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Journal of Oral Medicine, Oral Surgery, Oral Pathology and Oral Radiology

Journal homepage: [www.joooo.org](http://www.joooo.org)



## Original Research Article

# Etiology of chin laceration and their possible association with underlying mandibular fractures- A retrospective study

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## ARTICLE INFO

### Article history:

Received 01-10-2022

Accepted 21-10-2022

Available online 02-12-2022

### Keywords:

Chin laceration

Mandibular fractures

Etiology

## ABSTRACT

**Introduction:** The recognition of the associated mandibular fracture plays a vital role, if unrecognized may lead to complications such as Temporomandibular joint dysfunction, chronic pain and malocclusion. These complications may not be elicited at the time of injury, but many years later. Therefore, it is important to identify the presence of associated mandibular fractures while understanding the cause of injury followed by clinical examination.

Our study reviews the factors (etiology, gender, and age) that determines the various patterns of chin laceration and the incidence of associated mandibular fractures.

**Materials and Methods:** A retrospective study was conducted among 55 patients who reported to the Casualty/ Emergency room with chin laceration between July 2018 and July 2019. Data on age, gender, etiology, and associated fractures were noted. Patients with facial laceration other than the chin region were excluded from the study.

**Result:** Out of 55 patients, it was found that chin laceration was common in males in the age group of 20-40 years. 69.1% of it is due to the RTA, followed by fall from height, and assault. 27.8% of chin lacerations were associated with unilateral condylar fracture, and 20.4% were associated with symphysis fracture followed by parasymphysis, body, angle, and ramus fracture.

**Discussion:** Chin laceration acts as an important diagnostic clue for the underlying mandibular fracture and various complications that might occur with/after the fracture.

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## 1. Introduction

Mandible is the third most commonly fractured bone, which may be associated with chin laceration.<sup>1,2</sup> Due to its close proximity to the brain, central nervous system injuries might occur in association with chin laceration<sup>3</sup> as brain is vulnerable to multiple impact complex motion events.<sup>4</sup> The prevalence and incidence vary with age, gender, etiology, force, and the direction of the impact.<sup>1,2</sup> Etiology associated with those injuries are RTA, assault, fall from height, etc.<sup>1</sup>

Possible late complications like TMJ dysfunction, malocclusion, and ankylosis may be prevented with proper

clinical examination and knowledge about the mechanism of injuries.<sup>2</sup> Our study reviews the factors (etiology, gender, and age) that determines the various patterns of chin laceration and the incidence of associated mandibular fractures.

## 2. Materials and Methods

All the patients within Kelambakkam who endured chin laceration and required primary care between July 2018 and July 2019 were included in the study. After obtaining the case history and clinical examination, data were collected according to the etiology, age, gender, and associated mandibular fractures. Our study included all the patients

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with chin lacerations belonging to all ethnic groups, gender and excluded those patients with other facial lacerations.

Etiology was divided into four categories: RTA (Road Traffic Accident), fall from height, assault, and others. Fracture sites in the mandible were assigned into Symphysis, Parasymphysis, Angle, Body, Ramus, Condyle and were diagnosed using Computed tomography of facial bones with three dimensional reconstruction (CT). The size of the chin laceration were divided into less than 3cm, more than 3cm and, complex laceration. The age of the patient associated with the fracture was divided into three categories: less than 20, 20-40 and, more than 40 years.

The sample size was calculated using G\*Power software version 3.1.9.4. Chi-square test was used to analyze the frequency distribution between two groups. Percentage and Mean were calculated using the statistical package for social science version 21. Variables are etiology, age, gender, laceration size, and associated mandibular fracture. Confounding factors are age related changes in mandible like atrophic mandible, variations in density etc.

### 3. Results

#### 3.1. Chin laceration and its associated mandibular fracture

Out of 55 samples with chin laceration, 78.18% of the patients had a mandibular fracture (Figures 1 and 2), and the remaining 21.8% of patients' did not have any fractures. The test value shows that the chin laceration is significantly associated with mandibular fracture. (Table 1)

**Table 1:**

		Frequency	Percent	P Value
Valid	No fracture	12	21.8	0.000
	Fracture	43	78.18	
Total		55	100.0	



**Fig. 1:** Clinical photograph of laceration in chin region with associated symphysis of mandible fracture in CT facial bone

The presence of chin lacerations were correlated with the type of mandibular fracture revealed, 27.8% have unilateral condylar fracture, 20.4% had symphysis fracture, 16.4% had parasymphysis fracture, 7.4% had bilateral condylar



**Fig. 2:** Clinical photograph of laceration in chin with no associated mandibular fracture in CT facial bone

fracture, 5.6% of angle, 3.64% of ramus fracture and 20.4% did not have any fractures. (Table 2)

**Table 2:**

		Frequency	Percent
Valid	No fracture	11	20.0
	Bilateral condyle	4	7.3
	Para symphysis	9	16.4
	Symphysis	11	20.0
	Angle	3	5.5
	Unilateral	15	27.3
	Ramus	2	3.64
Total		55	100

#### 3.2. Gender and chin laceration

During the two-year study period, it was found that out of 55 patients that were associated with chin lacerations, 83.3% were male and 16.7% were female. Test values indicate that males are significantly associated with chin laceration. (Table 3)

**Table 3:**

		Frequency of chin laceration	Percent	P value
Valid	Male	45	83.3	0.000
	female	10	16.4	
	Total	55	98.2	
Total		55	100.0	

#### 3.3. Distribution of age with mandibular fracture

To find the frequency of fractures, patients with chin lacerations were divided into three groups according to their age.

Out of 55 patients, patients with chin lacerations belonging to the age group of 20-40 years had 65.4% of fracture when compared to the other age groups (<20 years – 13%, >40 years-22%). Test results show that there was no significant correlation between age and chin laceration. (Table 4)

**Table 4:**

		Frequency	Percent	P value
Valid	<20yrs	7	12.7	0.043
	20-40yrs	36	65.4	
	above 40yrs	12	21.8	
Total		55	100.0	

### 3.4. Size of the laceration and its associated fracture

Patients with chin laceration were divided into three groups depending upon the size of laceration.

Out of 55 patients, patients with a chin laceration size greater than 3 cm had higher chances of mandibular fracture when compared to other groups. Test results shows that laceration size greater than 3cm are significantly associated with mandibular fractures. (Table 5)

**Table 5:**

Laceration	Frequency of fracture	Percent	P value	
Valid	Less than 3	19	34.5	0.003
	More than 3	32	58.2	
	Complex laceration	4	7.27	
Total	55	100.0		

### 3.5. Etiology and chin laceration

Different etiology associated with chin lacerations are RTA, fall from height, assault, skid and fall. The most common cause of chin laceration was RTA (69.1%), followed by fall from height (14.5%), assault (7.27%), and others (9.1%). Test results shows that the RTA is the main etiological cause of chin laceration. (Table 6)

**Table 6:**

	Frequency of chin laceration	Percent	P value	
Valid	RTA	38	69.1	0.000
	Fall	8	14.5	
	Assault	4	7.27	
	Others	5	9.1	
	Total	55	100	

## 4. Discussion

This study has evaluated the relationship between the chin laceration and its associated mandibular fractures. It also analysed the distribution of chin laceration with etiology, gender, and age.

Kaban et al. mentioned that the chin lacerations are associated with underlying skeletal fractures. He

further stated that spectrum of injuries like disruption of symphyseal soft tissue, fractures of mandibular condyles, angles, symphysis, parasymphysis, and cervical spine fracture depends upon the direction and magnitude of impact force. This favors our study, as 74.6% had associated fractures.<sup>5</sup>

According to Lee et al., the risk of soft tissue lacerations increases with the anatomical prominence of the bony areas. He suggested that the skin is more likely to lacerate when the underlying bone can resist the forces that could produce a fracture. They demonstrated that the absorption of the force in blunt trauma is higher for the skin above the mandible and the frontal bone because the underlying bone better resists fracture and deformation when compared with other facial bones.<sup>6</sup>

Park et al. examined 1,742 patients and observed a total of 2,094 oral and maxillofacial lacerations. They found that chin lacerations are the most common extra-oral laceration, which may or may not be associated with facial bone fractures.<sup>7</sup>

Aslam et al. observed the etiology of lacerations as falls (48%), assaults (11%), hit by an object by accident (21%), and hit stationary object by accident (15%). It contradicts our study where the etiology of chin laceration was RTA (70.4%), fall from height (14.8%), assault (5.6%), others (9.3%).<sup>8</sup>

Laureano et al. examined 160 patients who received treatment in the emergency department. They stated that 56.8% of patients had a laceration size of 1.01-5cm.<sup>9</sup> It favors our study, as 59.3% of patients had a laceration size higher than 3cm and chances of underlying fractures are possible.

In a retrospective case-control study, Zhou et al. examined 1131 patients with maxillofacial fractures. They stated that patients with soft tissue injuries in mandible had an equal risk of mandibular fractures,<sup>10</sup> which favors our study as 74.6% had an associated fracture.

Roccia et al. examined 1960 patients stated that strong association is observed between the chin laceration and underlying mandibular fractures (considering symphyseal, parasymphyseal fractures as direct trauma and condylar fractures as indirect trauma).<sup>11</sup> It favors our study as 77.8% of chin lacerations were associated with underlying mandibular fractures.

The chin laceration has been described as a clue for the underlying fracture in the mandible. In this literature, the frequency of chin lacerations and mandibular fractures varies with age, gender, and etiology.<sup>12</sup>

The highest incidence of chin laceration with mandibular fracture was observed in male, with a laceration size of >3cm, and with RTA. In the case of associated mandibular fractures, the unilateral condylar fracture is most commonly associated with chin laceration followed by parasymphysis, symphysis, bilateral condylar fracture, ramus, and angle.

Deliverska et al. stated that depending upon the direction and magnitude of the impact force, the types of injuries vary from soft tissue laceration to the fracture.<sup>13</sup>

Dean et al. suggested symphysis and bilateral condylar fracture are most commonly associated with chin laceration, coexistent fractures of parasymphysis, angle, body, ramus of the mandible are less apparent.<sup>14</sup> In our study, unilateral condylar fractures were commonly observed.

Nabil et al. examined 100 adult patients with mandibular fractures secondary to RTA, where routine TMJ examination OPG, CT was done, followed by an MRI scan within ten days and after five years. He concluded that the internal derangement of TMJ on the same side of fracture is possible due to acute stage of trauma or as delayed consequences. In the nonfractured side, delayed TMJ derangement might occur due to trauma. Patients having condylar fractures associated with angle or body fracture are more prone to TMJ damage on both sides.<sup>15</sup>

Luce et al. stated that in an RTA- the head, torso, and extremities are subjected to forces many times than the gravity. The tolerance forces of various organ systems are already estimated. High impact force is necessary to cause laceration and associated fracture, which may be related to Central Nervous System injuries.<sup>16</sup> Abagara et al. also stated that mandibular fractures are indicators of possible craniocerebral injuries as high energy is required to disrupt the mandible.<sup>17</sup> Dar et al. concluded that head injury is not always associated with facial fracture but may be associated with soft tissue injuries alone.<sup>18</sup> Careful examination should be done to avoid unnecessary/fatal consequences.

## 5. Conclusion

Out of 55 patients, chin laceration was common in males and in the age group of 20-40 years. 69.1% was due to the RTA, followed by fall from height, and assault. 27.8% of chin lacerations were associated with unilateral condylar fracture, and 20.4% were associated with symphysis fracture followed by parasymphysis, body, angle, and ramus fracture. Our study provides essential data that chin laceration of various etiology and size are associated with mandibular fractures in different anatomical sites. Proper examination for segmental mobility, TMJ movements, and occlusion followed by radiographic evaluation should be done on patients with chin lacerations. Further studies are required to find whether the laceration can predict maxillofacial injuries.

## 6. Conflicts of Interest

There are no conflicts of interest.


## References

1. Jin KS, Lee H, Sohn JB, Han YS, Jung DU, Sim HY, et al. Fracture patterns and causes in the craniofacial region: an 8-year review of 2076 patients. *Maxillofac Plast Reconstr Surg*. 2018;40(1):29.

2. Yuen HW, Mazzoni T. Mandible Fracture. Treasure Island (FL: StatPearls Publishing; 2020.
3. Razak NA, Nordin R, Rahman N, Ramli R. A retrospective analysis of the relationship between facial injury and mild traumatic brain injury. *Dent Traumatol*. 2017;33(5):400–5.
4. Whyte T, Gibson T, Anderson R, Eager D, Milthorpe B. Mechanisms of Head and Neck Injuries Sustained by Helmeted Motorcyclists in Fatal Real-World Crashes: Analysis of 47 In-Depth Cases. *J Neurotrauma*. 2016;33(19):1802–7.
5. Bertolami BN, Kaban LB. Chin trauma: A clue to associated mandibular and cervical spine injury. *Oral Surgery, Oral Medicine, Oral Pathol*. 1982;53:122–6.
6. Lee RH, Gamble WB, Mayer MH, Manson PN. Patterns of facial laceration from blunt trauma. *Plast Reconstr Surg*. 1997;99(6):1544–54.
7. Park KH, Song JM, Hwang DS, Kim YD, Shin SH, Kim UK, et al. A clinical study of emergency room visits for oral and maxillofacial lacerations. *J Korean Assoc Oral Maxillofac*. 2015;41(5):246–50.
8. Lo S, Aslam N. Mechanisms and pattern of facial lacerations in the Accident Department. *Int J Clin Pract*. 2005;59(3):333–5.
9. Filho JRL, Alencar M, Ribeiro M, Silva-júnior E, and FG. Analysis of the variables affecting the prevalence and topography of the facial soft tissues injuries. *Int J Oral Maxillofac Surg*. 2017;46(1):85.
10. Zhou H, Lv K, Yang R, Li Z, Li Z. Mechanics in the Production of Mandibular Fractures: A Clinical, Retrospective Case-Control Study. *PLoS One*. 2016;11(2):e0149553.
11. Rocchia F, Bianchi FA, Zavattoni E, Baietto F, Boffano P. Etiology and patterns of facial lacerations and their possible association with underlying maxillofacial fractures. *J Craniofac Surg*. 2011;22(6):19–23.
12. Bertolami CN, Kaban LB. Chin trauma: A clue to associated mandibular and cervical spine injury. *Oral Surg Oral Med Oral Pathol*. 1982;53(2):122–6.
13. Deliverska E. Maxillofacial fractures in patients with multiple injuries and polytrauma. *J IMAB-Ann Proc Sci Papers*. 2016;22(2):1120–6.
14. Dean HT. Fractures of the Mandible: An Analysis of 50 Cases. *J Am Dent Assoc*. 1930;17:1074–85.
15. Nabil Y. Evaluation of the effect of different mandibular fractures on the temporomandibular joint using magnetic resonance imaging: five years of follow-up. *Int J Oral Maxillofac Surg*. 2016;45(11):1495–9.
16. Leuce EA, Tubb TD, Moore AM. Review of 1,00 Major Facial Fractures and Associated Injuries. *Plast Reconstr Surg*. 1979;63(1):26–30.
17. Agbara R, Obiechina AE, Ajike SO, Adeola DS. Pattern of maxillofacial injuries in patients with craniocerebral injuries: a prospective study. *J Oral Med Oral Surg*. 2018;24(3):112–8.
18. Dar N, Nisar H, Salman W, Hussain S, Qawnain S, Shafiq S, et al. Associated Maxillofacial Injuries in Patients with Severe brain Injuries: Institutional Study of Atertiary Care Hospital. *J Maxillofac Oral Surg*. 2017;05(10):29648–53.

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**Cite this article:** Rajesh P, Padmanaban V, Anbukkarasu H. Etiology of chin laceration and their possible association with underlying mandibular fractures- A retrospective study. *J Oral Med, Oral Surg, Oral Pathol, Oral Radiol* 2022;8(4):184-188.