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Research Article

Comparison of Locking Versus Conventional Mini Plates in the Treatment of Mandibular Fractures

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Abstract

Background: The introduction of the locking plate/screw system has offered certain advantages over conventional plating systems in the management of facial fractures. This system does not require intimate adaptation of the mini plates to the underlying bone and has greater stability. This study compares the clinical efficacy of locking mini plate/screw system and conventional mini plate system in the treatment of mandibular angle fractures.

Materials and Methods: Of ten patients with isolated angle of the mandible fractures five were treated surgically by open reduction and internal fixation using 2.3 mm locking titanium miniplate system and five using 2.0 mm conventional titanium mini plate system. All the patients were followed up on the first, third and seventh postoperative days for evaluation of post operative pain, swelling, mouth opening and one month and 3 months postoperatively for stability and failure of hardware. Pain was evaluated using a visual analog scale on which the patient scored in the first, third and seventh post-operative days. Swelling was measured using an inch tape from the tragus of the ear to commissure of the mouth and lateral canthus of the eye to the angle of mandible on the first, third and seventh post-operative days. Mouth opening was measured using a calibrated metal scale from the incisal edge of upper incisor to the incisal edge of lower incisor on the first, third and seventh post-operative days. Stability was checked by palpation at subsequent monthly reviews. Failure of hardware was observed for a period of six months and more. The patients were enquired about functional restoration postoperatively. A statistical analysis of all the collected data was done and the results were compared between both groups.

Results: Post operative pain after using locking miniplate system is lower in patients on the third postoperative day when compared to those who had conventional mini plates fixed but it is not statistically significant. Swelling after using locking miniplate is lower in patients on the third post-operative day but it is not statistically significant. Mouth opening after using locking miniplate is higher in patients on the seventh post operative day but it is not statistically significant. On digital palpation the stability of both the plates was found to be similar clinically. There was an infection three months postoperatively in one of the conventional plate patients which was attributed to his poor oral hygiene.

Conclusion: In this study, even though the results when compared were not statistically significant in the clinical aspects studied, earlier restoration of function was noted in patients treated with locking plates. However considering the cost factor involved we can reserve locking plates for very special cases such as those with osteoporosis alone.

Keywords: *Mandibular Fractures; Locking Plate; Rigid Fixation; Mandibular Angle Fractures; Trauma*

Abbreviations

ASA: American Society of Anaesthesiologists; BD: Bis in Die; CC: Cubic Centimeter; ENT: Ear Nose Throat; Post Op: Post Operative; Pre-Op: Pre Operative; IAN: Inferior Alveolar Nerve; IM: Intra Muscular; IMF: Inter Maxillary Fixation; IV: Intra Venous; INJ: Injection; LCP: Locking Compression Plate; LOC: Loss of Consciousness; NSAIDs: Non Steroidal Anti Inflammatory Drugs; ORIF: Open Reduction-Internal Fixation; SOS: As Soon As Needed; TAB: Tablet; TDS: Ter Die Sumendum; Ti: Titanium

Introduction

Facial injuries are traumatizing physically and psychologically. With increasing population and urbanization, there is a steady increase in maxillofacial trauma in developing countries, especially India. Mandible is frequently fractured in spite of being the strongest bone in the facial skeleton. The osteology, muscle attachments, their influence, the presence of teeth and tooth buds produce areas of weakness prone to fracture. These areas of weakness include angle, condylar region, symphysis and para symphysis. Different techniques for the treatment of mandibular fractures have evolved in the past few decades. Rigid internal fixation of mandibular fractures eliminates the need for intermaxillary fixation and facilitates stable anatomic reduction, reducing the risk of postoperative displacement of the fractured fragments all while allowing immediate return to function. Single non-compression monocortical miniplate fixation based on the principles advocated by Champy and Michele has been established to be an accepted and reliable method for internal fixation of mandibular angle fracture. The basic concept for rigid fixation is absolute stability. Champy suggested that engaging a single cortex is sufficient for rigid osteosynthesis. The introduction of mini plates in the treatment of mandibular fractures has led to a notable decrease in surgical soft tissue trauma and improved ease of handling, with sufficient stability and fixation of mandibular fractures. However loosening of screws due to transmission of pressure to the underlying bone leads to loss of fracture stability and fixation failure. The introduction of the locking plate/screw system has offered certain advantages over conventional plating systems in this aspect. This system does not require intimate adaptation of the mini plates to the underlying bone and has greater stability. This study compares the efficacy of locking mini plate/screw system and conventional mini plate system in the treatment of mandibular angle fractures.

Materials and Methods

Aim

To compare the efficacy of 2.3 mm Ti locking and 2.0 mm Ti conventional mini plates in the management of isolated mandibular angle fractures in terms of post-operative pain, oedema, mouth opening, stability of fracture fixation, infection and restoration of function.

Objective

To provide an evidence-based conclusion on efficacy in terms of post operative patient comfort while using these two mini plate systems in the treatment of mandibular angle fractures.

This study was done at the Department of Oral and Maxillofacial Surgery, Thai Moogambigai Dental College and Hospital, Dr. M.G.R. Educational and Research Institute, Maduravoyal, Chennai 107. The study protocol was approved by the University's ethical committee on investigations involving humans and was confirmed to be of declaration guidelines.

Inclusion criteria

1. Patients with isolated fractures of the angle of the mandible.
2. Age between 20 - 40 years.
3. Patients not having any other associated injury other than minor abrasions or lacerations elsewhere.
4. Patients not having a history of loss of consciousness, ear nose throat bleeding, seizures or vomiting after the fall.

Exclusion criteria:

1. Comminuted angle fractures.
2. Patients who come under ASA III.

In our study, out of ten patients, six were victims of Road Traffic Accidents and four were victims of assault injury. A thorough history was obtained and the cause of injury and mechanics of injury were noted. Any associated internal systemic injury in the body was ruled out.

The patients in our study had taken an orthopantomogram or 3D helical computed tomography or both depending on their condition at the time of presentation. Immediately after administration of a single dose of injection tetanus toxoid 0.5 cc IM, injection diclofenac 75 mg IM and management of any associated soft tissue trauma, once the radiological examination confirmed an isolated fracture in the mandibular angle, the patients were started on injection cefotaxime 1 gram IV BD, injection metronidazole 500 mg IV TDS, injection diclofenac 75 mg IM SOS and admitted in the wards for routine pre-operative evaluation.

Group A: Five patients with isolated angle of the mandible fractures were treated surgically by open reduction and internal fixation using 2.3 mm locking titanium mini plate system.

Group B: Five patients with isolated angle of the mandible fractures were treated surgically by open reduction and internal fixation using 2.0 mm conventional titanium mini plate system.

We had operated on all our patients in the study within 48 hours of their presentation to us. The standard surgical protocol was followed. Under general anaesthesia, the patient was draped and painted. After infiltration of local anaesthesia (2% Lignocaine with adrenaline 1:80000) at the surgical site, ascending ramal incision was placed, mucoperiosteal flap raised, fracture segment was identified and reduced.

In group A patients a 2.3 mm locking titanium mini plate four-hole with gap was adapted and fixed with 2.3 x 6 mm locking screws.

In group B patients a 2.0 mm conventional titanium mini plate four-hole with gap was adapted and fixed with 2 x 6 mm screws.

The wound was irrigated with 5% povidone-iodine and normal saline. Haemostasis was achieved and closure was done with 3-0 vicryl in simple interrupted sutures.

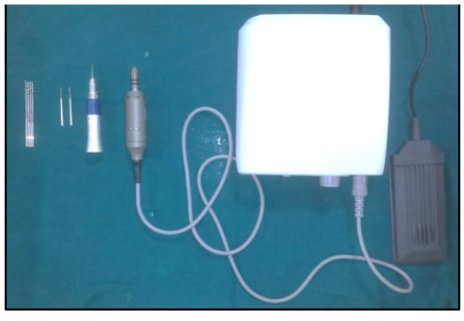
Postoperatively injection cefotaxime 1 gram IV BD, injection metronidazole 500 mg IV TDS, injection diclofenac 75 mg IM BD, injection dexamethasone 8 mg IV BD [for 1 day tapered gradually], injection emeset IV SOS 4 mg and injection ranitidine IV BD 50 mg for 3 days and given tablet paracetamol 650 mg SOS and tablet ranitidine 150 mg BD for 4 days.

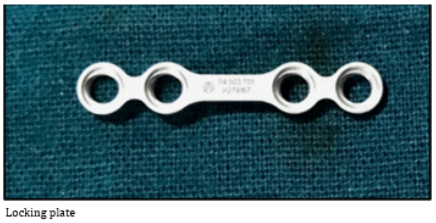
All the patients were followed up on the first, third, and seventh postoperative days for evaluation of post operative pain, swelling, mouth opening and one month and 3 months postoperatively for stability and failure of hardware.

Pain was evaluated using a visual analog scale on which the patient scored in the first, third and seventh post-operative days. Swelling was measured using an inch tape from the tragus of the ear to commissure of the mouth and lateral canthus of the eye to the angle of mandible on the first, third and seventh post-operative days. Mouth opening is measured using a calibrated metal scale from the incisal edge of upper incisor to the incisal edge of lower incisor on the first, third and seventh post-operative days. Stability was checked by palpation at subsequent monthly reviews. Failure of hardware was observed for a period of six months and more. The patients were enquired about functional restoration postoperatively.

A statistical analysis of the collected data was done and results were compared between both groups.

Armamentarium





Locking plate

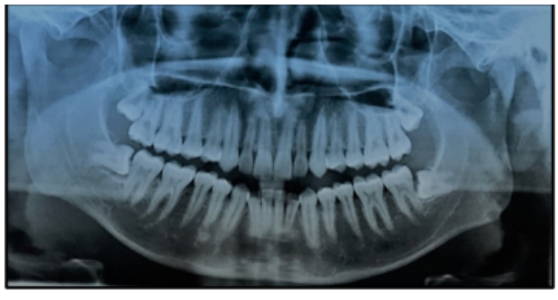
Locking screw

Case photos

Conventional mini plate

Frontal view

Profile view

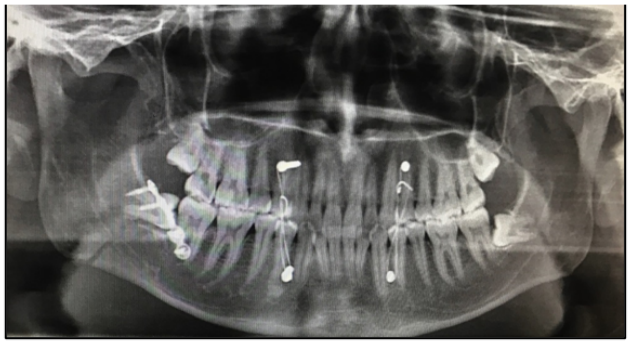


Pre op orthopantomogram

Fracture reduction

Plating

Suturing



Post op orthopantomogram

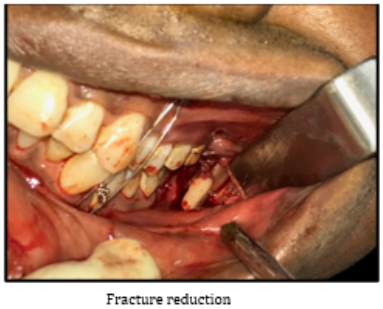
Case photos

Locking mini plate

Frontal view

Profile view

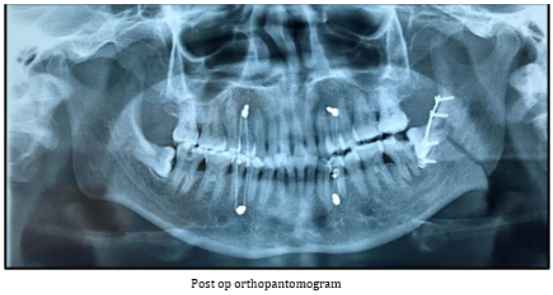
Pre op orthopantomogram



Fracture reduction

Plating

Suturing



Post op orthopantomogram

Measurement of swelling

Figure A

Group A	Day 1	Day 3	Day 7
1	5	3	1
2	4	3	1
3	5	3	1
4	6	2	1
5	6	3	1
Group B			
6	6	4	1
7	5	3	1
8	5	3	1
9	6	3	1
10	5	4	1

Table 1: *Post operative pain scale (VAS score).*

Group A	Day 1	Day 3	Day 7
1	4.3*3.8	4.1*3.7	4*3
2	4.2*3.9	4.1*3.8	4*3.7
3	4.3*3.8	4.1*3.8	4*3.8
4	4.2*3.7	4*3.6	4*3.5
5	4.3*3.8	4.2*3.6	4.1_3.5
Group B			
6	4.3*3.9	4.2*3.8	4.2*3.8
7	4.3*3.8	4.1*3.7	4.1*3.6
8	4.4*3.6	4.1*3.4	4.1*3.4
9	4.2*3.4	4.2*3.2	4.1*3
10	4.3*3.5	4.3*3.3	4.1*3

Table 2: *Swelling scale post operatively (In inches).*

Group A	Day 1	Day 3	Day 7
1	22	26	27
2	23	25	26
3	24	25	26
4	24	25	26
5	24	26	26
Group B			
6	23	25	26
7	24	25	25
8	23	25	25
9	23	25	26
10	24	26	26

Table 3: *Mouth opening post operatively (In mm).*

	N	Mean	Std. Deviation
Day 1	5	5.40	0.548
Day 3	5	3.40	0.548
Day 7	5	1.00	0.000

Table 4: *Descriptive statistics for pain score in group A.*

		95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Lower	Upper			P-value
Pair 1	Day 1 and Day 3	1.122	2.878	6.325	4	0.003
Pair 2	Day 1 and Day 7	3.720	5.080	17.963	4	0.000
Pair 3	Day 3 and Day 7	1.720	3.080	9.798	4	0.001

Table 5: *Paired samples test for pain score in group A.*

	N	Mean	Std. Deviation
Day 1	5	16.1880	0.36266
Day 3	5	15.1700	0.48260
Day 7	5	14.07	1.243

Table 6: *Descriptive statistics for swelling in group A.*

		95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Lower	Upper			P-value
Pair 1	Day 1 and Day 3	0.745	1.290	10.366	4	0.000
Pair 2	Day 1 and Day 7	0.531	3.704	3.706	4	0.021
Pair 3	Day 3 and Day 7	0.356	2.556	2.097	4	0.104

Table 7: *Paired samples test for swelling in group A.*

	N	Mean	Std. Deviation
Day 1	5	23.40	0.894
Day 3	5	25.40	0.548
Day 7	5	26.20	0.447

Table 8: *Descriptive statistics for mouth opening in group A.*

		95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Lower	Upper			P-value
Pair 1	Day 1 and Day 3	0.479	3.521	3.651	4	0.022
Pair 2	Day 1 and Day 7	1.181	4.419	4.802	4	0.009
Pair 3	Day 3 and Day 7	0.245	1.355	4.000	4	0.016

Table 9: *Paired samples test for mouth opening in group A.*

	N	Mean	Std. Deviation
Day 1	5	5.20	0.837
Day 3	5	2.80	0.447
Day 7	5	1.00	0.000

Table 10: *Descriptive statistics of pain score in group B.*

		95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Lower	Upper			p-value
Pair 1	Day 1 and Day 3	.984	3.816	4.707	4	0.009
Pair 2	Day 1 and Day 7	3.161	5.239	11.225	4	0.000
Pair 3	Day 3 and Day 7	1.245	2.355	9.000	4	0.001

Table 11: *Paired samples test of pain score in group B.*

	N	Mean	Std. Deviation
Day 1	5	15.6560	1.00041
Day 3	5	14.5400	1.01314
Day 7	5	13.8520	1.58850

Table 12: *Descriptive statistics for swelling in group B.*

		95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Lower	Upper			p-value
Pair 1	Day 1 and Day 3	.54264	1.68936	5.404	4	0.006
Pair 2	Day 1 and Day 7	.93189	2.67611	5.743	4	0.005
Pair 3	Day 3 and Day 7	.32703	1.70303	1.882	4	0.133

Table 13: *Paired samples test for swelling in group B.*

	N	Mean	Std. Deviation
Day 1	5	23.40	0.548
Day 3	5	25.20	0.447
Day 7	5	25.60	0.548

Table 14: *Descriptive statistics for mouth opening in group B.*

		95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Lower	Upper			p- value
Pair 1	Day 1 and Day 3	1.245	2.355	9.000	4	0.001
Pair 2	Day 1 and Day 7	1.161	3.239	5.880	4	0.004
Pair 3	Day 3 and Day 7	.280	1.080	1.633	4	0.178

Table 15: *Paired samples test for mouth opening in group B.*

		Levene's Test for Equality of Variances		t-test for Equality of Means			95% C.I	
		F	Sig.	t	df	Sig. (2-tailed)	L.B	U.B
Day 1	Equal variances assumed	0.640	0.447	.447	8	.667 (Non.sig)	0.831	1.231
Day 3	Equal variances assumed	1.524	0.252	1.897	8	.094 (Non.sig)	0.129	1.329

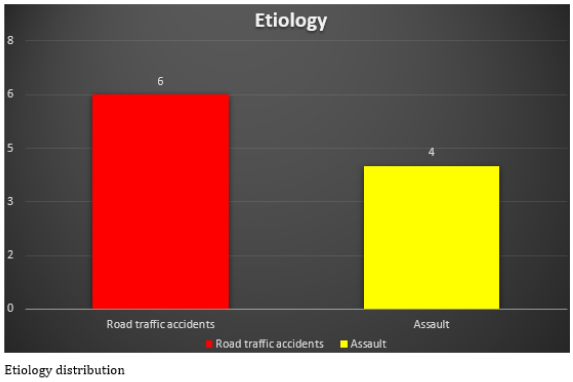
Table 16: *Independent samples test for pain score in group A and B.*

		Levene's Test for Equality of Variances		t-test for Equality of Means			95% C.I	
		F	Sig.	t	df	Sig. (2-tailed)	L.B	U.B
Day 1	Equal variances assumed	5.419	0.048	1.118	8	0.296 (Non. sig)	0.565	1.629
Day 3	Equal variances assumed	4.256	0.073	1.255	8	0.245 (Non. sig)	.527	1.787
Day 7	Equal variances assumed	0.607	0.458	.242	8	0.815 (Non. sig)	1.862	2.298

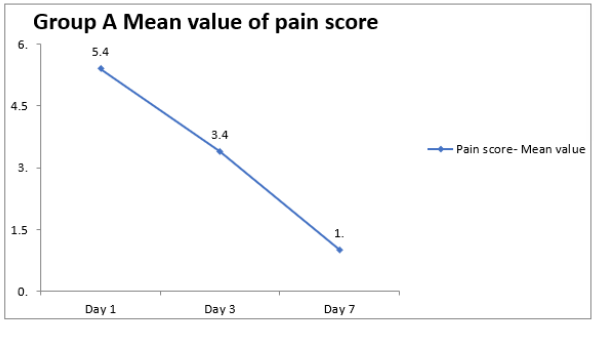
Table 17: *Independent samples test for swelling in group A and B.*

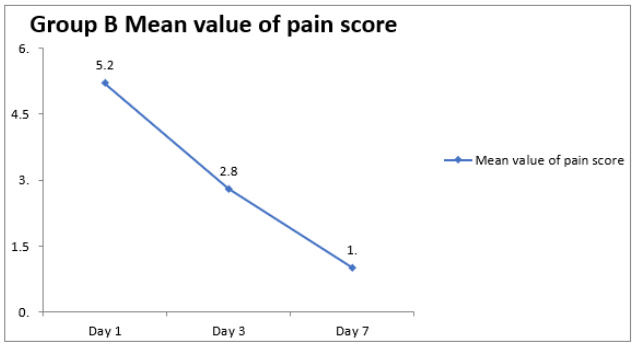
		Levene's Test for Equality of Variances		t-test for Equality of Means			95% C.I	
		F	Sig.	t	df	Sig. (2-tailed)	L.B	U.B
Day 1	Equal variances assumed	1.756	0.222	0.000	8	1.000 (Non.sig)	1.082	1.082
Day 3	Equal variances assumed	1.524	0.252	0.632	8	0.545 (Non.sig)	0.529	0.929
Day 7	Equal variances assumed	1.524	0.252	1.897	8	0.094 (Non.sig)	0.129	1.329

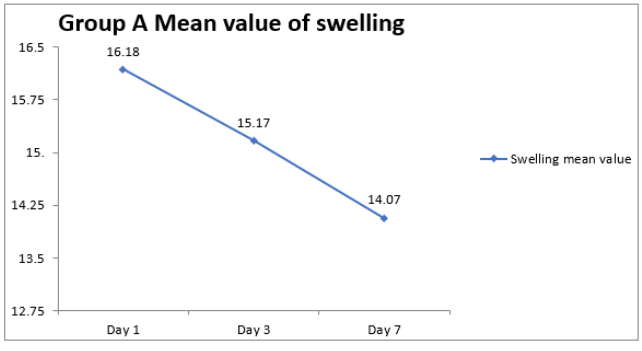
Table 18: *Independent samples test for mouth opening in group A and B.*

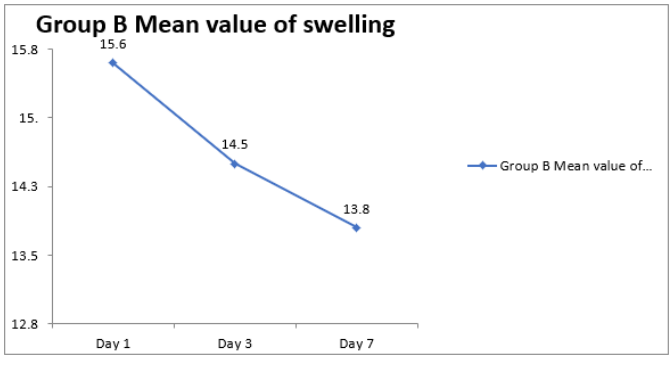


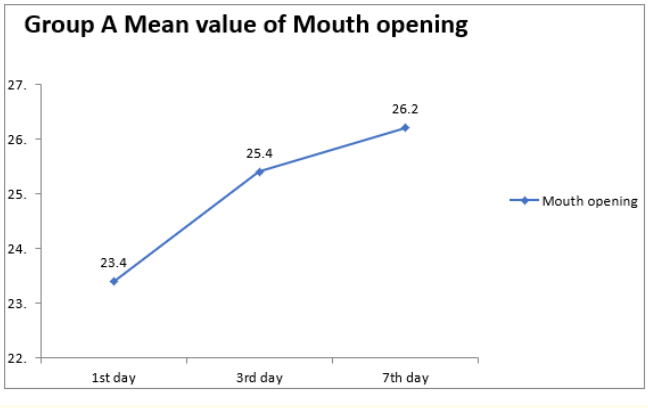
Etiology distribution

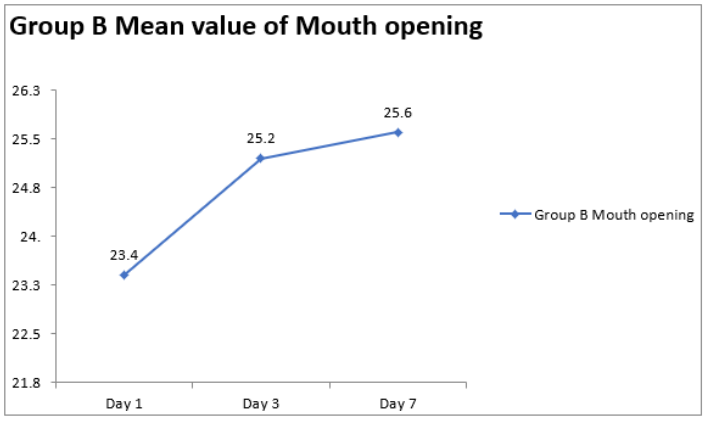


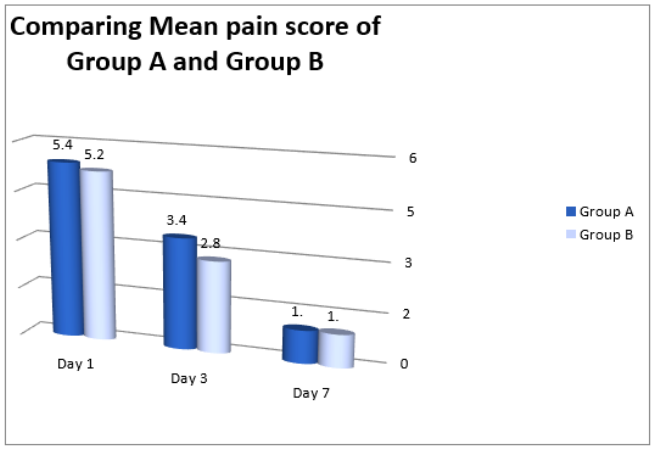

Group B Mean value of pain score
6.
4.5
3.
1.5
0.
5.2
2.8
1.
Day 1
Day 3
Day 7
Mean value of pain score

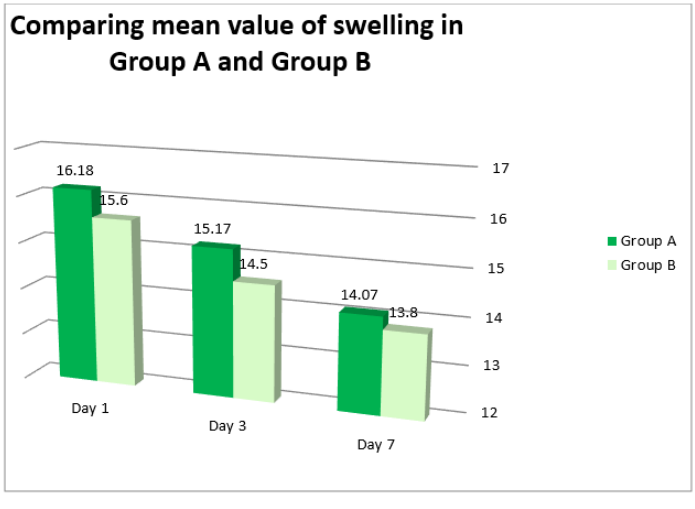

Group A Mean value of swelling
16.5
15.75
15.
14.25
13.5
12.75
16.18
15.17
14.07
Day 1
Day 3
Day 7
Swelling mean value


Group B Mean value of swelling
15.8
15.
14.3
13.5
12.8
15.6
14.5
13.8
Day 1
Day 3
Day 7
Group B Mean value of...


Group A Mean value of Mouth opening
27.
26.
25.
24.
23.
22.
23.4
25.4
26.2
1st day
3rd day
7th day
Mouth opening


Group B Mean value of Mouth opening
26.3
25.5
24.8
24.
23.3
22.5
21.8
23.4
25.2
25.6
Day 1
Day 3
Day 7
Group B Mouth opening


Comparing Mean pain score of Group A and Group B
5.4
5.2
3.4
2.8
1.
1.
6
5
3
2
0
Day 1
Day 3
Day 7
Group A
Group B


Comparing mean value of swelling in Group A and Group B
16.18
15.6
15.17
14.5
14.07
13.8
17
16
15
14
13
12
Day 1
Day 3
Day 7
Group A
Group B

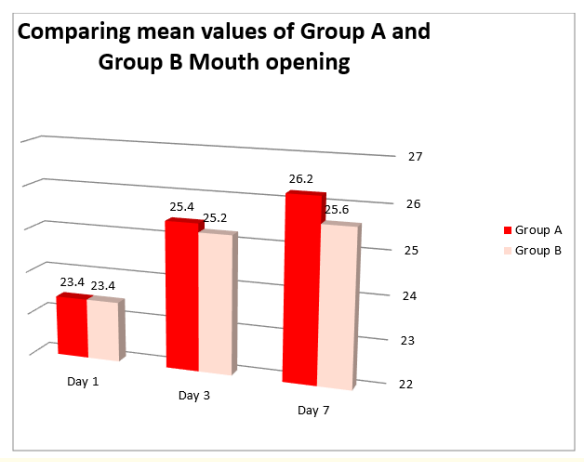


Figure B

Results

On evaluating the values for pain statically, the group A patients who received 2.3 mm locking mini plates showed a mean value of 5.40 S.D 0.548 on the first 3.40 S.D 0.548 on the third and 1.00 S.D 0.000 on the seventh postoperative days respectively. Group B patients who received 2.0 mm conventional mini plates showed a mean value of 5.20 S.D 0.837 on the first, 2.80 S.D 0.447 on the third and 1.00 S.D 0.000 on the seventh post-operative days respectively. The mean value is considerably higher between both the groups on post-op day 3 on the independent t-test assuming equal variance, the significance by the two-tailed test was $p = 0.094$ (< 0.05) which is statistically insignificant.

Inference: Pain after using locking miniplate system is lower in patients on the third postoperative day when compared to those who had conventional mini plates fixed but it is not statistically significant.

On evaluating the values for swelling statically, the group A patients who received 2.3 mm locking mini plates showed a mean value of 16.188 S.D 0.36266 on the first, 15.170 S.D 0.4826 on the third and 14.07 S.D 1. 243 on the seventh postoperative days respectively. Group B patients who received 2.0 mm conventional mini plates showed a mean value of 15.656 S.D 1.000 on the first, 14.54 S.D 1.013 on the third and 13.85 S.D 1.588 on the seventh post operative days respectively. The mean value is considerably different between both the groups on post-op day 3 on the independent t-test assuming equal variance, the significance by the two-tailed test was $p = 0.245$ (> 0.05) which is statistically insignificant.

Inference: Swelling after using locking miniplate is lower in patients on the third post-operative day but it is not statistically significant.

On evaluating the values for mouth opening statically, the group A patients who received 2.3 mm locking mini plates showed a mean value of 23.4 S.D 0.894 on the first, 25.4 S.D 0.548 on the third and 26.2 S.D 0.447 on the seventh postoperative days respectively. Group B patients who received 2.0 mm conventional mini plates showed a mean value of 23.0 S.D 0.548 on the first, 25.2 S.D 0.548 on the third and 25.6 S.D 0.447 on the seventh post operative days respectively. The mean value is considerably different between both the groups on post-op day 3 on the independent t test assuming equal variance, the significance by two tailed test was $p=0.096$ (> 0.05) which is statistically insignificant.

Inference: Mouth opening after using locking miniplate is higher in patients on the seventh post operative day but it is not statistically significant.

On digital palpation the stability of both the plates was found to be similar clinically.

There was an infection three months postoperatively in one of the patients treated with conventional mini plate system which was attributed to his poor oral hygiene.

In the angle region, its time consuming sometimes to adapt a conventional titanium mini plate due to the anatomy of the mandible. However, while using locking mini plate even without exact adaptation of the plate to the bone the stability was reliable.

The only disadvantage of locking plate system is its cost which is almost four to five times that of the conventional mini plate system and the specific armamentarium required to fit the particular screw.

Discussion

Fracture fixation with conventional compression mini plates has its own advantages as well as limitations. The axial, torsional, and three-point bending forces must be neutralized to achieve fracture stability. With the use of conventional plates, force friction between the plate and the bone counters the external forces experienced by the plate screw-bone construction Therefore, the ability of conventional plates to achieve stability is limited by screw torque [1,2]. Osteoporosis, cancellous bone, comminuted fractures and/or pathological bone can prevent adequate thread purchase to allow the development of sufficient torque (1.5 N) to establish stability [3]. The excessive soft-tissue stripping necessary to improve the frictional coefficient between the plate and the bone can compromise the blood supply to bone fragments and soft tissue flaps. Furthermore, limiting exposure has the additional benefit of improving the cosmetic result. There have been multiple attempts to improve the fixation of conventional plates to the compromised bone. A desire to preserve the blood supply to the bone by eliminating or at least reducing, plate contact with the periosteum provided the impetus for the development of the early fixed-angle-plate systems. Designers postulated that by preserving the blood supply to bone it would be possible to minimize or avoid refracture after hardware removal or development of infection in a sequestrum under the deep surface of the plate, delayed union and non-union [4]. The stiffness provided by external fixators increases as the connecting bar is moved closer to the bone and the amount of pin spread is increased. The fundamental principles of external fixators apply to locked plates and need to be respected to avoid complications. Locking plates are thus comparable with extremely rigid external fixators and run the risk of becoming "nonunion generators". The clinical successes of these plates led to the introduction of the Locked Compression Plate (Synthes) [5] and a proliferation of locked-plate designs by several manufacturers. Locked plates have become an attractive alternative to conventional plates as they can be used as "bridge plates" to preserve fragmentary blood supply, they provide fixed angular stability with the potential for improved fixation in osteoporotic bone, and they reduce the risk of primary loss of reduction as exact plate-contouring is not required [6]. We have analysed the clinical features of both the systems in this study.

Post operatively the patient's pain was marked by the patients on a visual analogue scale. Pain perception and threshold values varies from person to person. Management of pain must be done multi-modally but for the purpose of the study we prescribed a standard regimen of NSAIDs post operatively for all the patients.IM Injection of Diclofenac was given BD on day 0 and day 1 post operatively and it was replaced by Tablet Paracetamol 650 orally TDS on day 2 and 3 and then made SOS beyond day 2. None of them required any other analgesics during the first week post operatively. All of the patients marked almost similar score in the scale and all of them were comfortable at the time of discharge. The swelling had reduced 100% by a week's time. Our observations of pain after using locking mini plate is lower in patients on the third post operative day but it is not statistically significant. Post operatively there is a massive fluid shift between body compartments and it presents as oedema in the extracellular space. Although the oedema that presents after mandibular angle fracture reduction is not debilitating the absence of it would mean more comfort for the patient. IV Dexamethasone 8 mg was given peri operatively and continued for two days post operatively which was then tapered and stopped. Schmelseizen concluded in his study that 6 mg Dexamethasone injection 12 hrs before and 12 hrs after surgery showed reduction in cheek swelling by 54.3% ($P < 0.001$) as

measured with a tape and 29% (P < or = 0.056) by sonographic measurement. The limitation in the jaw opening was reduced by 17.7% (P < 0.002) after dexamethasone. Pain assessed by visual analog scale was reduced by 50% (P < 0.01). The amount of analgesics required postoperatively (codeine phosphate) was reduced by 37% (P = 0.02) following dexamethasone administration. In accordance with these studies all our patients were showing minimal swelling which gradually reduced overtime [8].

All our patients were comfortable with post operative mouth opening. Both the group patients showed similar improvement in mouth opening [9]. Yet the locking plate system patients all accounted for early return of function. The locking plate group reported ease in chewing moderately hard food as early as two weeks and resumed to their regular food habits within four months post op whereas the conventional plate patients took a little while longer.

In vitro studies have shown strikingly improved stability of locking plate system when compared to the conventional mini plates, especially in decreasing the torsion and the opening of the fracture site. In conventional systems with similar dimensions, fixation is achieved by the screw thread inserted into the bone, creating a friction lock between the plate and the bone, which is essential to achieve stability after the reduction. Torsional forces between bony fragments may lead to a loss of this friction lock, which result in reduced primary stability. Cordey., *et al*. state that the friction between the screw head and plate is the main weak point of the entire fixation. In the locking plate system, the thread on the screw head locks into the congruent thread of the plate, transforming the screws and plate into a unit, creating a rigid splint with higher mechanical stability. Stability was found to be equally stable as checked by palpation in both the group patients, this was in correlation with other similar studies [10].

As the locking screw is forming a fixator system within itself, exact adaptation of the plate was not necessary. Even without exact anatomic adaptation of the plate we achieved stability as achieved by a well anatomically adapted conventional mini plate. So for budding surgeon to adapt the plate in an anatomically difficult region like the angle locking plate requiring less precisional adaptation is a boon [11].

Infection in mandibular fracture cases is one of the most common post operative complications. Wound dehiscence and plate exposure are often associated with contamination and clinical mobility that may necessitate plate removal 80 in our study we were faced with one patient with plate exposure in the conventional group patient. He reported three months following surgery with complains of pain and difficulty chewing on operated side. When he came to the department we noticed plate exposure and pus discharge. The plates were subsequently removed under local anaesthesia and he was given a oral dose of antibiotics and analgesics for five days. The incidence of post operative infection, is greatly influenced by the patient existing condition and oral hygiene we attribute the infection in this case to his poor oral hygiene status [12].

The main disadvantage of locking plate is the cost factor. This system is approximately 7 to 8 times costlier than the conventional titanium mini plate system. Not all the patients can afford to spend much on the hardware.

Conclusion

In this study, a sincere attempt was made to clinically compare the efficacy of 2.3 mm locking plate/screw system with 2.00 mm conventional mini plate in treatment of mandibular angle fractures without maxillomandibular fixation. Even though the results when compared were not statistically significant in the other aspects studied, earlier restoration of function was noted in patients treated with locking plates.

Conflicts of Interest

None.

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