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RESEARCH ARTICLE
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Comparison of Crevicular vs Vestibular incision for postoperative complications in Symphysis and parasymphysis fracture

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ABSTRACT

Aim: To compare crevicular and vestibular incisions in postoperative complications in symphysis and parasymphysis fracture.

Materials and methods: This clinical trial involved 12 patients with mandibular symphysis and parasymphysis fractures which were divided into two groups of 6 each; Group 1-Crevicular incision(Test group) and Group 2 – Vestibular incision(Control group). Patients were randomly allocated to control and study groups. The fractures were approached using the routine vestibular incision in the control group and the crevicular incision with vertical release in the study group. The postoperative swelling, pre and postoperative mouth opening and the neurosensory disturbances.

Results: The study group demonstrated favourable surgical outcomes in the immediate postoperative phase as compared to the control group. The difference in mouth opening, swelling and neurosensory impairment between the two groups was found to be statistically significant.

Conclusion: Crevicular incision was found to be an ideal alternative to a vestibular incision in achieving surgical access and fixation of the mandibular symphysis and parasymphysis fractures with a reduction in postoperative patient discomfort and better surgical outcome.

Keywords: *Crevicular incision, Vestibular incision, Symphysis fracture, Parasymphysis fracture, Open reduction and Internal fixation, Quality of life, Innovation*

INTRODUCTION

The mandibular symphyseal area is the most prominent and most vulnerable to trauma. [1] [2] [3] [4]. There is a compression of the outer cortex and expansion of the inner cortex, and the fracture will result when the forces are beyond the limits of the capacity of the bone to withstand them, in the parasymphysis area, also the mandible is weaker as the canine has the longest and the strongest root, it occupies a lot of space in the bone, undermines and weakens it and also due to the presence of mental foramen [5]. Thus, the mandible tends to fracture at this site. The management of such fractures is done by ORIF intraorally or extraorally depending on the nature of the injury.

Within this, the most popular method being extensively used is the intra-oral approach employing a vestibular incision [6]. Fixation by using plates and screws usually follows this incision. But experience and findings suggest that this surgical approach is associated with multiple postoperative complications including structural injury, swelling [7], scarring, obliteration of vestibular depth, need for plate removal [8] and wound infections [9] [10]. Moreover, the mental nerve that is primarily responsible for carrying the sensory information from the brain to the gingival mucosa, lips and chin, when exposed to either direct or indirect trauma during the surgical procedure can give rise to paresthesia [11] [12] which is troublesome and is a long-term effect to the patients.

Also, the mentalis muscle is stripped from the mandible in a subperiosteal plane [13]. Retraction of the labial tissues is facilitated by stripping them off the inferior border of the symphysis. Subperiosteal dissection of the mandibular body is relatively simple compared to that of the symphysis because there are fewer Sharpey's fibres inserted into the bone, that's why a simple mucosal closure is inadequate in the anterior region of the mandible as it allows retraction of the facial muscles, which will heal in an abnormally low position along the mandible [14].

The critical factors that lead to such surgical complications are (i) unnecessary and over-manipulation of the tissues in and around the anterior mandibular region during the ORIF procedure and (ii) non-standard and poor surgical approach (iii) improperly designed incision with improper closure iv) maintenance of hygiene by the patient [15] [16]

By appropriate choice and design of the incision technique, these complications can be greatly avoided or at least minimized to a greater extent which in turn reduces the discomfort and improves the quality of the patient's life post the surgical procedure.

Keeping in mind the above postoperative complications, patient discomfort and safety, it is the responsibility of the surgeon to understand and evaluate an alternative incision technique and compare its suitability and performance concerning the traditionally employed vestibular incision.

The aim of this study was therefore to evaluate the suitability and post-surgical outcome of such an alternate incision technique referred to as the crevicular incision technique on mandibular symphysis and parasymphysis fractures.

The crevicular incision is a very simple type of incision and is commonly used in periodontal cases. It is also given in case of an apicoectomy, impactions. If the crevicular incision is used in case of Mandibular fractures for ORIF it will give wider exposure with excellent healing and lesser complications, there is one problem with the sulcular incision that in giving this incision it also causes damage to the gingival tissues and periodontal ligaments but longer-term studies prove that there is no effect on the periodontal ligaments.

MATERIALS AND METHODS

Study setting

This comparative study was carried out in a University hospital setting and the subjects chosen for this study are patients undergoing

open reduction and internal fixation for mandibular symphysis or parasymphysis fracture who reported to Saveetha Dental College, Chennai. The patients participated out of their own free will. Ethical clearance was obtained from the Ethics committee at Saveetha Dental College.

A total of 12 subjects were selected for this study by simple random sampling. All the patients were operated on in the same institution (Saveetha dental college, Chennai). The total 12 patients were divided into two groups of 6 each. In Group 1, patients with crevicular incision were included and in Group 2 patients with Vestibular incision were included.

Inclusion Criteria:

Population: Patients undergoing open reduction and internal fixation for mandibular symphysis and parasymphysis fractures

Intervention: Crevicular incision for mandibular symphysis and parasymphysis fracture

Comparison: Vestibular incision for mandibular symphysis and parasymphysis fracture

Outcomes:

- Swelling
- Mouth opening
- Paresthesia

Exclusion Criteria

- Mandibular body,angle and condylar fractures.
- Uncooperative/Mentally retarded patients
- Under the age of 18
- Patients not willing to participate
- Patients with other systemic illnesses such as Cardiovascular diseases, respiratory diseases, neurological disorders etc.
- Not the in-inclusion criteria

Data Collection

Subjects were randomly allocated a via simple random sampling technique. The sequence was generated by a co-investigator not involved in the study. They were divided into two groups of 6 each. Group 1 received a Crevicular incision for mandibular symphysis and parasymphysis fracture. (test group) and Group 2 received a vestibular incision for mandibular symphysis and parasymphysis fracture (control group).

Surgical procedure

Patients were admitted after routine investigations and anaesthetist fitness for surgery. Pre-medications were administered intravenously. Under General anaesthesia, Nasotracheal intubation was done, standard scrubbing and draping were done, and 2% Lignocaine with 1:200000 Adrenaline was given. In group 1 consisting of 6 patients, a crevicular incision was given for mandibular fracture. The fracture site was exposed and reduced. Fixation was done using Stainless steel or titanium plates and screws. The closure was done using 3-0 Vicryl. Hemostasis was achieved and extubation was uneventful for all surgeries. All the surgeries were performed by a single surgeon.

Outcomes measured

The outcomes that were measured are as follows

- Pre and Postoperative swelling
- Pre and Postoperative mouth opening
- Pre and Postoperative paresthesia.

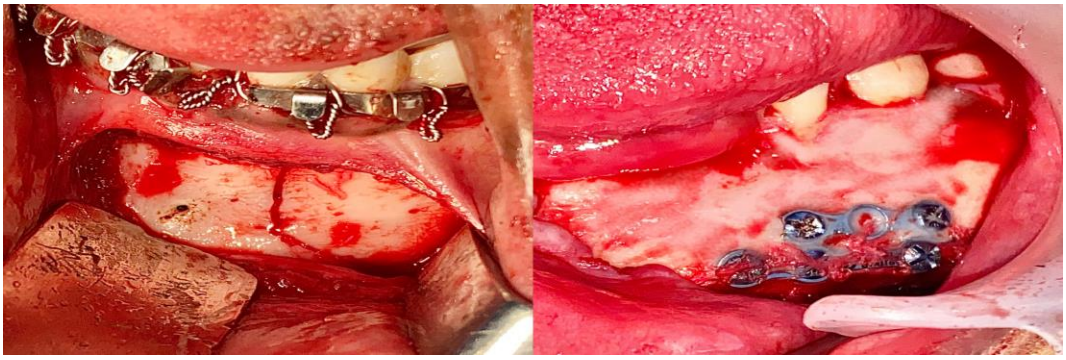
Swelling and mouth opening was measured pre-operatively, 1st postoperative day, 3rd day and 7th day. The neurosensory evaluation was done preoperatively, on 1st postoperative day, 3rd day, 7th day and after 2 weeks.

The results were tabulated and compared using an independent t-test.

The postoperative time swelling was measured using 5 points. The midpoint in the tragus (Point A), angle of the mouth (Point B), lateral canthus of the eye (Point C), mandibular angle (Point D) and soft tissue gnathion(Point E).

The mouth opening was measured by the interincisal distance. The neurosensory assessment was done using direction sense (using a cotton tip applicator) where the patients were told to close their eyes and tell if they feel the touch sense present or absent. It is done 15 times and the results are tabulated as normal if

the sensation is present more than 90% of the time and abnormal if less than 90% of the time.



RESULTS

A total of 12 patients were included in this study. Out of the 12 patients, 7 were males and 5 were female. The patient's age ranged from 24 to 49 years.

The mouth opening which was measured preoperatively, on the 1st, 3rd and 7th postoperative days was found to be more in Group 1 than in Group 2 and was found to be statistically significant (Table 1). The swelling was measured on the 1st, 3rd and 7th postoperative days and was found to be lesser in Group 1 than in Group 2 and was found to be statistically significant (Table 2).

TABLE 1: Measurement of swelling and mouth opening

	Swelling				Mouth opening		
	Preoperative (mean+ Stdev)	Postoperative			Postoperative		
		Day 1	Day 3	Day 7	Day 1	Day 3	Day 7
Treatment group	2.89 ±1.99	4.08 ± 0.67	0.99 ± 0.62	0.99 ± 1.66	41.02±2.67	43.33 ±2.87	46.46 ±3.52
Control group	3.16 ±1.25	7.27 ± 1.95	4.87 ± 1.09	2.96 ± 0.87	35.37±1.94	46.77 ±2.81	48.37 ±3.69
p-value	0.21	<0.01	<0.01	<0.01	0.03	0.037	0

The neurosensory assessment for direction sense showed less impairment in Group 1 as compared to Group 2.

TABLE 2: Assessment of neurosensory activity using direction sense

Group	Direction sense			
	Response	Postoperative day		
		Day 1 (%)	Day 3 (%)	Day 7 (%)
Study	Normal	85.6	96.2	100
	Abnormal	13.3	3.1	0
Control	Normal	36.2	45.2	93.1
	Abnormal	62.1	52.3	6.3
p-value		<0.001	<0.001	0.462

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DISCUSSION

The most important steps for the successful management of mandibular fractures include; appropriate incision, flap design, exposure, reduction, fixation, suturing [17] and postoperative care [18] [19] [20].

The incision must be as that it gives proper exposure and visualization to the fracture site, not damaging the surrounding vital structures and also easy for suturing [21]. The most commonly used and considered to be the gold standard for mandibular symphysis and parasymphysis fractures is the vestibular incision. But this incision is found to have certain complications postoperatively such as swelling, reduced mouth opening and nerve paresthesia.

In this study, we have compared the vestibular incision with the crevicular incision for the mandibular symphysis and parasymphysis fractures.

The vestibular incision has been followed for many years in which a cuff of the mucosa is left below the attached gingiva. The incision can vary according to the operator. After the incision, the flap elevation needs to be done in both inferior and superior directions. Also when the surgeon is inexperienced, there are chances for injury to the mental nerve [22] [23].

Crevicular incision on the other hand has many advantages such as ease of design. In this technique, an incision is placed on the crevices of the gingiva. So there is a direct reach to the bone. Flap elevation becomes easy and only needs to be done in one direction. With a vertical release incision, there is no tension on the flap and it does not tear [24] [25] [26]. This incision has very less chance of nerve damage, easy exposure to the fracture site and minimal scar formation. This incision gives a direct approach to the subperiosteal plane [27].

In a few cases, there may be severely displaced fracture fragments in such cases. The gingival cuff of tissue may be a hindrance while the manipulation and reduction of the fracture. In such cases, a crevicular incision may be a better choice when compared to the vestibular approach.

CONCLUSION

In conclusion, a Crevicular incision was found to be an ideal alternative to the vestibular incision in achieving surgical access and fixation of mandibular body fractures with a reduction in postoperative patient discomfort and better surgical outcome. The limitation of this study is that the sample size was small and less follow-up time. Further studies can be done with a larger sample size to generalize the results and obtain a standard protocol for mandibular symphysis and parasymphysis fractures and increase the success of surgeries.

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Conflict of interest

Nil

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