

Incidence of Pathologies Associated with Impacted Mandibular Premolars and Third Molars

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Abstract

Impaction is the cessation of eruption or failure of a tooth to erupt caused by a physical barrier in the eruption path, abnormal positioning of tooth and loss of space are other impediments. The rising incidence of impacted teeth and their influence on the dental arches have long been of concern to the oral maxillofacial surgeons. The aim of the study is to evaluate different types of Mandibular pathologies associated with impacted third molars. This was a retrospective study conducted in the Department of Oral and Maxillofacial Surgery in Saveetha Dental College, Chennai. A total of 470 cases ranging in the age from 18 years to 45 years with the diagnosis of Impacted mandibular third molars were considered for this study. Data were analysed using IBM SPSS statistics. This study showed vertical impaction and mesioangular impaction were most frequently involved in the formation of cystic lesions among which vertical impaction occupied (1.7%) and mesioangular impaction (0.2%). Tumors with 0.6% are associated with vertical impaction of mandibular third molar followed by mesioangular and distoangular impactions. Within the limitation of the study, we observed that there exists a significant incidence of Pathologies associated with impacted mandibular third molars.

Keywords: *Cyst, impactions, mandibular third molars, tumors.*

Introduction

Most common pathologies associated with third molars are Caries of impacted teeth or adjacent tooth, molar root resorption, periodontal bone loss of adjacent tooth and odontogenic cysts and tumors¹. Impacted third molar is a Universal problem which may be on an increased prevalence. Most epidemiological studies do not distinguish between the prevalence of one or two or more impacted third molars. The figures vary with different populations worldwide. The proponents

of prophylactic removal of the third molar have used this position of possible pathologies that can be associated with the third molar teeth as evidence of early removal. Impacted mandibular third molars are common complaints among patients seen in the oral and maxillofacial surgery department². Dentistry comprises practices related to oral cavity. Oral diseases are a major problem among the general population and there are various procedures carried out to prevent and treat them³. During dental treatment, anxiety and fear have been said to enhance pain during dental treatment. It may disturb patient's compliance during treatment resulting in poor dental and oral health⁴.

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Materials and Methods

Study setting and Data collection:

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 having mandibular impactions with pathologies were diagnosed and its treatment with surgical removal of the offending tooth were shortlisted from the main records based on the inclusion/exclusion criteria. So final sample, which contains 470 patients were enrolled for the study. Ethical committee approval for this study was obtained from the Institutional Ethics Committee with the following ethical approval number. SDC/SIHEC/2020/DIASDATA/0619-0320.

Sampling :

The study population included patients who underwent treatment for having mandibular impactions with pathologies Saveetha Dental College by means of Systematic Sampling.

Inclusion Criteria- Patients of all age groups and gender with impacted mandibular third molars with diagnosis of having mandibular impactions with pathologies were included.

Exclusion Criteria- Patients with impactions without any pathologies, and common dental problems were excluded from the study.

Duplicate patient records and incomplete data were excluded. Data were reviewed by an external reviewer. Totally, n= 470 patients were included. Demographic data such as the patient's age, gender and pericoronitis, pericoronal abscess were also recorded.

Data Analysis:

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

Position of mandibular third molar in relation to presence or absence of cysts: In 6 vertical impaction, cysts were present likewise in 1 mesioangular, 1 horizontal impaction cysts were present but in contrast, no Cysts were associated with distoangular impaction. Position of mandibular third molars in relation to presence or absence of tumors. In our study we found that tumors associated with impacted mandibular third molars were common in vertical impaction, Mesio angular, and horizontal with

no incidence in disto angularly impacted teeth. This study showed that vertical and mesioangular impactions were the most frequent in causing cysts, mesioangular being 0.5% and vertical impaction accounted for 1.7% and 0.6% of tumors were associated with the vertical impaction and then mesioangular and distoangular respectively. The distribution of age, gender, teeth number and position of tooth and their association with the formation of cysts and tumors and their statistics were depicted in [figures 1,2,3,4,5,6,7,8].

Third molars are usually the last tooth to erupt and most commonly impacted tooth⁵. The associated pathologies with third molar teeth may be clinically evident or hidden. When hidden, patients will frequently present vague complaints such as headache, pressure or pain that is not readily attributable to the teeth⁶. Painless dental extraction is the most common procedure carried out by dentists, and it is a common model for evaluating the efficacy of analgesics and anti inflammatories for acute dental pain relief⁷.

Pain has been described to be commonly associated with the third molars, however vague complaints may confuse the clinician leading to the misdiagnosis. Impacted third molar teeth have been reported to be common in the second and third decades of life. Surgical alterations in the position of the bony facial skeleton will inevitably affect the soft tissues⁸.

The high female predilection reported may be due to difference in between the growth curve of males and females. Male jaws continue to develop during the period of eruption of third molars therefore creating more space for the third molar eruption while females of jaws cease to grow during the same time. Botulinum, is a protein and lethal neurotoxin and is one of the most potent biological substances known which is used in bioterrorism as well. It is the first toxin used for therapeutic purposes⁹.

Patients having dental fear tend to go to the dentist only when they experience pain, thereby increasing the chance of fear, that their visit to the dentist will involve pain. This, in turn, results in exacerbation of their anxiety. It was found that dental anxiety was ranked fifth among the most

commonly feared situations¹⁰. Dental caries have been regarded as the most common dental disorder affecting the third molars because most of them will be malpositioned. Root resorption of the second molar tooth occurs as associated pathology of impacted third molars.

Sometimes dental follicular tissues can be confused with odontogenic tumors by the clinicians. Those patients who were surgically treated for their impacted teeth emphasising the need for histopathological examination of curretted tissue from the extracted socket if any suspected lesions/pathologies were present. The curretted soft tissue was sent for histopathological examination. Pharmacological agents have also been used in the recent past as adjuvants in various procedures to aid in the reduction of blood loss. Among these, tranexamic acid has been proved to efficiently reduce bleeding¹¹. Human immunodeficiency virus infection and acquired immunodeficiency syndrome are the globally emerging public health problems. It has profoundly affected every aspect of the public health sector¹²

In a radiographs, the dental follicular sac surrounding the tooth is interpreted as pericoronal radiolucency and width of this radiolucency is of at most important to determine the difference between a normal and abnormal follicle. A major issue related to present bio medical waste management is that many hospitals dispose their waste in an improper way, which contributes to spread of serious diseases such as hepatitis and human immunodeficiency virus¹³. The impacted mandibular third molars having follicular size measuring 2.4 mm or less radiographically and also executed pathology which emphasizes the need for the histopathological examination apart from the just clinical and radiographic examination. Bacterial endocarditis or infective endocarditis is a serious infection of the heart valves and endocardium that most often is related to congenital and acquired cardiac defects. bacterial endocarditis can commonly occur in patients with artificial heart valves¹⁴.

There is consensus regarding removal of the third molar impactions with almost no controversy concerning its removal when pathologies associated with them. The pathological changes associated with the impact of cystic changes which includes dentigerous cyst odontogenic keratocyst, calcifying odontogenic cyst and Commonest neoplasms ameloblastoma, myxoma and odontogenic fibroma are the components neoplasms¹⁵. Maxillofacial

trauma is any physical trauma to the facial region, is commonly encountered by maxillofacial surgeons, and is often associated with high morbidity¹⁶.

One of the most common postoperative complications after the extraction of permanent teeth is a condition known as dry socket. This term has been in use since 1896, when it was first described by Crawford¹⁷. Developmental dentigerous cysts is derived from the reduced enamel epithelium of the tooth forming organ associated with the crown of an unerupted tooth. Histologically dentigerous cyst is lined by a non keratinized stratified squamous epithelium and its cavity is filled by fluid or semi fluid content. A simple ranula which may be associated with impacted teeth can be treated by marsupialization or sclerotherapy or complete excision.¹⁸. Ameloblastoma contributes 10% of the odontogenic tumor. These are benign neoplasms under locally aggressive and slow growing neoplasms and infiltrative. There is equal male and female Predilection with the age range of 20 to 40 years. Ameloblastoma is classified as either intraosseous or extraosseous. Oral squamous cell carcinoma is the most frequent oral malignancy. Although it has been suggested that Oral squamous cell carcinoma arises through the accumulation of multiple genetic changes, the precise molecular mechanism and their relevance to clinicopathological variables are still unclear¹⁹. Oral submucous fibrosis is an insidious, chronic, disabling disease that affects the entire oral cavity, sometimes pharynx and rarely larynx²⁰. Odonomas are shown growing asymptomatic with limited growth and change into Complex odontoma which are associated with the permanent unerupted mandibular teeth. These lesions have radiopaque Mineralised structures with radiolucent halo.

The cysts and neoplastic changes taking place during development and because of this, the neoplastic and preneoplastic changes, early curative measures should be taken to avoid any complication for the well being of the patient. Graph 2. Position of impacted mandibular third molar in relation to occurrence of tumours.

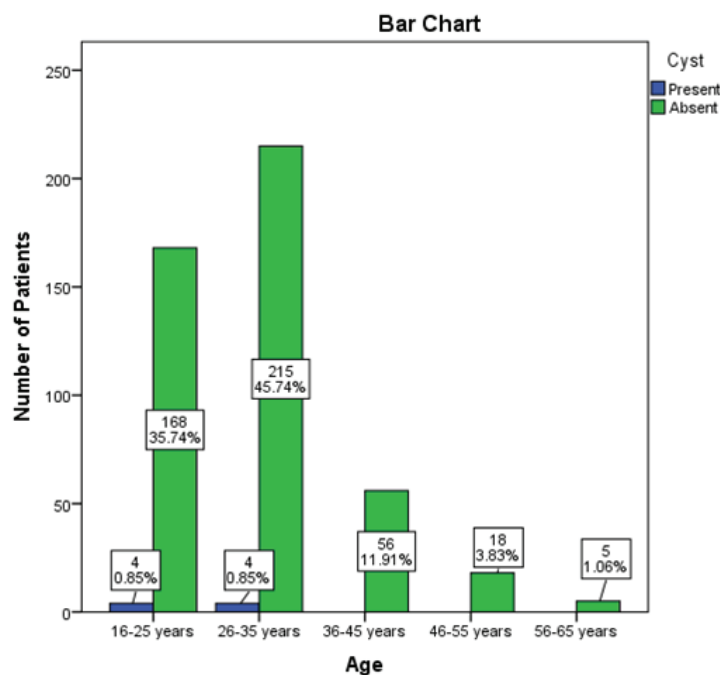


Figure 1 .Bar diagram showing the association Age with Presence or Absence of cyst.X axis represents the age group and Y axis represents no of patients affected by cyst formation.It is found that incidence of cyst formation among impacted mandibular teeth is uncommon in all age groups except very minimal prevalence in 16-35years (Blue).Chisquare test done,chi square value p=0.775[p > 0.05] which is statistically not significant.Even though, it is statistically not significant, the incidence of cyst formation among impacted mandibular tooth is more in patients with age group of 16-35 years when compared to other groups.

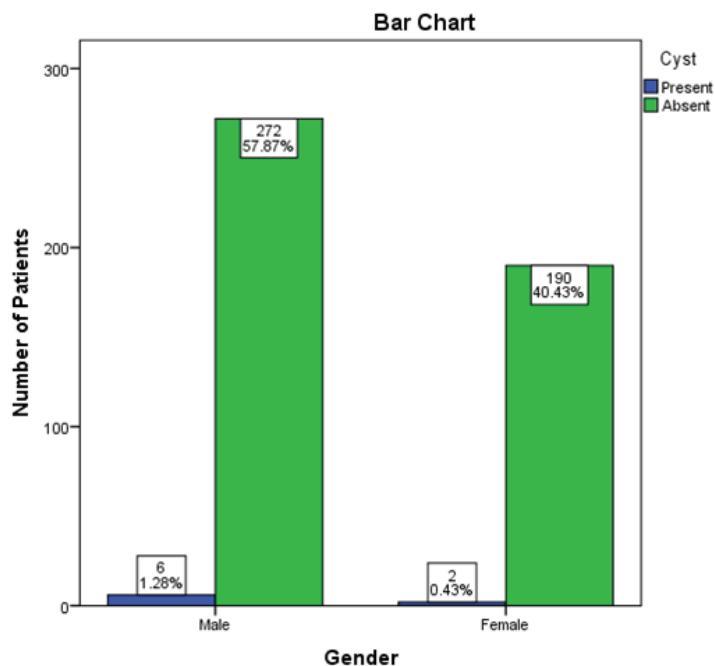


Figure 2 .Bar diagram showing the association of Gender with Presence or Absence of cyst.X axis represents the age group and Y axis represents no of patients affected by cyst formation.chi square test done (p - 0.358[p > 0.05])and was found to be statistically not significant. Even though, it is statistically not significant, the incidence of cyst formation (Blue) was found to be common among impacted mandibular tooth is more in males compared to females.

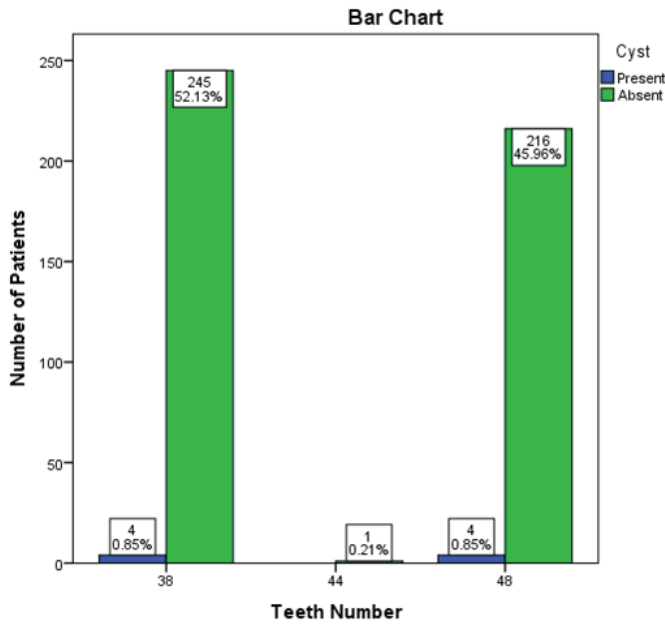


Figure 3 .Bar diagram showing the association of tooth number with Presence or Absence of cyst.X axis represents the age group and Y axis represents no of patients affected by cyst formation.Blue bar indicating presence of cyst and while Green bar represent absence of cyst,from the table,it is found that incidence of cyst formation among impacted mandibular tooth is very less in all 38,48,44 less than one percent.chi square test done,chi square value p - 0.976

[p > 0.05]and was found to be statistically not significant.Even though, it is statistically not significant, the incidence of cyst formation among impacted mandibular teeth is very low but equally distributed among mandibular molars and premolars.

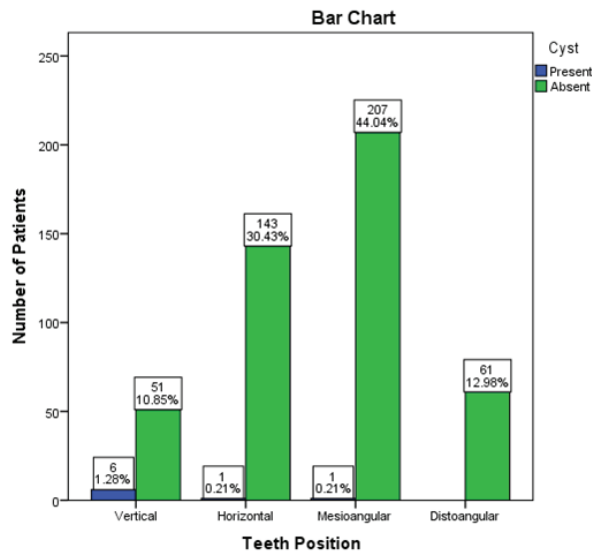


Figure 4. Bar diagram showing the association of tooth position with Presence or Absence of cyst.X axis represents the position of teeth and Y axis represents no of patients affected by cyst formation.It is found that incidence of cyst formation (Blue) among impacted mandibular tooth is very less in all type impaction maximum prevalence itself is 1.28% in vertical type and nil in distoangular.Chi square test done,chi square value p - 0.000 [p < 0.05]and was found to be statistically significant.It is statistically significant, the incidence of cyst formation among impacted mandibular tooth is more in vertical ,horizontal and mesioangular impactions.

Graphs for presence or absence of Tumor Vs mandibular impacted teeth

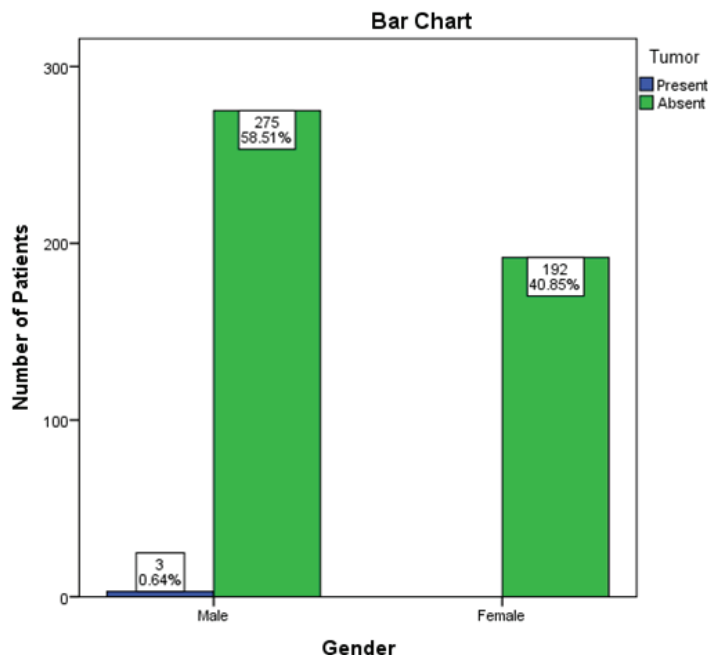


Figure 5 .Bar diagram showing the association of Gender with Presence or Absence of tumor.X axis represents the gender group and Y axis represents no of patients affected by cyst formation. It is found that incidence of tumor formation (Blue) among impacted mandibular tooth is more in males and none in females.chi square test done,chi square value p - 0.149[p > 0.05] and was found to be statistically not significant.Even though, it is statistically not significant, the incidence of tumor formation among impacted mandibular tooth is more in males compared to females.

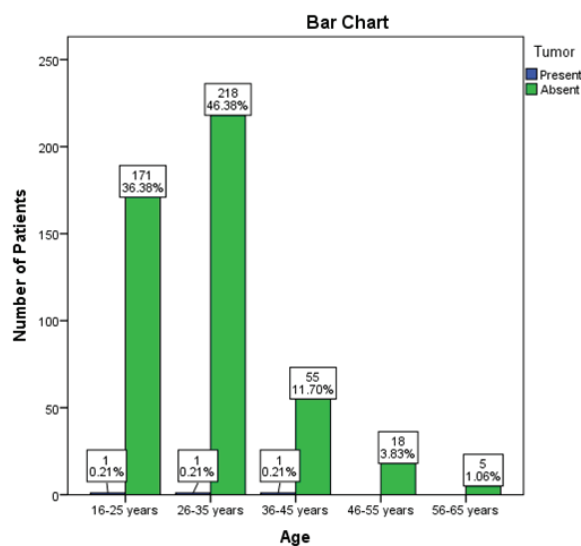


Figure 6 .Bar diagram showing the association Age with Presence or Absence of tumor.X axis represents the age group and Y axis represents no of patients affected by tumor formation.It is found that incidence of tumor formation (Blue) among impacted mandibular teeth is uncommon in all age groups except very minimal prevalence in 16-45years[0.21%].chi square test done,chi square value p-0.838[p > 0.05] and was found to be statistically not significant.Even though, it is statistically not significant, the incidence of tumor formation among impacted mandibular tooth is more in patients with age group of 16-35 years when compared to other groups.

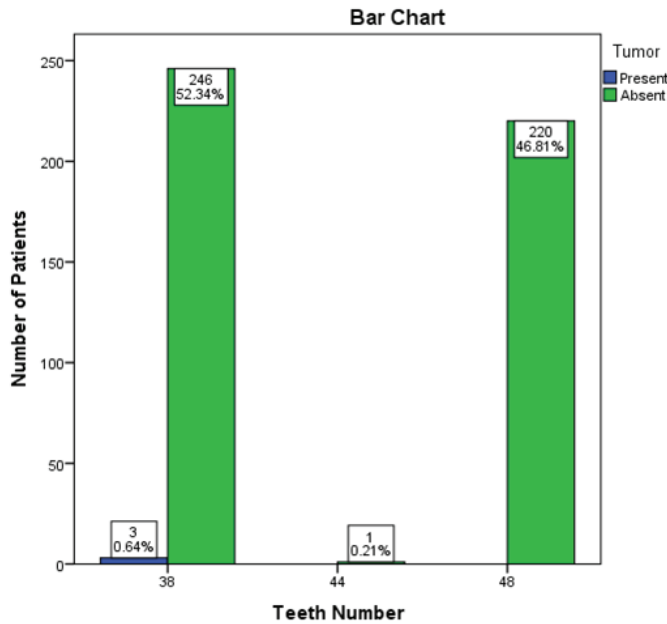


Figure 7 .Bar diagram showing the association of tooth number with Presence or Absence of tumor .X axis represents the teeth number and Y axis represents no of patients affected by tumor formation. It is found that incidence of tumor formation (Blue) among impacted mandibular tooth is very less in all 38,48,44 less than one percent..chi square test done,chi square value p - 0.976 [p > 0.05] and was found to be statistically not significant.Even though, it is statistically not significant, the incidence of tumor formation among impacted mandibular tooth is more in 38 compared to 48.

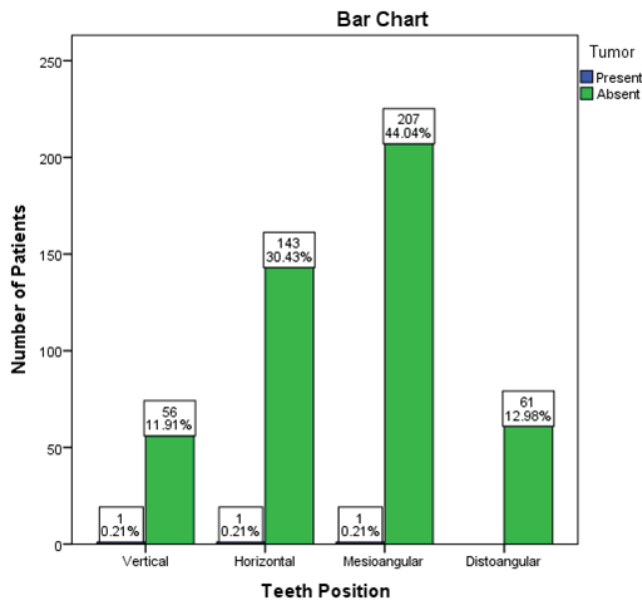


Figure 8 .Bar diagram showing the association of tooth position with Presence or Absence of tumor .X axis represents the teeth position and Y axis represents no of patients affected by tumor formation. It is found that incidence of tumor formation (Blue) among impacted mandibular tooth is very less in all 38,48,44[0.21%]..chi square test done,chi square value p - 0.659 [p > 0.05] and was found to be statistically not significant.It is statistically significant, the incidence of tumor formation among impacted mandibular tooth is more in vertical ,horizontal and mesioangular impactions.

Conclusion

Within the limitation of study there is significant finding in the incidence of pathologies associated with impacted mandibular premolars and third molars. Early diagnosis by doing biopsy is important as these cysts and tumors may be associated with morbidities and also because of chances of malignant transformation has been reported in long standing benign pathologies.

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Authors Contribution: Yandeti Srinivasulu carried out the retrospective study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Abdul Wahab PU aided in conception of the topic, participated in the study design, statistical analysis and supervised in preparation of the manuscript. Senthil Murugan P participated in the selection of the topic, study design, statistics and coordinated in developing the manuscript. All the authors had equally contributed in developing the manuscript.

Conflict of Interest : No conflict of interest .

Funding for study: Nil

Limitations of the study and future scope :

This study is of shorter duration with limited population. So to ascertain the findings of our study, we have to do further studies in the future with large sample size and longer duration. This can be helpful to find out more regarding pathologies associated with impacted mandibular third molars .

Ethical Clearance: It is taken from “Saveetha Institute Human Ethical Committee” (Ethical Approval Number- SDC/SIHEC/2020/DIASDATA/0619-0320)

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