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EVALUATION OF THE TEETH IN LINE OF MANDIBULAR FRACTURE: A 3-YEAR RETROSPECTIVE STUDY

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ABSTRACT
Teeth plays most vital role in classification and treatment of mandibular fracture. Hence mandibular fracture involving the dentate region are compound in nature because of presence of teeth. Management of non vital, avulsed, fractured or displaced teeth plays an important role in healing of the fracture. According to the literature these teeth can be preserved either by endodontic treatment or sometime needful extraction is required. Presence of teeth in the fracture line helps in preventing displacement of fracture, also aids in achieving proper reduction. At the same time teeth present in the line of fracture may get secondarily infected ,along with delayed healing of fracture because of its communication through the periodontal ligament into the oral cavity .Hence management of this teeth in the line of fracture depend upon the clinical situation. Purpose of this study was to potentially evaluate the prognosis of teeth in the line of fracture, clinically and radiographically, and their associated complications.

KEYWORDS: Fracture line, mandibular fracture, tooth mobility, tooth vitality, malunion, osteomyelitis.

1) INTRODUCTION
The mandible because of its moderately noticeable position is more inclined for fractures and records for the most widely recognized facial bone wounds, about half of the mandibular fractures occurs in the teeth bearing region. In spite of the fact that mandible is the heaviest grounded facial bone, most of the versatile pattern of fractures takes place in mandible. Such fractures present with pain, edema, hematoma, derangement of occlusion, displacement and mobility of the fracture segments, facial asymmetry, and disturbance in phonation.[1] According to published litreatures, the most serious wounds are caused via Road traffic accidents (RTA). RTA have been accounted for as a main source of mandible fractures.[2] Mandibular fractures are among the most widely recognized wounds to the facial skeleton, with a 6:2 extent amongst mandibular and zygomatic fractures.[3] Studies shows that majority of young generation are more exposed to mandible fracture.[6] The writing recommends the accompanying mean recurrence rates in light of area: Body - 29%, Condyle - 26%, Angle - 25%, Symphysis - 17%, Ramus - 4%, Coronoid process - 1%.% The mandible is included in 70% of patients with facial fractures. The quantity of mandible fractures per patient reaches from 1.5-1.8. Around half of patients with a mandible fracture have more than 1 fracture. Now a days a most typical issue in overseeing mandibular fracture includes managing teeth in the line of fracture. Nevertheless, any fracture including the dentate regions of the jaw can possibly include erupted teeth in the fracture line. Any possible harm to the tooth present in the fracture line may leads subluxation, separation or root fracture. The tooth included may become non vital due to traumatic dentoalveolar injury or may have a previous pulpal, periodontal or periapical pathology. Each of these fractures, could incline the fracture to contamination or may convolute recuperating. Prior to the initiation of antimicrobial treatment, the risk of contamination in a compound fracture represented a few issues in treatment.

Delayed union, nonunion and osteomyelitis were regularly encounterted, rendering the treatment frequently delayed and complicated.[7-8] Different opinion exists with respect to the extraction or conservation of such teeth. The treatment of teeth situated in the line of fracture has rarely turned out to be more conservative.[7,8] The likelihood to control contamination by the utilization of antimicrobial medications and requirement of rigid internal fixation in the management of a fracture has made the prophylactic extraction of such teeth pointless. General inconvenience rate related with a tooth present in the fracture line shifts somewhere around 14% and 18%. Impact of teeth in a fracture line on contamination is difficult to decide because of cooperation with different elements. Hence root fractures, periodontal pathology close to the fracture line, functionless teeth, and vertical tooth fracture are all indicated for extraction. This elements either alone or joined could incline the fracture to disease and may confound recuperating. Early studies specified that presence of teeth in line of fracture regularly turn into a nidus for contamination. Indeed, even crucial teeth were routinely extracted, as it was believed that the correspondence of the fracture of oral cavity by means of periodontal space cultivates contamination. It has likewise been expressed that teeth in fracture line can be left set up, if certain essentials, for example, early treatment with stable splints or by practically stable osteosynthesis are met.[10]

2) MATERIALS AND METHODS

2.1) STUDY DESIGN: This was a Retrospective type of study carried out at the department of Oral and Maxillofacial Surgery of K.M.SHAH DENTAL COLLEGE from January 2016 to December 2018. The study protocol was approved by Sumandeep Vidyapeeth Institutional Ethics Committee(SV IEC). Written informed consent was obtained from all patients after they were given full written and verbal information regarding the study.

2.2) SAMPLE DESCRIPTION: data was collected from the departmental records of the patients who were treated with the mandibular fracture and fulfill the inclusion criteria.

2.3) INCLUSION CRITERIA FOR THE SELECTION OF SAMPLE

1. Patients of any age group who are diagnosed with Mandibular fracture and treated in Department of oral and Maxillofacial Surgery, K. M. Shah Dental College Vadodara during the period of January 2016 to December 2018.
2. Patient records with complete necessary details.

2.4) EXCLUSION CRITERIA FOR THE SELECTION OF SAMPLE

1. Patients who present to the department of oral and maxillofacial surgery with Maxillofacial Infection
2. Patients with history of Pathological fracture or present with pathological fracture
3. Patients with Incomplete records.
4. Patient who did not come for post operative follow up.

2.5) MATERIALS

1) Data collected from the departmental records.
2) Hard copy of well formatted data.

2.6) METHODOLOGY

A 3 years retrospective study was designed to evaluate the teeth in line of mandibular fracture at the department of oral and maxillofacial surgery, K M shah dental college, piperia, waghodia, vadodara.

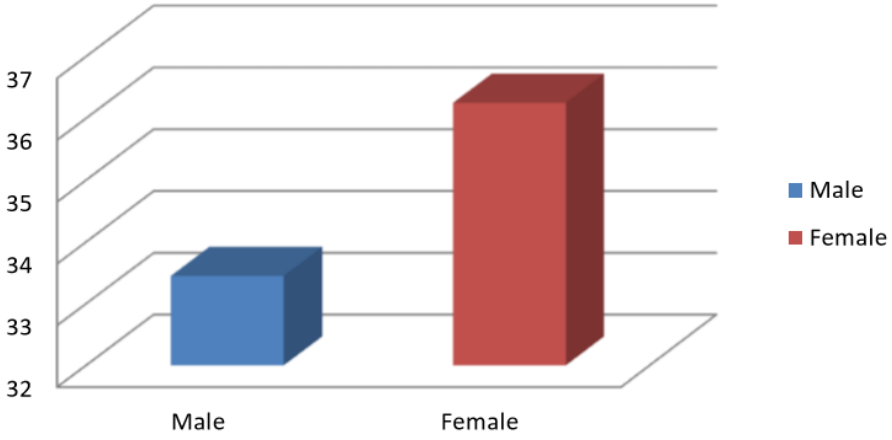
For this study, we collected the data of the patients, operated in last three year at the department of oral and maxillofacial surgery, KMSDCH for mandibular fracture. We assessed the age, sex, pattern of mandibular fracture, teeth involved in fracture line, pre and postoperatively of the teeth in line of fracture and need for extraction or endodontic treatment postoperatively, mobility of the tooth present in the line of fracture. After the collection of data, a descriptive method using tables and graphs was employed to elucidate the data for statistical analysis.

3) OBSERVATION AND RESULTS

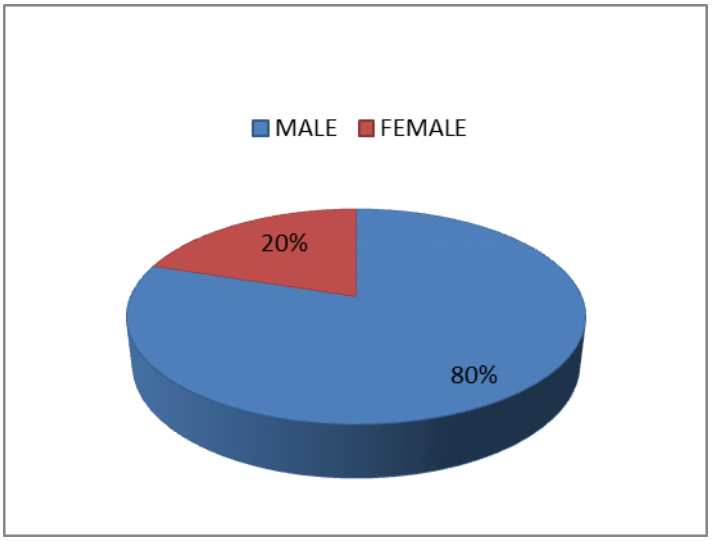
A reterospective study was done**. Graph 1** shows that in present study among females 35 year was the most common age group observed whereas in males 30 years age group was more commonly observed and there were no specific age differentiation present. **Chart.2** shows males are more commonly involved than females. **Chart.3** shows fracture pattern with single mandibular fracture symphysis (1) regions shows 13% involvement, 44% of cases parasymphysis (2), body (3) region involves 13% of cases; angles (4) region involves 9% of cases. Multiple mandibular fractures shows 1% involvement of symphysis (1) and body (3) fracture, 9% of cases involving parasymphysis(2) and body(3) region, 1% of cases involving parasymphysis (2) and angle (4), 3% of cases involves body (3) and angle (4) fracture respectively, out of which parasymphysis was most commonly involved. **Graph 4** shows number of teeth involved in fracture line. In 4% of cases only 1 tooth was involved, 56% of cases 2 teeth were involved, in 16% of cases 3 teeth were involved, in 23% of cases 4 teeth were involved, in 1% of cases 5 teeth involved and in majority of the cases 2 teeth are involved in fracture line. **Graph 5** showing pre and post operative vitality of the involved tooth in fracture line, in 89% of cases pre operative vitality was positive and in 88% of cases post operative vitality was positive. In 11% of cases pre operative vitality was positive and in 12% of cases post operative vitality was negative ,which proves that in majority of the cases postoperatively vitality of tooth is present. **Graph 6** showing Mobility of the tooth in the line of fracture. In 94% of cases teeth were not mobile

post operatively. In 6% of cases teeth were mobile post operatively, which evaluates minimum postoperative mobility of teeth in majority of the patients. **Graph 7** showing tooth in the line of fracture extracted post operatively. In 94% of cases no teeth was extracted post operatively, In 6% of cases teeth extracted post operatively and shows that in maximum number of cases no teeth extraction required postoperatively. **Graph 8** showing tooth endodontically treated post operatively. In 91% of cases no endodontic treatment was done post operatively, In 9% of cases teeth was treated endodontically post operatively, hence proves that the in majority of the cases no endodontic treatment is required postoperatively.

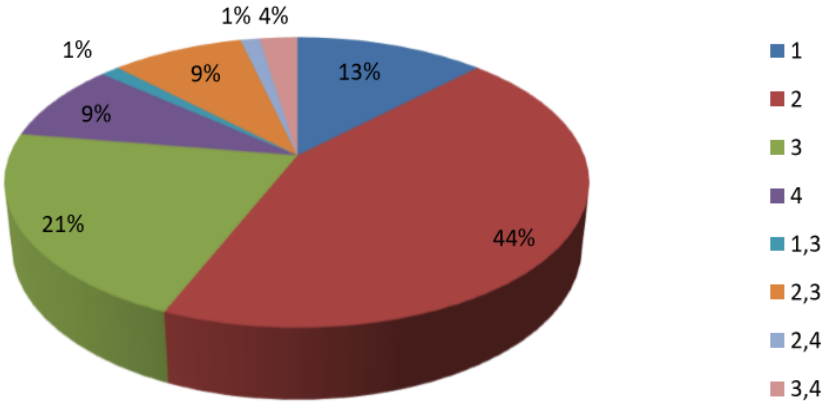
MEAN AGE (GRAPH 1)



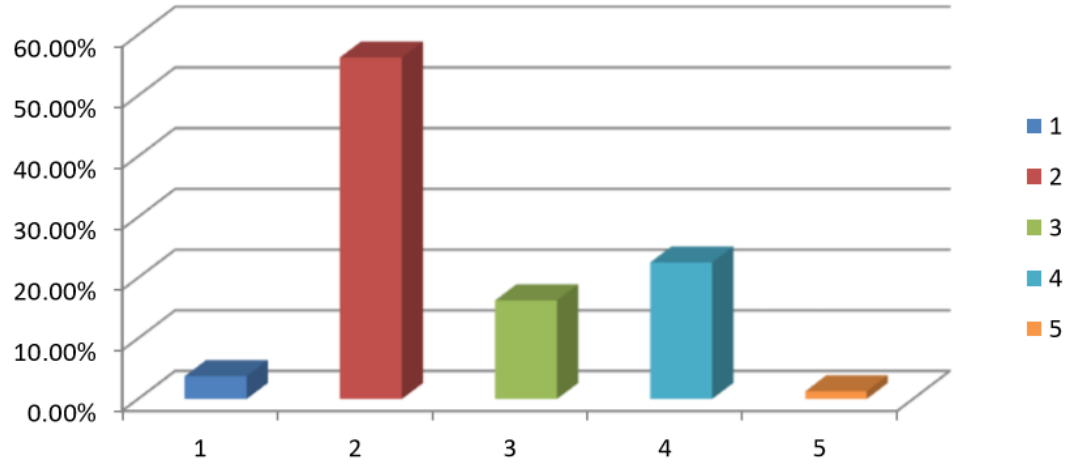
GENDER (CHART 2)



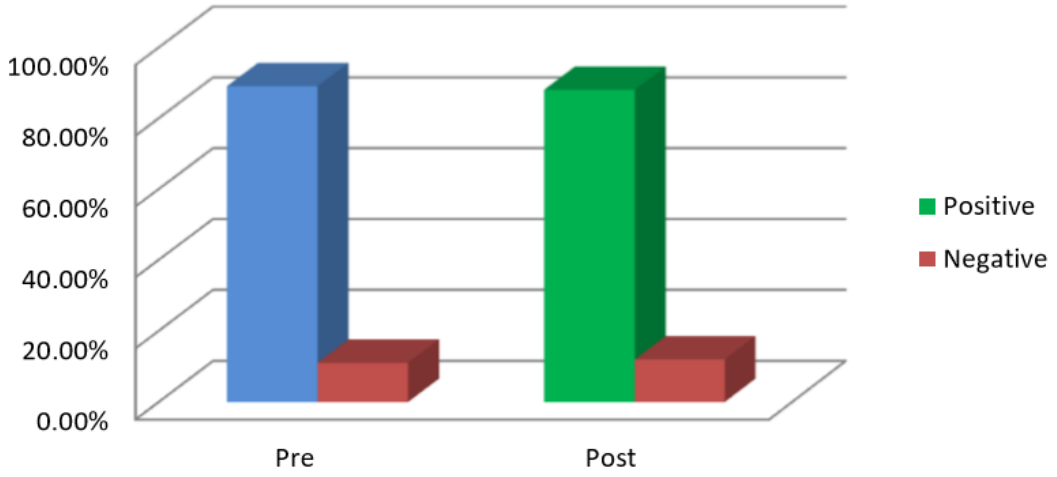
FRACTURE PATTERN (CHART 3)



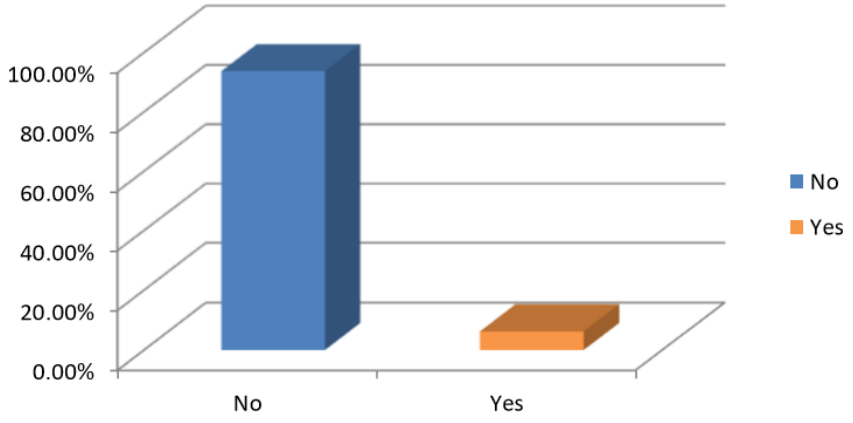
TOOTH INVOLVED IN THE FRACTURE LINE (GRAPH 4)



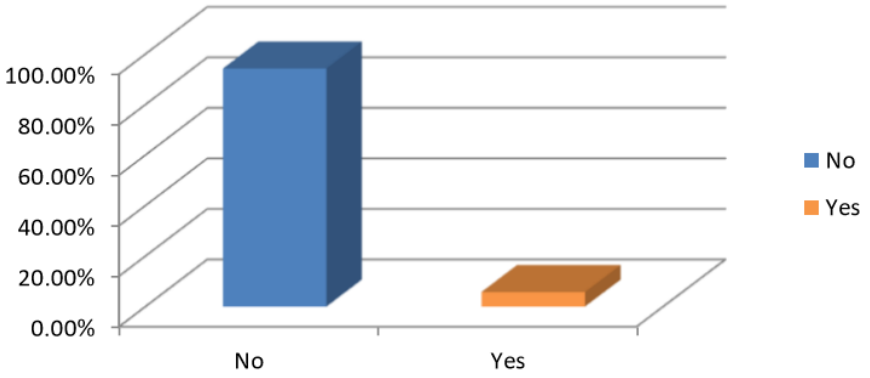
PRE AND POST OPERATIVE VITALITY OF THE INVOLVED TOOTH (GRAPH 5)



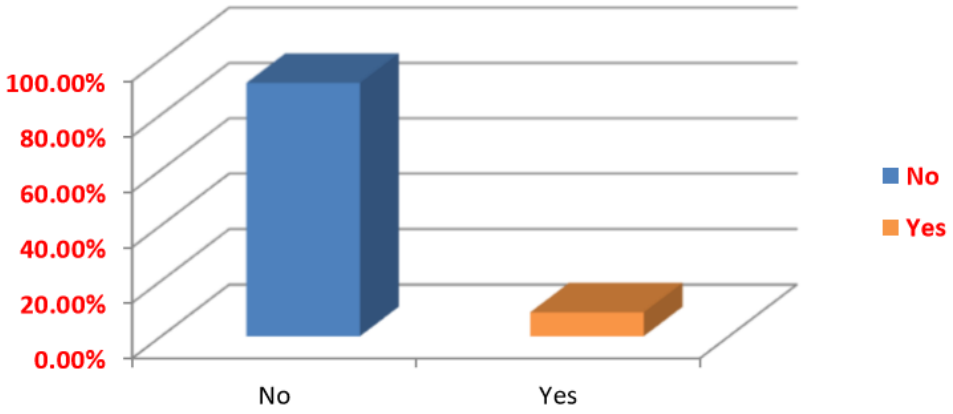
MOBILITY OF THE TOOTH IN THE LINE OF FRACTURE (GRAPH 6)



TOOTH IN THE LINE OF FRACTURE EXTRACTED POST OPERATIVELY (GRAPH 7)



TOOTH ENDODONTICALLY TREATED POST OPERATIVELY (GRAPH 8)



4) DISCUSSION

A fracture may be defined as a sudden violent loss in continuity of bone, solution of continuity of the bone may be complete or incomplete in character. Maxillofacial injury stays a standout amongst the most widely recognized, yet difficult parts of oral and maxillofacial surgery. The mandible still stays a standout amongst the most ordinarily harmed bones in the injury. Mandibular fractures are available in more than 13% of all extremely harmed patients. They are the fourth most common facial fracture, happening in 37% of patients, and are the most usually worked upon. Among patients with facial wounds, mandibular fracture happens in the range of 37% to 67% of the cases, depends on locality (urban or country, military). The incidence of mandibular fracture related with anatomic region was the body (29.5%), angle (27.3%), condyle (21.1%), symphysis (19.5%), ramus (2.4%), and coronoid (0.2%).[15]

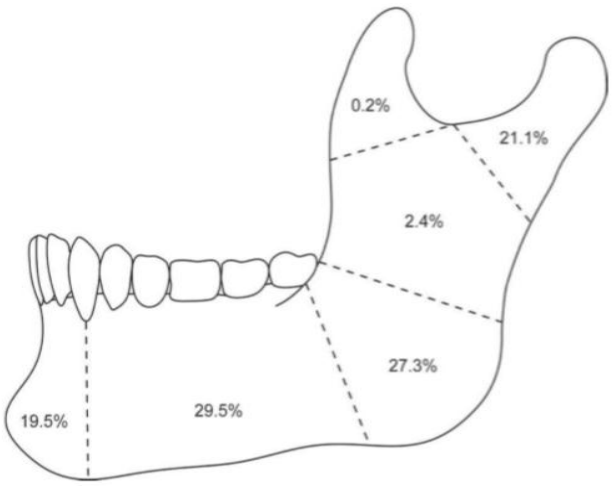


Fig. 1: showing incidence of different pattern of mandibular fracture.

A particular interest is given to mandible owing to the diversity of its location, severity of fractures, and the availability of different treatment modalities. In managing mandibular fracture, the common problem involves dealing with teeth in the line of fracture. Whichever fracture involving the dentate areas of the jaw has the potential to involve erupted teeth in the fracture line. The involved tooth in fracture line communicates through periodontal space with oral cavity, which can permit the infection spread. Another alternative is that the blood supply of these teeth may be distraught by trauma, and causing necrosis of the pulp with subsequent infection[7]. In the literature, various methods described to manage the teeth in the line of fracture. Previously, teeth in the line of fracture were constantly extracted because it can lead osteomyelitis, and nonunion. Teeth in the line of fracture if not infected, can be left inside to aide in open reduction and internal fixation while manipulating the fracture segments.[10]

Management of teeth retained in fracture line:-1. Good quality intraoral radiograph 2. Institution of appropriate systemic antibiotic therapy 3. Splinting of teeth if mobile 4. Endodontic therapy if pulp is exposed 5. Immediate extraction if fracture becomes infected 6. Follow-up of 1year with endodontic therapy if there is demonstrable loss of vitality.

In ours study we notice that the main aetiology behind mandibular fracture is Road traffic accident, with 80% of male prelidiction of mean age group between 20–40 year. We noted that among the fracture involving the teeth bearing area of mandible, the most common fracture was parasymphysis. In analysing dentate mandibular fracture, in whom multiple fracture was present in the dentate region. Fracture with parasymphysis along with the body was most certainly seen. On pre operative panaromic radiograph the teeth involved in the line of fracture were changing. As per the Kamboozia's classified Teeth retained in line of fracture basedon position of the fracture in relation to apical foramen and the lateral periodontium of involved tooth estimated from preoperative panoramic radiograph into four types. It has been found that the type I and II was most commonly involved, type IV was also found in the cases with multiple mandibular fracture, where the type III was the least in number. Among this 89% (186) of cases teeth were vitals pre operatively and in 88.04% (184) of cases teeth were vitals post operatively. In 11% of cases teeth were non vital pre operatively and 12% of cases teeth were non vital post operatively. In some cases tooth were found non vital after treatment with open reduction and internal fixation, it might be because of manipulation for reduction of bony fragment or while fixing the hardware with screw might placed to the apical or into the root area. Preoperatively in 6% of cases tooth mobility was noticed and in 11% of cases teeth were found to be non vital. In 3 cases total four numbers of teeth were extracted intra operatively due to poor prognosis, tooth prevents the reduction and the tooth fracture vertically or obliquely which cannot be endodontically treated. In 6% of cases teeth was extracted post operatively, 4% of teeth were extracted mainly in between the 6 - 8 month of follow up, whereas 2% of teeth were extracted in between 2-4 month of follow up. Teeth were extracted following the rule of absolute or relative indications for removal of tooth from fracture line. Most of teeth which were detected as mobility or non vital preoperatively, were endontically treated in 7% of cases. In that 3% were treated within a week postoperatively and 4% were treated in the post operative follow up between 2-8 months respectively. The results of this study, which indicate a good prognosis for the retained tooth, support a future strategy of extracting tooth in fracture line only when absolutely indicated according to the above mentioned guidelines.

5) CONCLUSION

From the analysis we found that not all teeth present in the fracture line are needs to be extracted or endodontically treated. Because, in the study we found that the teeth were extracted or endodontically treated if only there is secondary infection affecting the healing of fracture. Preservation of these teeth most of the times prevents displacement and helps in reduction and fixation. In most of the instances the teeth in the fracture line should be kept in situ and managed as per the requirement.

6) ACKNOWLEDGEMENT

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