

Correlation Of Mandibular 3rd Molars With Angle Fractures

Research Article

Shivani. N¹, Senthil Murugan. P^{2*}, Leelavathi. L³

¹ Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University Chennai, India.

² Associate Professor, Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University Chennai, India.

³ Senior Lecturer, Department of Public Dentistry, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University Chennai, India.

Abstract

Mandible is considered as the strongest bone in the facial skeleton. However, due to its anatomic, exposed position and configuration, traumatic forces leading to fracture are reported to be high. This study focuses on understanding the correlation between angle fracture and impacted 3rd molars. This study aims to assess the correlation of mandibular 3rd molars with mandibular angle fractures. A retrospective cross-sectional study was conducted using the patient records from the Department of oral and maxillofacial Surgery, Saveetha Dental College, Chennai from June 2019 -April 2020. Patients who underwent treatment for mandibular angle fractures were taken into this study. Sampling done by means of systematic Sampling. Data was collected and then subjected to statistical analysis. Microsoft excel 2016 (Microsoft office 10) data spreadsheet was used to collect data and later exported to the statistical package for social sciences for windows version 20.0, SPSS INC Chicago IU USA. The total sample size of the study was 24. Prevalence of angle fracture was found to be higher in (17-25) years age group (45.8%) followed by 26-35 years (41.7%). Among males and females, males showed a higher prevalence of angle fracture (91.7%). About (75%) of angle fractures were associated with impacted third molars and right Angle fractures (70.8%) were more prevalent than left angle fractures. Within the limits of the study, it was found that angle fracture was more prevalent in males (91.7%) and in the age group (17-25) years (45.8%) respectively and the prevalence of angle fractures associated with third molars was about (75%). Although, no statistical significance was found in the correlation of age and gender with angle fracture respectively.

Keywords: Impacted Teeth; Road Traffic Accidents; Transalveolar Extraction; Trauma etc.

Introduction

The mandible is the strongest bone of the maxillofacial region. [31]. But, ironically it is one of the most commonly fractured bones due to its prominence in the face and weakening of the corticocancellous framework due to the presence of teeth [23]. The weak regions of the mandible include angle region, condylar region, and the parasymphysis region. Mandible angle is described as a transitional zone between the dentulous zone and the edentulous and the area where impacted teeth are most commonly found [9]. The presence of a third molar is considered to cause a reduction in the bone mass which makes it more vulnerable to

fractures [3, 30]. various other complications of an impacted third molar include infections, loss of the nearby tooth, pericoronitis dental caries Etc [7].

Angle fractures occur in the triangular region between the anterior border of the masseter and the posterior superior insertion of the masseter [14, 7]. These are also described by the relationship between the direction of the fracture line and the effect of muscle distraction on fracture fragments [36]. fracture is favorable when muscle tends to draw bony fragments together and unfavorable when bony fragments are displaced by muscle forces. There is a concept stating that keeping asymptomatic lower third molars

*Corresponding Author:

Dr. Senthil Murugan Pandurangan,

Associate Professor, Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospitals, Saveetha Institute Of Medical and Technical Sciences, Saveetha University, 162, Poonamallee High Road, Chennai 600077, TamilNadu, India.

Tel: 91 97908 69469

E-mail: senthilmuruganp.sdc@saveetha.com

Received: January 12, 2021

Accepted: January 22, 2021

Published: January 29, 2021

Citation: Shivani. N, Senthil Murugan. P, Leelavathi. L. Correlation Of Mandibular 3rd Molars With Angle Fractures. *Int J Dentistry Oral Sci.* 2021;8(1):1460-1465. doi: <http://dx.doi.org/10.19070/2377-8075-21000291>

Copyright: Senthil Murugan Pandurangan ©2021. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

may be tied up to complications with an increased chance of mandibular fracture after trauma [10, 22, 13, 12]. However, the extraction of asymptomatic third molars is also not free of risk as it also has a higher chance of fractures and infections during transalveolar removal [1, 25, 35]. Pathological fractures in the mandibular angle region can occur in the case of highly invasive squamous cell carcinoma and diffuse large b cell lymphoma and HIV positive patients [19, 21]. botulinum toxin has been employed in the closed treatment of various mandibular fractures such as condylar fractures [16].

Although retaining an impacted tooth does more harm than the risk of fracture during extraction, hence it is important to make the population aware of the risk factors of retained impacted teeth [27]. Prior to extraction thorough patient history should be assessed. Clinicians must prescribe antibiotics prior to the treatment for patients with cardiovascular disease to prevent infective endocarditis [18]. If a clinician suspects increased anxiety states in a patient, he/she must prescribe anxiolytics priorly to the patients. [15, 33]. Post-treatment, the site should be sutured for effective healing and must prescribe antibiotics and analgesics and counsel the patient regarding the post-extraction instructions and care. [6, 26, 28]. Also, to prevent cross infections, clinicians must employ proper waste management of the personal protective equipment, extracted tooth, etc [19, 17].

Materials And Methods

Study design and setting

This retrospective study was conducted by collecting records of 86,000 patients from June 2019- April 2020 who had reported to Saveetha Dental College for treatments. Patients reporting to the Department of Oral and Maxillofacial Surgery with the diagnosis of mandibular angle fractures were shortlisted from the main records based on the inclusion/exclusion criteria.so final sample which contains 24 patients were enrolled for the study. Ethical committee approval was obtained from the Institutional Ethics Committee. The study population included patients who underwent treatment for angle fractures at the Outpatient Department of Saveetha Dental College by means of Systematic Sampling.

- Inclusion Criteria- Patients of all age groups and gender with angle fractures were included.

- Exclusion Criteria- Patients with other fractures and pathologies, were excluded from the study.

Duplicate patient records and incomplete data were excluded. Datas were reviewed by an external reviewer. Totally, n= 24 patients were included and were divided into 4 different age groups such as (17-25) years,(25-35) years, (above 36) years. Demographic data such as the patient's age, gender were also recorded. The data obtained were tabulated in Microsoft Excel 2016 (Microsoft office 10) and later exported to SPSS (Statistical Package for Social Sciences) for Windows version 20.0, SPSS Inc, Chicago IU, USA) and subjected to statistical analysis. Chi-square test was employed with a level of significance set at $p < 0.05$.

Results And Discussion

The data for this retrospective study was based on residents of Chennai seeking treatment at Saveetha Dental College, Chennai. Since, all the data available were included without the sorting process, no bias was expected in the selection of patients. The current study seems to find the prevalence of angle fracture and to correlate the occurrence of Mandibular angle fracture with impacted third molar.

The final dataset consists of 24 patients who were of Indian origin who underwent Mandibular angle fracture treatment. The age group with higher prevalence was (17-25 years) (45.8%) followed by 26-35 years (41.7%). (table 1 and figure 1). Among males and females, males had a higher prevalence of angle fractures. (91.7%). (table 2 and figure2).With reference to the site of the fracture,the right mandibular angle was more prevalent (70.8%) than the left side. (table 3 and figure 3) About 75% of angle fracture was associated with an impacted tooth. (table 4 and figure 4) However, there was no statistically significant correlation of age, gender and presence of impacted tooth with that of angle fracture. (Table 5 and Figure 5) (Table 6 and Figure 6).

In the current study, Most mandibular angle fractures occurred in the age group of (17-25) years (45.8%) and (25-36) years (41.7%). Meisami et al, stated the the incidence of angle fractures was higher in males (78%) than in females (22%) [22]. In another study done by thorn et al stated that most mandibular fractures occur due to road traffic accidents, falls, and accidents [34, 29]. The possible reason for this in our geographic region may be the very high

Figure 1. This Graph shows the frequency of age distribution of the study population based on angle fractures. The parameters include : 17-25 years, 26-35 years and above 35 years age group, and these were represented on the X-axis and the frequency of the study population is represented on Y axis. From the graph, it is evident that the age group with the highest prevalence was 17-25 years (45.8%).

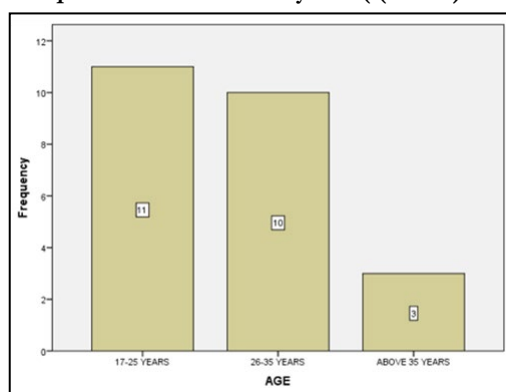


Figure 2. Graph showing gender distribution of the study population where parameters are: male and female which are represented on the x-axis and the percentage of the study population is represented on y axis. From the graph, it is evident that males have a higher prevalence (91.7%) than females. (8.3%).

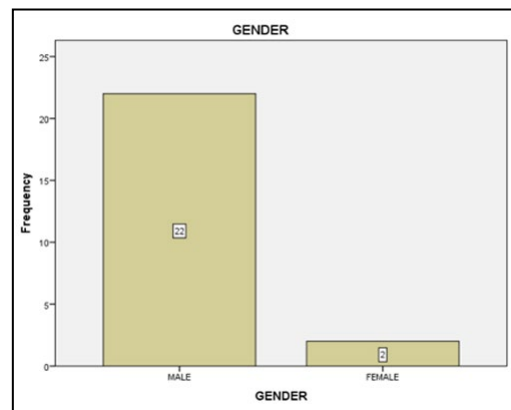


Figure 3. Graph showing the diagnosis of the angle fracture of the study population. Where the Parameters are: right angle and left angle fracture and are represented on the x-axis and the frequency of the study population is represented on y axis. From the graph, it is evident that right angle fractures (70.8%) are more prevalent than left angle fractures. (29.2%).

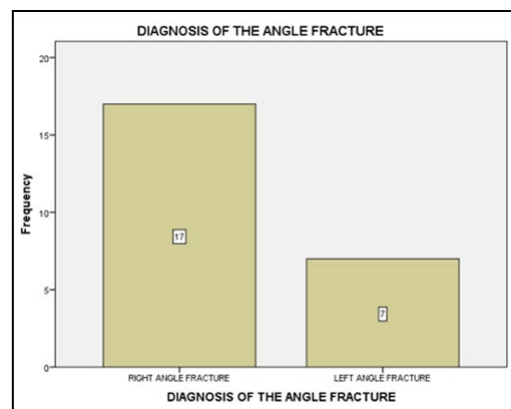


Figure 4. This Graph shows the association of impacted 3rd molars within the study population where the Parameters included are: yes and no and are represented on the x-axis and the frequency of the study population is represented on y axis. From the graph, it is evident that (75%) of the fractures were associated with impacted 3rd molars and the rest (25%) were not.

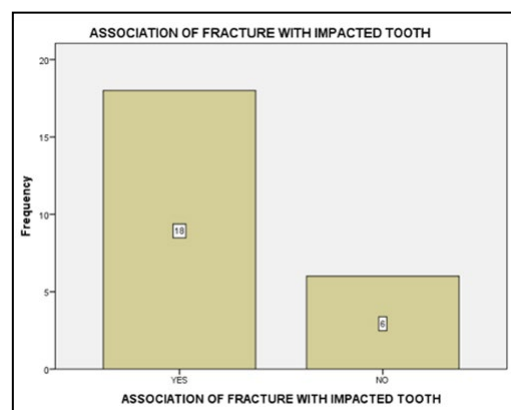


Table 1. Cross-tabulation of association of age with the association of angle fracture with impacted 3rd molar. The age is represented on the x-axis and the association of angle fracture with impacted third molar is represented on the y-axis. Chi square test showing p= 0.204 (Pearson chi square test, p value >0.05, statistically non significant).from the table there was no statistical significance between age and angle fracture.

		Association of fracture with Impacted tooth		Total	P Value
		Yes	No		
Age	17-25 Years	9	2	11	0.204
	26-35 Years	8	2	10	
	Above 35 Years	1	2	3	
Total		18	6	24	

Figure 5. Bar graph depicting the association of age with the association of angle fracture with impacted 3rd molar. X axis represents the age of the study population and Y axis represents the association of angle fracture with impacted third molar. Yes was denoted in blue and No was denoted in green. Chi square test showing $p = 0.204$. [Pearson chi square test, p value > 0.05 , statistically non significant). From the table there was no statistical significance between age and angle fracture.

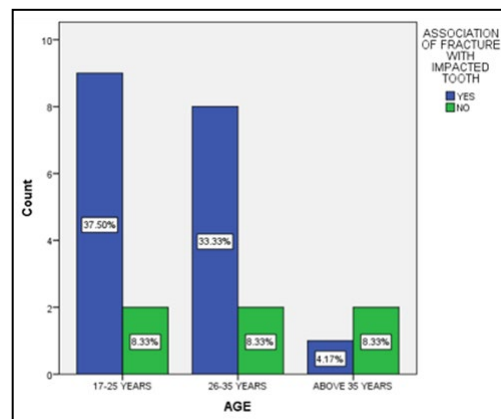
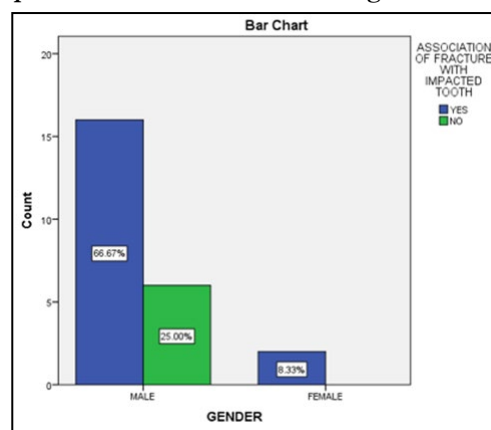


Table 2. Cross-tabulation of association of gender with the association of angle fracture with impacted 3rd molar. The gender is represented on the x-axis and the association of angle fracture with impacted third molar is represented on the y-axis. There was no significant association between gender and association of angle fracture with an impacted 3rd molar. (Pearson chi square value 0.727. Chi square test done, p value 0.394 [$p > 0.05$, statistically non significant]).

		Association Of Fracture With Impacted Tooth		Total	P value
		Yes	No		
Gender	Male	16	6	22	0.394
	Female	2	0	2	
Total		18	6	24	

Figure 6. Clustered bar Graph depicting the association of gender with the association of angle fracture with impacted third molar. X axis represents the age. Y axis represents the association of angle fracture with impacted third molar. Yes was represented in blue and No was represented in green. Chi square test showing $p = 0.3$ ($p > 0.05$ indicating statistically non significant). From the graph, it is found that there was no statistically significant relationship between gender and impacted teeth associated with angle fracture.



use of two-wheelers, lack of safety measures, and improper road conditions. This result was in concordance with many previous literatures [2, 24].

In our study, males (91.7%) showed a higher prevalence for mandibular angle fractures than females. These results were in concordance with a few other literatures which showed a ratio of male: female of (5.1:1) and (3.7:1) respectively [32, 5]. This may be because of basic roles males have and their increased chances of road traffic accidents. However, the occurrence of fracture and distribution between male and female have become almost equal

due to the increased involvement of females in social engagement which also involves a lot of travelling. The male-dominant culture has now been shifted and women are given equal opportunities [20].

In the current study, The mandibular angle fracture was more prevalent on the right side. Though there is no evidence to support the dimension of this hypothesis in the direction of the agreement [4].

According to the current study, the presence of an impacted third

molar increases the chances of angle fracture in 75% of cases. A similar study stated that patients with impacted third molars had thrice the increased risk of angle fractures when compared to patients without third molars [22]. These results are consistent with various literatures and can be explained in terms of the stress-strain distribution within the mandible [11]. Also, the angle region is the transition between the dentulous and edentulous regions and the presence of impacted teeth reduces bone density and increases the chances of fracture [9].

Dodson TB 1997 et al., explained the mechanism of mandibular fractures, in his study he found that when a strong force which can result in fracture is applied on the mandible through its lateral surface, the bone in the angle region tends to bend medially thereby producing compressive forces on the lateral surface of mandible which is getting impacted. This resultant force also produces tensile forces on the lingual surface of the mandible. So when the tensile forces applied exceeds the natural resistance strength of mandible fractures results especially in the region of mandibular angle where third molars are impacted which causes weakness of bone in that particular area [8]. This study provides evidence that patients with retained impacted mandibular third molars are more susceptible to angle fracture than those without.

Limitations And Future Scope

The limitations of the study include geographic limitations as the study was conducted only with the south Indian population predominantly. The majority of the study participants were males. This might bias the results, as the sample taken is not representative of the population. Future scope of the study will be better and will yield more accurate results if different ethnic groups with increased sample size and long duration of the study were considered.

Conclusion

Within the limits of the study, it was found that angle fracture was more prevalent in males (91.7%) and in the age group (17-25) years (45.8%) respectively. The angle fracture commonly occurred on the right side (70.8%) and the prevalence of angle fracture with impacted third molar was found to be (75%). Although, no statistical significance was found in the correlation of age and gender with angle fracture respectively.

References

- Abhinav RP, Selvarasu K, Maheswari GU, Taltia AA. The Patterns and Etiology of Maxillofacial Trauma in South India. *Ann Maxillofac Surg*. 2019 Jan-Jun;9(1):114-117. Pubmed PMID: 31293938.
- Adi M, Ogen GR, Chisholm DM. An analysis of mandibular fractures in Dundee, Scotland (1977 to 1985). *Br J Oral Maxillofac Surg*. 1990 Jun;28(3):194-9. Pubmed PMID: 2135661.
- Antic S, Milicic B, Jelovac DB, Djuric M. Impact of the lower third molar and injury mechanism on the risk of mandibular angle and condylar fractures. *Dent Traumatol*. 2016 Aug;32(4):286-95. Pubmed PMID: 26821987.
- Balaji SM. Impacted third molars in sagittal split osteotomies in mandibular prognathism and micrognathia. *Ann Maxillofac Surg*. 2014 Jan;4(1):39-44. Pubmed PMID: 24987597.
- Barde D, Mudhol A, Madan R. Prevalence and pattern of mandibular fracture in Central India. *Natl J Maxillofac Surg*. 2014 Jul-Dec;5(2):153-6. Pubmed PMID: 25937725.
- Christabel A, Anantanarayanan P, Subash P, Soh CL, Ramanathan M, Muthusekhar MR, et al. Comparison of pterygomaxillary dysjunction with tuberosity separation in isolated Le Fort I osteotomies: a prospective, multi-centre, triple-blind, randomized controlled trial. *Int J Oral Maxillofac Surg*. 2016 Feb;45(2):180-5. Pubmed PMID: 26338075.
- Daley TD. Third molar prophylactic extraction: a review and analysis of the literature. *Gen. Dent*. 1996;44(4):310-20.
- Schubert W, Kobienia BJ, Pollock RA. Cross-sectional area of the mandible. *J. Oral Maxillofac. Surg*. 1997 Jul 1;55(7):689-92.
- Duarte BG, Assis D, Ribeiro-Júnior P, Gonçalves ES. Does the Relationship between Retained Mandibular Third Molar and Mandibular Angle Fracture Exist? An Assessment of Three Possible Causes. *Cranio Maxillofac Trauma Reconstr*. 2012 Sep;5(3):127-36. Pubmed PMID: 23997857.
- Fuselier JC, Ellis EE 3rd, Dodson TB. Do mandibular third molars alter the risk of angle fracture? *J Oral Maxillofac Surg*. 2002 May;60(5):514-8. Pubmed PMID: 11988927.
- HUELKE DF. LOCATION OF MANDIBULAR FRACTURES RELATED TO TEETH AND EDENTULOUS REGIONS. *J Oral Surg Anesth Hosp Dent Serv*. 1964 Sep;22:396-405. Pubmed PMID: 14178798.
- Vijayakumar Jain S, Muthusekhar MR, Baig MF, Senthilnathan P, Loganathan S, Abdul Wahab PU, et al. Evaluation of Three-Dimensional Changes in Pharyngeal Airway Following Isolated Lefort One Osteotomy for the Correction of Vertical Maxillary Excess: A Prospective Study. *J Maxillofac Oral Surg*. 2019 Mar;18(1):139-146. Pubmed PMID: 30728705.
- Jesudasan JS, Wahab PU, Sekhar MR. Effectiveness of 0.2% chlorhexidine gel and a eugenol-based paste on postoperative alveolar osteitis in patients having third molars extracted: a randomised controlled clinical trial. *Br J Oral Maxillofac Surg*. 2015 Nov;53(9):826-30. Pubmed PMID: 26188932.
- Kruger, G. O. (1963) 'DIAGNOSIS AND TREATMENT OF JAW FRACTURES', GP, 28, pp. 117-123.
- Kumar S. Relationship between dental anxiety and pain experience during dental extractions. *Asian J. Pharm. Clin. Res*. 2017a;10(3):458.
- Kumar S. The emerging role of botulinum toxin in the treatment of orofacial disorders: Literature update. *Asian J. Pharm. Clin. Res*. 2017b;10(9):21-9.
- Kumar S, Rahman RE. Knowledge, awareness, and practices regarding biomedical waste management among undergraduate dental students. *Asian J. Pharm. Clin. Res*. 2017;10(8):341.
- Kumar S, Sneha S. 'KNOWLEDGE AND AWARENESS REGARDING ANTIBIOTIC PROPHYLAXIS FOR INFECTIVE ENDOCARDITIS AMONG UNDERGRADUATE DENTAL STUDENTS'. *Asian Journal of Pharmaceutical and Clinical Research*. 154.
- Kumar V, Patil K, Munoli K. Knowledge and attitude toward human immunodeficiency virus/acquired immunodeficiency syndrome among dental and medical undergraduate students. *J Pharm Bioallied Sci*. 2015 Aug;7(Suppl 2):S666-71. Pubmed PMID: 26538940.
- Marciani RD. Third molar removal: an overview of indications, imaging, evaluation, and assessment of risk. *Oral Maxillofac Surg Clin North Am*. 2007 Feb;19(1):1-13. Pubmed PMID: 18088860.
- Marimuthu M, Andiappan M, Wahab A, Muthusekhar MR, Balakrishnan A, Shanmugam S. Squamous cell carcinoma gene expression and their clinical correlation in oral squamous cell pathway. *Indian J Dent Res*. 2018 May-Jun;29(3):291-297. Pubmed PMID: 29900911.
- Meisami T, Sojat A, Sandor GK, Lawrence HP, Clokie CM. Impacted third molars and risk of angle fracture. *Int. J. Oral Maxillofac. Surg.*. 2002 Apr 1;31(2):140-4.
- Menon S, Kumar V, V S, Priyadarshini Y. Correlation of Third Molar Status with Incidence of Condylar and Angle Fractures. *Cranio Maxillofac Trauma Reconstr*. 2016 Sep;9(3):224-8. Pubmed PMID: 27516837.
- Mwaniki DL, Guthua SW. Occurrence and characteristics of mandibular fractures in Nairobi, Kenya. *Br J Oral Maxillofac Surg*. 1990 Jun;28(3):200-2. Pubmed PMID: 2135662.
- Packiri S, Gurunathan D, Selvarasu K. Management of paediatric oral ranula: a systematic review. *J Clin Diagn Res*. 2017 Sep;11(9):ZE06-ZE09.
- Patil SB, Durairaj D, Suresh Kumar G, Karthikeyan D, Pradeep D. Comparison of Extended Nasolabial Flap Versus Buccal Fat Pad Graft in the Surgical Management of Oral Submucous Fibrosis: A Prospective Pilot Study. *J Maxillofac Oral Surg*. 2017 Sep;16(3):312-321. Pubmed PMID: 28717289.
- Patturaja K, Pradeep D. Awareness of Basic Dental Procedure among General Population. *Res J Pharm Technol*. 2016 Sep 1;9(9):1349.
- Rao TD, Kumar MS. Analgesic efficacy of paracetamol vs ketorolac after dental extractions. *Res J Pharm Technol*. 2018 Aug 1;11(8):3375-9.
- Scherer M, Sullivan WG, Smith DJ Jr, Phillips LG, Robson MC. An analysis of 1,423 facial fractures in 788 patients at an urban trauma center. *J Trauma*. 1989 Mar;29(3):388-90. Pubmed PMID: 2648018.
- Soós B, Janovics K, Tóth Á, Di Nardo MD, Szalma J. Association between third molar impaction status and angle or condylar fractures of the mandible: A retrospective analysis. *J. Oral Maxillofac. Surg*. 2020 Jul 1;78(7):1162-e1.
- Subbaiah MK, Ponnuswamy IA, David MP. Relationship between mandibular angle fracture and state of eruption of mandibular third molar: A digital

- radiographic study. *J Indian Acad Oral Med Radiol.* 2015 Jan 1;27(1):35.
- [32]. Subhashraj K, Ramkumar S, Ravindran C. Pattern of mandibular fractures in Chennai, India. *Br J Oral Maxillofac Surg.* 2008 Mar;46(2):126-7. Pubmed PMID: 17098339.
- [33]. Sweta VR, Abhinav RP, Ramesh A. Role of Virtual Reality in Pain Perception of Patients Following the Administration of Local Anesthesia. *Ann Maxillofac Surg.* 2019 Jan-Jun;9(1):110-113. Pubmed PMID: 31293937.
- [34]. Thorn JJ, Møgeltoft M, Hansen PK. Incidence and aetiological pattern of jaw fractures in Greenland. *Int J Oral Maxillofac Surg.* 1986 Aug;15(4):372-9. Pubmed PMID: 3091715.
- [35]. Wagner KW, Otten JE, Schoen R, Schmelzeisen R. Pathological mandibular fractures following third molar removal. *Int J Oral Maxillofac Surg.* 2005 Oct;34(7):722-6. Pubmed PMID: 15878820.
- [36]. Zaydon TJ, Brown JB. Early treatment of facial injuries. *Acad. Med.* 1964 Nov 1;39(11):1060.