about the procedure.

The inclusion criteria comprised of patients with mandibular fractures involving symphysis or parasymphysis fractures with or without displacement requiring open reduction. Patients compromised of systemic status, infection of the fracture site on initial presentation, fracture resulting from gunshot wounds, patients with bone loss, and comminuted fractures were excluded from the study. All the 34 patients were treated with semirigid fixation, i.e., miniplates with 2 mm monocortical screws via the intraoral approach. The patients were selected randomly and were divided into two groups and each group contained 17 samples.

Group I—These received standard treatment [open reduction internal fixation (ORIF) with 2 mm titanium miniplate and screws] via the intraoral approach by the conventional intraoral mandibular vestibular incision with a single-layer closure.

Group II—These received standard treatment (ORIF with 2 mm titanium miniplate and screws) via the intraoral approach by a staircase modification of the intraoral mandibular vestibular incision with two-layer closure of the wound.

The treated patients were prospectively followed and examined for the postoperative complications such as pain, swelling, infection, dehiscence, sensory disturbances, and nonunion/malunion of the fracture site. Patients were followed up at the intervals of 2nd postoperative day, 1 week, 2 weeks, and 6 weeks postoperatively and were evaluated for any of the above complications.

Assessment Parameters and Methods

Pain

In all the groups, the patients were asked for pain at the operated site on first review (postoperative 2nd day), second review (postoperative 7th day), third review (postoperative 15 day), and 4th review (6th week).

It was recorded using the scoring system, i.e., none (0), mild (1), moderate (2), and severe (3).[9]

Swelling

Facial swelling was measured postoperatively, after 2 days, 7 days, and 15 days postoperatively using visual scoring on clinical observation. It was recorded using the scoring system, i.e., none (absent)—0, mild—1, moderate—2, and severe—3.

Infection

It was recorded in yes/no, as per the following observations: purulent discharge from the surgical or fracture site, increased facial swelling beyond 7th postoperative day, fistula formation at the surgical or fracture site with evidence of drainage, and fever associated with local evidence of infection (swelling, erythema, or tenderness).

Sensory Disturbances

Patients were asked about the presence of subjective sensation or hyperesthesia in the mental region and about the difference in the nature of sensation when compared with the noninjured side and with the skin of the cheek. Sensory testing was performed using light touch with cotton wool and sharp or blunt differentiation with a sharp dental probe on the skin of the chin and the lower lip.[10]

Finally, the response was recorded in yes/no.

Dehiscence

Any dehiscence of the incision site was recorded in yes/no, as on clinical observation.

Nonunion/Malunion

On the basis of clinical and radiographic examination, the malunion or nonunion was recorded in yes/no after a period of 6 weeks.

Results

The Chi-square test was used to analyze the data and the level of significance was at 0.05. The two groups were compared on the basis of prognosis of the incision site, fracture healing, and associated complications (Tables 1 to 6).

Preoperatively, all the 34 cases in the total study group had no (grade 0) swelling. On 2nd postoperative day, 8 (23.5%) patients were found to have mild (grade I) swelling of which 2 (11.8%) were of group I, and 6 (35.3%) were of group II. A total of 26 (76.5%) patients presented with moderate swelling (grade II) of which 15 (88.2%) were of group I and 11 (64.7%) were of group II. None of the patients presented with severe swelling (grade III) on the 2nd postoperative day. The *p* value was 2.615 and hence the difference was no significant. On 7th postoperative day, 24 (70.6%) patients had no swelling (grade 0), out of which 10 (58.8%) belonged to group I and 14 (82.4%) to group II. A total of 9(26.5%) cases had mild swelling (grade I), 6 (35.3%) from group I and 3 (17.6%) from group II.

One (2.9%) case from group I reported of severe swelling (grade III). This case belonged to group I (5.9%). The *p* value was 0.264 and hence the difference was not significant. On 14th postoperative day, swelling was absent in all the cases.

Preoperatively, out of total 34 patients of the total study group, 8 (23.5%) cases had no pain (grade 0), 4 (23.5%) cases each in both groups, while 26 (76.5%) cases had mild pain (grade I), 13 (76.5%) cases in each of the groups. The *p* value was 1.0 and the difference was nonsignificant statistically. On 2nd postoperative day, patients reported with moderate (grade II) and severe pain (grade III). Out of the total 34 patients from the study group, 26 (76.5%) cases reported with moderate pain (grade II), 12 (70.6%) from group I and 14 (80.4%)

Table 1: Grade of the swelling on different days in different groups (Chi-square test)

		Day 0	*Day 2*			*Day 7*				*Day 14*	
Group		*GD0*	*GDI*	*GDII*	*GDIII*	*GD0*	*GDI*	*GDII*	*GDIII*	*GD0*	*Total*
Group I	*N*	17	2	15	0	10	6	0	1	17	17
	%	100.0	11.8	88.2	0.0	58.8	35.3	0.0	5.9	100.0	100.0
Group II	*N*	17	6	11	0	14	3	0	0	17	17
	%	100.0	35.3	64.7	0.0	82.4	17.6	0.0	0.0	100.0	100.0
Total	*N*	34	8	26	0	24	9	0	1	34	34
	%	100.0	23.5	76.5	0.0	70.6	26.5	0.0	2.9	100.0	100.0
Chi-square		–	2.615			2.667					
Significance		–	0.106			0.264					
Inference		–	NS			NS					

Table 2: Grades of the pain on different days in different groups (Chi-square test)

		Day 0		*Day 2*				*Day 7*				*Day 14*				*Day 45*		
Group		*GD0*	*GDI*	*GD0*	*GDI*	*GDII*	*GDIII*	*GD0*	*GDI*	*GDII*	*GDIII*	*GD0*	*GDI*	*GDII*	*GDIII*	*GD0*	*GDI*	*Total*
Group I	*N*	4	13	0	0	12	5	0	10	6	1	4	12	1	0	16	1	17
	%	23.5	76.5	0.0	0.0	70.6	29.4	0.0	58.8	35.3	5.9	23.5	70.6	5.9	0.0	94.1	5.9	100.0
Group II	*N*	4	13	0	0	14	3	0	11	6	0	5	12	0	0	16	1	17
	%	23.5	76.5	0.0	0.0	82.4	17.6	0.0	64.7	35.3	0.0	29.4	70.6	0.0	0.0	94.1	5.9	100.0
Total	*N*	8	26	0	0	26	8	0	21	12	1	9	24	1	0	32	2	34
	%	23.5	76.5	0.0	0.0	76.5	23.5	0.0	61.8	35.3	2.9	26.5	70.6	2.9	0.0	94.1	5.9	100.0
Chi-square		0		0.654				1.048				1.111				0		
Significance		1		0.419				0.592				0.547				1		
Inference		NS		NS				NS				NS				NS		

Table 3: Infection rates on different days in different groups (Chi-square test)

		Day 0	*Day 2*	*Day 7*		*Day 14*		*Day 45*	
Group		*No*	*No*	*No*	*Yes*	*No*	*Yes*	*No*	*Total*
Group I	*N*	17	17	15	2	16	1	17	17
	%	100.0	100.0	88.2	11.8	94.1	5.9	100.0	100.0
Group II	*N*	17	17	17	0	17	0	17	17
	%	100.0	100.0	100.0	0.0	100.0	0.0	100.0	100.0
Total	*N*	34	34	32	2	33	1	34	34
	%	100.0	100.0	94.1	5.9	97.1	2.9	100.0	100.0
Chi-square				2.125		1.03			
Significance				0.145		0.31			
Inference				NS		NS			

Table 4: Wound dehiscence on different days in different groups (Chi-square test)

		Day 2	Day 7		Day 14		Day 45	
Group		*No*	*No*	*Yes*	*No*	*Yes*	*No*	*Total*
Group I	*N*	17	15	2	14	3	17	17
	%	100.0	88.2	11.8	82.4	17.6	100.0	100.0
Group II	*N*	17	17	0	17	0	17	17
	%	100.0	100.0	0.0	100.0	0.0	100.0	100.0
Total	*N*	34	32	2	31	3	34	34
	%	100.0	94.1	5.9	91.2	8.8	100.0	100.0
Chi-square			2.125		3.29			
Significance			0.145		0.07			
Inference			NS		NS			

Table 5: Sensory disturbances on different days in different groups (Chi-square test)

		Day 0	Day 2		Day 7		Day 14		Day 45	
Group		*No*	*No*	*Yes*	*No*	*Yes*	*No*	*Yes*	*No*	*Total*
Group I	*N*	17	15	2	15	2	15	2	17	17
	%	100.0	88.2	11.8	88.2	11.8	88.2	11.8	100.0	100.0
Group II	*N*	17	16	1	16	1	16	1	17	17
	%	100.0	94.1	5.9	94.1	5.9	94.1	5.9	100.0	100.0
Total	*N*	34	31	3	31	3	31	3	34	34
	%	100.0	91.2	8.8	91.2	8.8	91.2	8.8	100.0	100.0
Chi-square			0.366		0.366		0.366			
Significance			0.545		0.545		0.545			
Inference			NS		NS		NS			

Table 6: Malunion/nonunion in different groups (Chi-square test)

		Mal_non_union		
Group		*No*	*Yes*	*Total*
Group I	*N*	17	0	17
	%	100	0	100
Group II	*N*	17	0	17
	%	100	0	100
Total	*N*	34	0	34
	%	100	0	100

from group II. Eight (23.5%) cases reported for severe pain, 5 (29.4%) from group I and 3 (17.6%) from group II. The *p* value was 0.419 and the difference was not significant statistically. On 7th postoperative day, 21 (61.8%) cases reported with mild swelling (grade I), 12 (35.3%) cases reported with moderate swelling (grade II), and 1 (2.9%) case reported with severe swelling (grade III). Out of the 22 cases of the mild swelling, 10 (58.8%) belonged to group I and 12 (64.7%) belonged to group II. A total of 12 (35.3%) cases each from group I (6) and group II (6) had moderate swelling. One case from group I (5.9%) had severe swelling. The *p* value was 0.592 and the difference was not significant. On 14 days postoperative, 9 (26.5%) cases had no pain (grade 0), 24 (70.6%) had mild pain (grade I), 1 patient (2.9%) had moderate (grade II) pain, and none had severe (grade III) pain. Out of the 9 patients with no pain, 4 (23.5%) belonged to group I and 5 (29.6%) to group II. Out of the 24 patients with mild swelling, 12 (70.6%) were belonging to the each group. One patient with severe swelling (grade III) belonged to group I (5.9%). On the 6th week postoperative period, 32 (94.1%) patients had no pain (grade 0) while 2 (5.9%) patients still had mild pain (grade I). Among the 32 patients with no pain, 16 (94.1%) belonged to each group. Among the 2 patients with mild pain, 1 (5.9%) belonged to each group. The *p* value was 1.0 and the difference was not significant statistically.

On 7th postoperative day, 2 cases (5.9%) reported with infection and wound dehiscence. This case belonged to group I. Therefore in total, 11.8 % cases of group I had wound dehiscence and infection on day 7 while group II cases did not had any wound dehiscence and infection. The *p* value was 0.145, which was statistically not significant.

On 14th postoperative day, 1 case (2.9%) of the total 34 had infection. Hence, in total 1 case (5.9%) from group I had infection. The *p* value was 0.31. The difference in the variables was hence nonsignificant statistically.

On 14th postoperative day, 3 cases (8.8%) reported with dehiscence. These all cases again belonged to group I. Hence in total, 3 cases (17.6%) of group I had wound dehiscence. The *p* value for both the days was 0.070. The difference in the variables was hence not significant statistically.

On 2nd postoperative day, 3 (8.8%) cases had paresthesia in and around the surgical site out of which 2 (11.8%) belonged to group I and 1 (5.9%) belonged to group II. On the 7th postoperative day, results were same as the results of the 2nd postoperative day. On 14th postoperative day, again the results were same as the results of the 2nd postoperative day. But on the 6 weeks postoperative review, no patients with paresthesia or anesthesia of the surgical or the surrounding site were found.

None of the cases, among the 40 patients of the study group, had nonunion or malunion, at the end of the postoperative 6 weeks.

Discussion

The mandible is the second most commonly fractured bone of the maxillofacial skeleton and tenth most fractured bone in the whole body. It is a horse shoe-shaped bone occupying a very prominent and vulnerable position on the face.[6,11] Because of its position and prominence, it is a vital structure for the survival of the individual to protect the airway, for proper function of the stomatognathic system.[12]

The surgical approach has shown to play an important role in the process. The intraoral approach used in the present study is expected to expose the bone to a higher bacterial count than an extraoral approach and thereby increasing the chances of infection.[10,13,14] However, the selection of extraoral or intraoral approaches mainly depends upon the accessibility of the fracture location. In this study, in all of the cases the intraoral approach was used.

Our study was basically concerned with the two types of the intraoral wound closure both differentiating on wound closure techniques, one being a single-layer closure technique (conventional intraoral mandibular vestibular technique), while other being a double-layer technique (staircase modification of the conventional intraoral mandibular vestibular technique). Very limited literature has been there on this. Although it has been found that that the healing rate, cosmetic outcome, and scar width are almost similar while comparing both types of closure in facial lacerations.[15]

Champy et al.[7] and Cawood[5] recommended that, to achieve low rates of wound dehiscence and infection, miniplate osteosynthesis must be performed soon after an injury. Champy et al.[7] recommended fixation within 12 hours, whereas Cawood[5] extended this period to 24 hours after an injury. All the patients in this study were treated with so called "delayed miniplate osteosynthesis" (Kohno et al.,[16] Edwards et al.[17]), which was performed later than the recommended time interval; this was due to various other reasons such as a delay in the patient coming to the hospital, associated head injury, various systemic problems, etc.

Maloney et al.,[18] evaluated the validity of a treatment protocol that is based on the hypothesis that a compound mandibular fracture untreated for more than 72 hours from injury is *de facto* infected. An intramedullary infection is usually presented immediately adjacent to the fracture site. Topazian and Goldberg noted that initially an osteomyelitis is an infection of the medullary bone and haversian systems, which in turn will extend to involve the periosteum and obstruct the blood supply to the bone.

Champy et al.,[7] and Cawood[5] also recommended fixation from 12 hours to 24 hours after injury. The mean time elapsed between the injury and the operation was 3.00 $\pm$ 0.61 days for group I and 3.12 $\pm$ 0.70 days for the group II, which was almost similar to the study by Maloney et al.,[16] who had prescribed the open reduction of the fracture within 72 hours of the injury.

Mean surgical duration for the operations via same approaches took almost similar duration of time that was found to be 53.82 $\pm$ 8.01 minutes for the open reduction and semirigid fixation via conventional intraoral mandibular vestibular incision and 55.29 $\pm$ 8.74 minutes for the open reduction and semirigid fixation via the staircase modification of the conventional mandibular vestibular technique. A slight increase in the surgical duration of the modified staircase approach could be related to the incision in two steps and double closure of the incision site. The differences between the time elapsed between the injury and the operation and the surgical duration of the operation for both the groups were statistically insignificant ($p = 0.48$ for time elapsed and $p = 0.92$ for the surgical duration, respectively).

Pain is an unpleasant sensory and emotional state associated with actual or potential tissue damage.[19] On comparing the differences of the pain intensity and the time period of the pain on the 7th, 14th, and 45th day, it can be concluded that patients of group I (the conventional technique of the mandibular vestibular approach) had more pain in comparison to the patients of group II (the staircase modification of the conventional approach). This can be associated with the increased swelling in group I patients.

Swelling is an expected sequelae of the open reduction and IMF in fractures. Postoperative swelling has been attributed to the reflection of the mucoperiosteum and tissue manipulation.[20] It reaches a maximum 2–3 days postoperatively and normally subsides by the 4th day. It should completely resolve by the 7th postoperative day.[21] In our study, facial swelling was measured preoperatively, after 2 days, 7 days postoperatively using a visual scoring on clinical observation. It was recorded using a scoring system, i.e., none (absent)—0, mild—1, moderate—2, and severe—3. Preoperatively, none of the patients had any visible swelling.[15]

The inference of this being that, on 2nd postoperative day, patients who had been treated by the conventional technique and as single-layer closure (group I) had significantly more swelling as compared to the patients treated by the modified technique and double closure (group II). On the 7th postoperative day, since one patient from group I had severe (grade III) swelling, swelling was found to be more in group I patients as compared to those in group II on this review period also. The increase in the swelling and the duration in the group with the conventional intraoral mandibular vestibular technique can be explained because of the increased periosteal stripping and more tissue manipulation in the conventional approach.

It can thus be concluded that patients in group II (staircase modification with double-layer closure) performed better than group I patients (conventional mandibular vestibular technique with single-layer closure), although statistically the difference is not significant.

The risk of potential infection of these wounds without the use of prophylactic antibiotic ranges from 22 to 50%. However, this risk can be reduced to as low as 10% with the use of prophylactic antibiotics. Despite these documented benefits, the use of prophylactic antibiotics to prevent postoperative infections in head and neck surgery, in general, and in oral and maxillofacial surgery, in particular, has and continues to be the subject of controversy.[22–24] The present study were total 3 patients out of the total 17 of group I presented with wound dehiscence. The increased incidence of the wound dehiscence may be attributed to associated infections. Also, since the wound was closed in a single layer as compared to the wound closure of the group II where it was closed in layers, the strength of the sutured wound was less in group I. The infection and the wound dehiscence were associated with the group I patients. None of the patients from group II experienced wound dehiscence.

Various methods of determining sensory function[25,26] of the mental region have been studied by Zaytown and Campbell.

These include thermal stimulation, Von Frey tactile stimulation, and Weber two-point discrimination and brush directional measures. The tests used in this study measure mainly mechanoreceptor. The present methods were chosen because they are simple and suitable for trauma patients. The results of present study indicate that the preoperative sensory status corresponding to the presence of fracture displacement did not affect the degree of the postoperative sensory disturbance, when adequate reduction and fixation is done. However, the sensory disturbance may also be affected by the surgical procedure. According to Lizuka and Lindquist[10] the nerve can be involved in traction and/or compression caused by manipulation of the fracture fragments during fracture reduction and stabilization. Extraction of tooth in line of fracture could also cause injury to the inferior alveolar nerve. In addition, a bicortical screw placed near the mandibular canal might irritate or damage the nerve. The postoperative sensory deficits were possibly a result of the combined effects of all these factors. The associated sensory disturbances among the patients of group I were possibly because of the neuropraxial injury of the nerve during the manipulation of the tissue during fracture reduction and the soft tissue management. Since the symptoms relieved in 2 weeks in all the patients, no medication was prescribed for this.

Nonunion is a serious complication of a fracture and may occur when the fracture moves too much, has a poor blood supply, or gets infected. None of the cases among the 34 patients of the study group had nonunion or malunion, at the end of the postoperative 6 weeks.

The aim of this study was to compare the efficacy of both incisions on soft tissue and hard tissue healing with the objective of comparing them on the basis of the various postsurgery complications. At the end period of the 6 weeks time, all the patients had satisfactory soft tissue and hard tissue healing. However, it was quite evident that the patients of group II (staircase modified mandibular vestibular incision approach) had better healing rate than group I (conventional mandibular vestibular incision approach).

Last but not the least, in this study only primary complications were analyzed where late complications can also occur. These may be associated with plate removal, osteomyelitis, joint dysfunction, hypertrophic scar formation, and prolonged sensory disturbances that in some cases might develop into posttraumatic neuralgia. Such developments may not be recognized unless long-term follow-up is undertaken

Conclusion

Both the approaches are equally successful in providing a satisfactory osteosynthesis and soft tissue healing in the fractures of the anterior mandible, and there is no significant difference between the time duration for both the incision approaches. The use of staircase modification of the conventional mandibular intraoral incision reports better healing rate, as on performance of the patients till the 6 weeks time period but both the approaches are equally successful in providing a satisfactory osteosynthesis and soft tissue healing in the fractures of the anterior mandible. Since the second incision in the staircase modification approach is placed more inferior in the canine or the premolar region, there is always a chance of severing the branches of the mental nerve. Therefore, it is advised to separate the mental nerves and vessel, first by careful and meticulous dissection, to prevent any iatrogenic injury of the nerve.

Mandibular fractures left untreated more than 72 hours from injury are *de facto* infected. However, the results with delayed miniplate osteosynthesis were within acceptable limits.

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