Retrospective Study of Pattern of Mandibular Third Molar Impaction in South Indian Population

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Abstract

The aim of the study is to assess prevalence and pattern of mandibular third molar impaction in south indian population. Numerous Patient records were analysed and data was recorded The data that was collected was tabulated in excel and then imported into SPSS software. Incomplete or censored data was excluded from the study. The Statistical test that was run was the chi sequence test using the statistical software SPSS by IBM.In this study the results obtained can be summarized, presence of statistical significance between the Correlation of winters classification and gender of the study population (p=0.005), presence of statistical significance between the Correlation of winter's classification and age (p=0.002), presence of no statistical significance between the Correlation of winter's classification and tooth number (p=0.089). In the present study the Most prevalent gender to have impacted mandibular 3rd molar was males (58.36 %), Most prevalent impacted 3rd molar based on teeth number teeth number is 38 (54.1%), Most prevalent age group to be diagnosed with impacted 3rd molar was between the year 20-29 year (54.86 %). Most prevalent angulation Winters classification was found to be mesioangular (42.16%). Within the limitation of the present study, correlation between tooth angulation and age, sex and tooth number was found to be statistically significant , further studies to be conducted to asses the treatment difficulty and option for impacted tooth .

Keywords: *Impaction, Mandibular third molar, Mesioangular, Distoangular, Mandible*

Introduction

The definition of impaction has gone through several modifications by several authors, In the year 1954 Mead defined an impacted tooth as a tooth that is prevented from erupting into its positioning because of malposition, lack of space, etc. Later Peterson characterized impacted teeth as those teeth that fail to erupt into the dental arch within the expected time which is widely accepted [1]. In 2004 Farman [2] wrote that impacted teeth are those teeth that are prevented from eruption due to a physical barrier within the path of eruption. The advent of civilization, the use of a soft and refined diet has completely eliminated the need for a large and strong jaw for mastication and so with evolution, human jaws have shrunk from its large ape size to a smaller one and therefore there is no space in our mouths in order to accommodate all 32 teeth [3]. Some of the common causes of impaction are inadequate space in the dental arch, insufficient development of the retromolar space, Mandibular ramus growth -resorption at its anterior surface ,deposition at its posterior surface, in case of imbalance, the mandibular third molar impacted [4] . Proper history has to be taken while performing these minor surgical procedures. Patients under Antiplatelet monotherapy or even antiplatelet dual therapy need not be altered or stopped before minor oral surgical procedures. Most of the post-operative bleeding can be easily controlled by local hemostatic measures

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However, patients on combined anticoagulant and antiplatelet therapy or dual antiplatelet therapy appear to be at increased risk for postoperative bleeding complications, hence care should be taken [5 6] . It is also important to obtain the cardiac history and physician fitness letter before starting treatment for cardiac patients . Since surgical dental procedures are common and risk for cardiac diseases is on the rise, use of antibiotic prophylaxis before the start of the treatment in susceptible patients is highly recommended [7].

Local anesthesia forms an integral part of the extraction processes . A local anaesthetic (LA) is a drug that causes a reversible local anaesthetic change in the oral cavity , generally for the aim of having a local analgesic effect, that is, inducing absence of pain sensation by inhibiting nerve conduction during a variety of dental procedures [8]. Hypotensive anaesthesia is now an established method for the same, as it is said to reduce blood loss by up to 40%.6 Pharmacological agents have also been used in the recent past as adjuvants in various procedures to aid in the reduction of blood loss [9]. The required armamentarium may be chosen according to the patient's needs. Dentists must be well aware of these newer delivery systems, their usage and must have up-to-date knowledge, so as to provide the benefits of latest technology to their patients [10]. Even with proper planning the occurrence of medical emergencies are common, it can be prevented by taking a thorough medical history, examining the patient and formulating a comprehensive treatment plan with appropriate alterations to dental treatment as required [11].

The location and arrangement of impacted third molar, surrounding bone, mandibular canal and adjacent tooth are significant in imaging diagnosis for the proper surgical treatment planning. The most efficient radiographic technique for the assessment of 3rd molar impaction is the panaromic radiographic technique. CBCT can also be used for this purpose With CBCT, it was possible to perform the scanning with the patients sitting upright [12]. Based on the radiographic method the classification by winter was given. The angle of impacted teeth is measured using the Winter's classification system, by measuring the angle formed between the two longitudinal axes of the second and third molars [13]. He classified the impaction based on the angulation of impaction. He classified the 3rd molar into Mesioangular, Horizontal, Distoangular , Vertical, Inverted.

Several studies assessing the prevalence of 3rd molar impaction based on winters classification. The most common angulation noticed was mesioangular . A study conducted in a population in Oman showed results where mesioangular angulation was the most common occupying around 35% of the study population [14]. Another study conducted in the north Indian population also revealed that the mesioangular angulation was the most common comprising about 49.2% of the study population with the mandibular arch being the most common arch for impaction of 3rd molar [15]. Studied conducted always come with several limitations , the challenges faced by other articles include Many research done failed to show much difference between male and female population ,Not many population studies done for pattern of 3rd molar impaction in South Indian population , Improper radiographs taken for assessment , Inter examiner variability

The need for such a study is to full fill the gap between the clinical practitioners and the researchers. To figure out an Effective method of surgical removal of impacted tooth that can be formulated based on a particular population and the need to increase awareness among dental professionals.

The aim of the study is to assess prevalence and pattern of mandibular third molar impaction in south Indian population

Material and Methods

The study was performed to assess prevalence and pattern of mandibular third molar impaction in south indian population conducted in a university setting. Ethical approval was obtained from the institutional ethical committee (ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). The number of people involved in the study included two researches and the data and results were reviewed by two reviewers. The data collected was carried out during the period between July 2019 to march 2020. 564 patient reports were viewed and data was collected. Numerous Patient records were analysed and data was recorded . The data that was collected was tabulated in excel and then imported into SPSS software. Incomplete or censored

data was excluded from the study.The Statistical test that was run was the chi sequence test using the statistical software SPSS by IBM.

Results and Discussion

The following results were obtained after importing and analyzing the data in SPSS

The p value obtained after running the chi-square analysis for the comparison of winter's classification of impacted 3rd molar and gender was statistically significant (p=0.005) (Refer table 1, figure 5). The p-value obtained after running the chi-square analysis for the comparison of winter's classification of 3rd molar impaction and age was statistically significant (p=0.002) (Refer table 1, figure 6). The p- value obtained after running the chi-square analysis for the comparison of winter's classification of 3rd molar impaction and tooth number was not statistically significant (p=0.089) (refer table 1, figure 7). Based on the study population of the males occupied about 58.38% of the population and females occupied about 41.64 % of the population (Refer figure 4). Based on this study population mesioangular angulations occupied about 42.16% of the population, distoangular angulation occupied about 14.26% of the population, horizontal angulation occupied about 34.48% of the population and vertical angulation occupied about 9.091% of the population (Refer figure 1). Based on this study population the age group where most of the impactions were diagnosed was between 20-29 years occupying about 54.55% of the population, followed by 30-39 years which occupied about 29.15 % of the study population, 40-49 years occupying about 7.680 % of the population , 17-20 years occupying about 6.583 % of the population and 50-59 occupying about 2.038 % of the population (Refer figure 2). Based on the tooth number the most common mandibular 3rd molar impaction was noticed in tooth 38 occupying about 54.86% of the population and tooth 48 occupied about 45.15 % of the population (Refer figure 3).

The third molars are the last teeth to erupt in the oral cavity. Since they erupt at about the time when the youth goes off into the world to become wise, they are referred to as wisdom teeth [16]. Impacted 3rd molars are very troublesome , retained, unerupted mandibular third molars are often associated with varied pathologies which are Pericoronitis , Dental caries , Cysts and tumours associated with the tooth , Periodontitis , Root resorption [17] . untreated mandibular third molar can sometimes even cause fracture of the mandible , unfortunately not much data is available on the etiology and fracture patterns seen in the South Indian region [18] , it can also cause temporomandibular disorders, recent studies have shown that BTX injections can be the least invasive mode, which can provide relief of intractable symptoms in patients who have failed to show any improvement with the conventional modalities of treatment [19]

Surgical removal of impacted third molar is the single most commonly performed operation by oral and maxillofacial surgeons. Dental anxiety and fear are common among patients, and dental extractions are one of the most feared procedures [20]. Klingberg and Broberg described dental anxiety as a state of apprehension that something dreadful is going to happen in relation to dental treatment or certain aspects of dental treatment [20] . The reduction of anxiety can be done using pharmacological methods . newer and more innovative techniques have come into use . VR is an effective distraction tool to alleviate the anxiety of the patient. It is easy to use, affordable, and avoids the need for the use of pharmacological agents to reduce the anxiety level of the patient [21].Pain associated with surgical removal of teeth ranges between moderate and severe during the first 24 hours after surgery, with the major pain intensity occurring between 6 and 8 hours when a conventional local anaesthetic is used.Dental pain is largely inflammatory, and evidence based medicine has shown that non-steroidal anti-inflammatory drugs (NSAIDs) are the best analgesics for dental pain [22]

A surgeon's lack of experience could also be a major factor in the development of postoperative complications [23]. The surgical removal of many impacted mandibular third molars which have been asymptomatic for years are often carried out to prevent any future complications and pathologic conditions that might occur [24]. Regular dental checkups will help with early identification of pathogenesis and early treatment [25 26] . Patient awareness about common dental procedures is very important so that they can seek early treatment. In a survey conducted it was noticed that the awareness level about basic dental procedures were appropriately good among the general population [27].

Extraction of Mandibular third molar was performed when the following indication proposed by Koerner [28] where present which include existing pathology or pain due to pericoronitis, periodontitis, periapical abscess, cysts or neoplasms , resorption of adjacent roots, and inflammation of the opposing soft tissue leaving the impacted tooth being can even lead to oral carcinoma. Cancer cells exhibit a wide range of genetic alterations that include gene rearrangements, point mutations, and gene amplifications, leading to disturbances in molecular pathways modifying cell growth, survival, and metastasis [29]**.** Treatment of patients sometimes even puts the operator at risk this occurs due to improper asepsis Dental professionals are at a greater risk for acquiring cross-infection while treating patients. This is evident from the fact that most of the human pathogens have been isolated from oral secretions [30] [31]. There are also very prone to needle stick injuries which puts them at greater risk for exposure to deadly infections due to greater exposure to microorganisms and viruses that cause blood borne diseases, such as the human immunodeficiency virus (HIV) and the hepatitis B (HBs) and hepatitis C viruses [32]. It is important for dental students to improve their knowledge to enable diagnosis and management of HIV/AIDS and patients with other diseases to have a more positive attitude toward these patients. Furthermore, as their knowledge improves, dental students may understand methods of infection control and how to prevent transmission [33] [33]

Pain, trismus and surgical edema dry socket are the most common complications that occur following impacted lower third molar surgery . Inferior alveolar nerve injury , lingual nerve injury have also been noted to be complications to surgical removal of impacted teeth [34] the formation of Simple ranula is common during the first and second decade of life while plunging ranula occurs frequently during the third decade of life this can complicate the treatment of 3rd molar impaction removal [35]. It has also been noted that alveolar osteitis is also a common complication that occurs following extraction of 3rd molar. In a study conducted it was noted that a usage of eugenol post extraction showed no occurrence of alveolar osteitis [36]. Complication can occur that will make it difficult for execution of the extraction like the presence of oral sub mucous fibrosis which causes limitation in mouth opening leading to increase in difficulty in extraction [37]. High consumption of tobacco has been noticed in the south east asia region by the population belonging to the age group of 20-30 which is common occurrence age for impaction also. Attainment of homeostasis is an integral part of any surgical procedure should also be done for impaction surgeries , the 3 basic steps are (1) Vasoconstriction, (2) formation of a platelet plug, and (3) coagulation (secondary hemostasis) [38].

In this study the results obtained can be summarized, presence of statistical significance between the Correlation of winters classification and gender of the study population (p=0.005), presence of statistical significance between the Correlation of winter's classification and age (p=0.002), presence of no statistical significance between the Correlation of winter's classification and tooth number (p=0.089). In the present study the Most prevalent gender to have impacted mandibular 3rd molar was males (58.36 %), Most prevalent impacted 3rd molar based on teeth number teeth number is 38 (54.1%), Most prevalent age group to be diagnosed with impacted 3rd molar was between the year 20-29 year (54.86 %). Most prevalent angulation Winters classification was found to be mesioangular (42.16%).

In the present study there was statistical significance present between Correlation of winters classification and gender of the study population similar results were obtained by study conducted by Eshghpour M et al [39] It was also noted that there was statistical significance between the Correlation of Winter's classification and age of the patients in the study population similar findings was noted in a study conducted by Mahmoud Al-Dajani et al [40] . It was also noted that there was no statistical significance between Correlation of winter classification and tooth number , dissimilar findings were noted in a study conducted by Krishna Gopal Bhuju et al [41], whereas similar findings were noted in a study conducted by Aveek Mukherji [42]. We found that the prevalence of mandibular third molar impaction was significantly higher in males population in comparison to females. This is in contrast with the study of Hashemipour *et al* [43], Quek *et al* [44] Hugoson and Kugelberg [45] Ma'aita and Alwrikat [46] and Kim *et al* [47]. They reported a gender predilection for females. However, Brown *et al* [48] in their study said that s no sexual predilection gender-

wise for incidence of mandibular third molar was found . The pattern of occurrence of angulation of impacted third molars in our study showed that mesioangular impaction was the most common. Our findings are in accordance with previous studies who have reported that mesioangular impaction was the most prevalent type of impaction in the mandibular third molars of African American, Singaporean, American, Arabian, and Iranian populations [49]). We also noted that the most common age to be diagnosed to have impaction was between 20-29 years which was similar to a study conducted by Gopal Bhuju et al [41].

The Limitation of the present study included Unequal distribution of cases, Ethnic distribution was not accessible and Treatment complication was not assessed.Future scope of this study will include more studies to be conducted to verify results based on different populations treatment difficulty assessment.

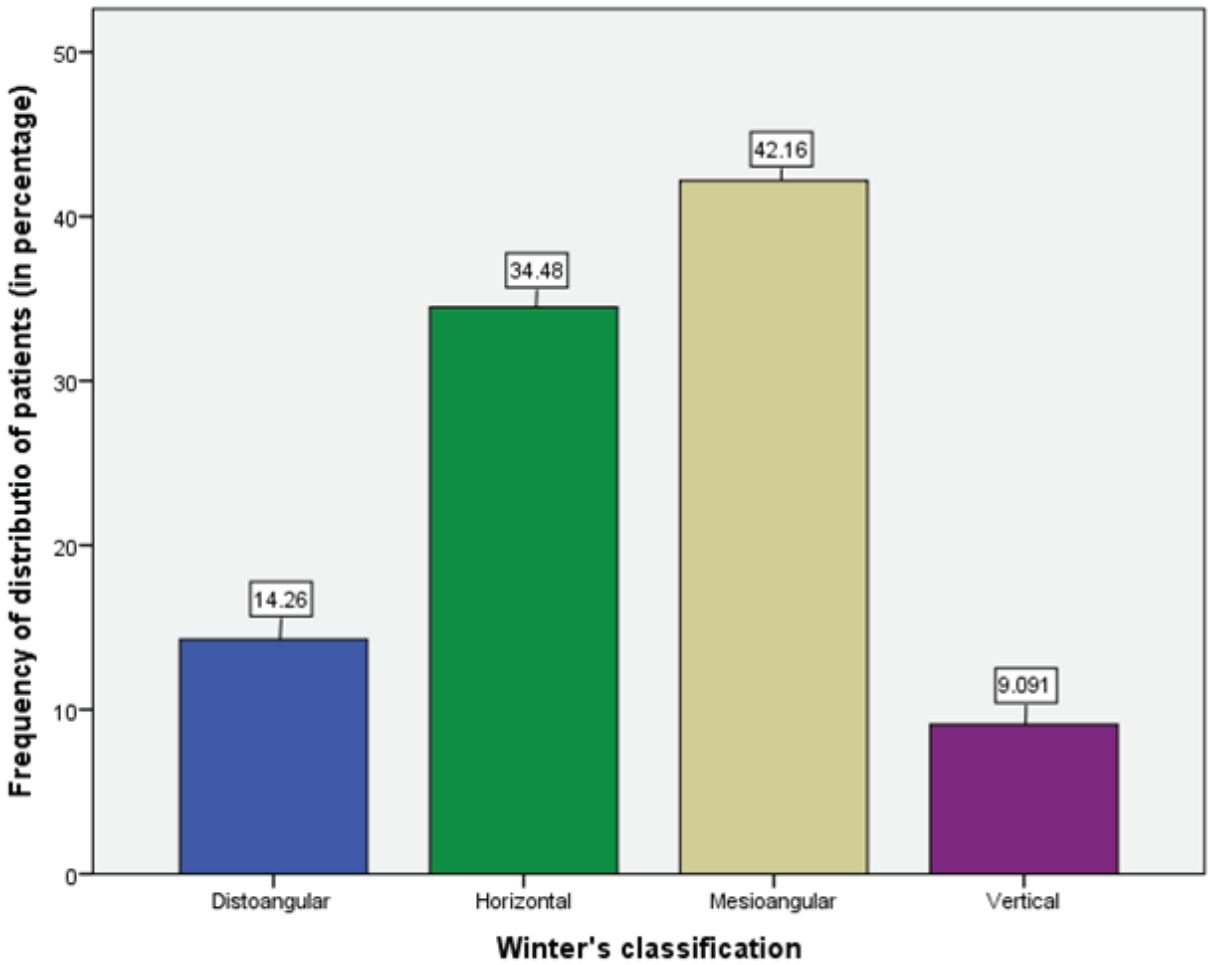

FIGURE 1: This graph represents the represents the of distribution of angulation of impacted mandibular 3rd molar based on Winter's classification (x-axis represents Winter's classification , y axis represents frequency of distribution of patients in percentage) where blue represents distoangular angulation, green represents horizontal angulation and grey represents mesioangular angulation and purple represents vertical angulation . The graph shows that about 42.16% of the population had mesioangular angulation of impacted 3rd molar, 34.48% had horizontal angulation, 14.26% had distoangular angulation and 9.091% had vertical angulation. It can be inferred that the most common angulation noticed was Mesioangular angulation

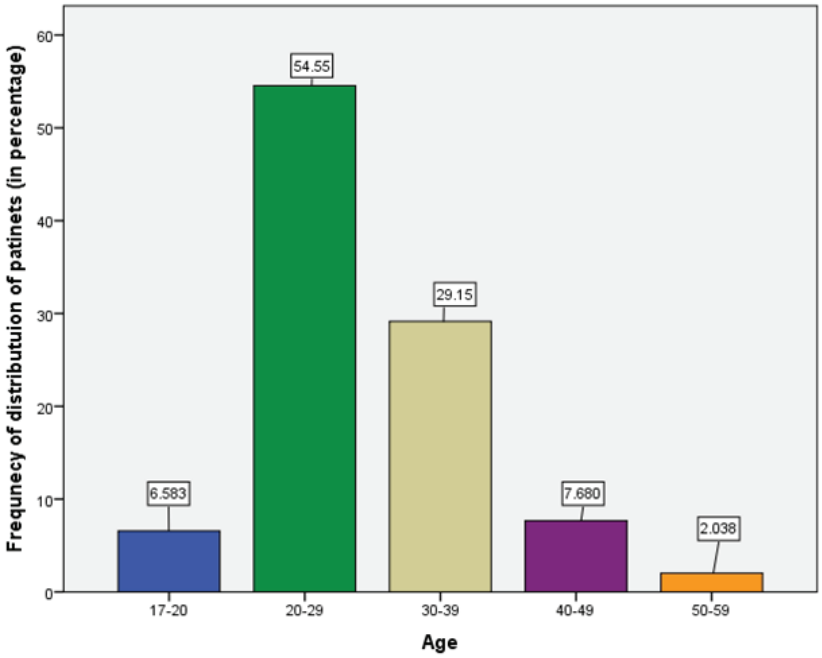

FIGURE 2: This graph represents the distribution of patients with impacted mandibular 3rd molars based on age (x-axis; age , y axis: percentage) where blue represents age group 17-20 years , green represents age group 20-29 years, grey represents age group 30-39 years, purple represents age group 40-49 years and orange represents age group 50-59 years . The graph shows that the(54.55% of the study population belong to the age group of 20-29 years , f(29.05% belong to the age group of 30-39 years , 7.680% belong to the age group of 40-49 years , 6.583% belong to the age group of 17-20 years and 2.038 belong to the age group of 17-20 years. It was noted that the most common age group where impacted mandibular 3rd molar was present was in the age group of 20-29 years.

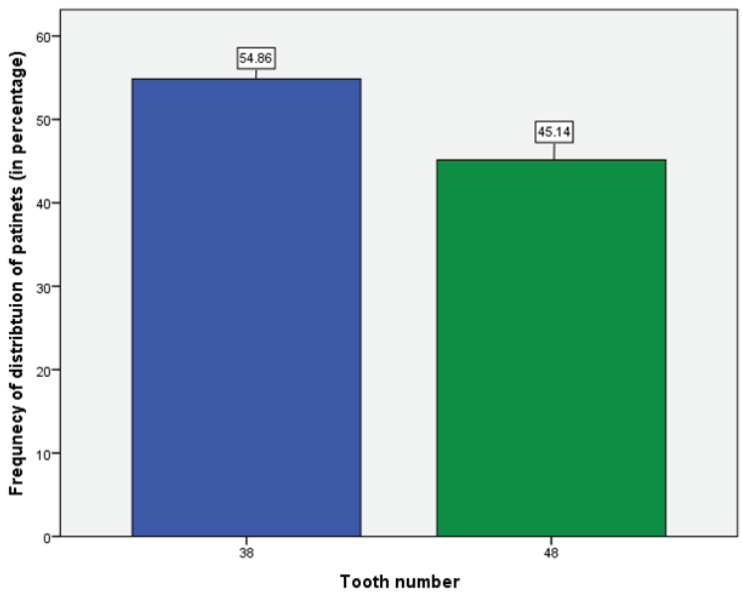

FIGURE 3: This graph represents the distribution of patients with impacted mandibular third molar based on tooth number (x-axis; tooth number , y axis: percentage) where blue represents tooth number 38 years and green represents tooth number 48. The graph shows that about 54.86% of the patients had impacted teeth in 38 and 45.14% had impacted teeth in 48. It was noted that the most common impacted mandibular teeth was 38.

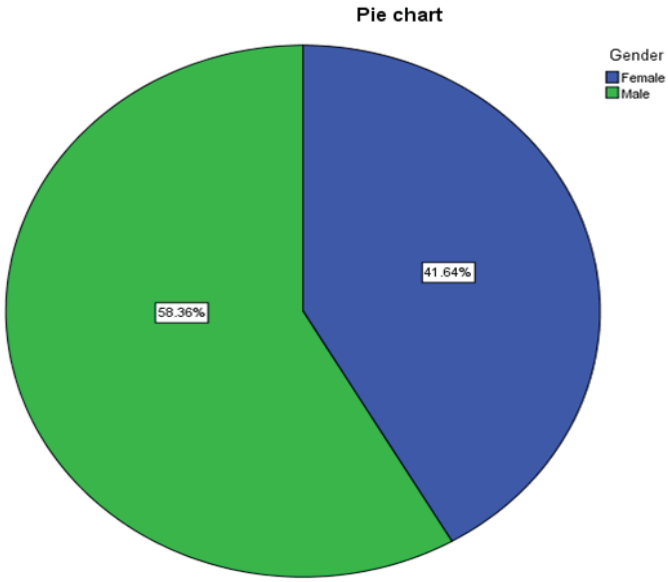

FIGURE 4: This pie chart represents the distribution of patients with impacted mandibular third molar based on gender where blue represents female patients and green represents male patients. The chart shows that 58.36% were male patients and 41.64% were female patients. It can be inferred that the mandibular impacted 3rd molar was more commonly seen in males than in females.

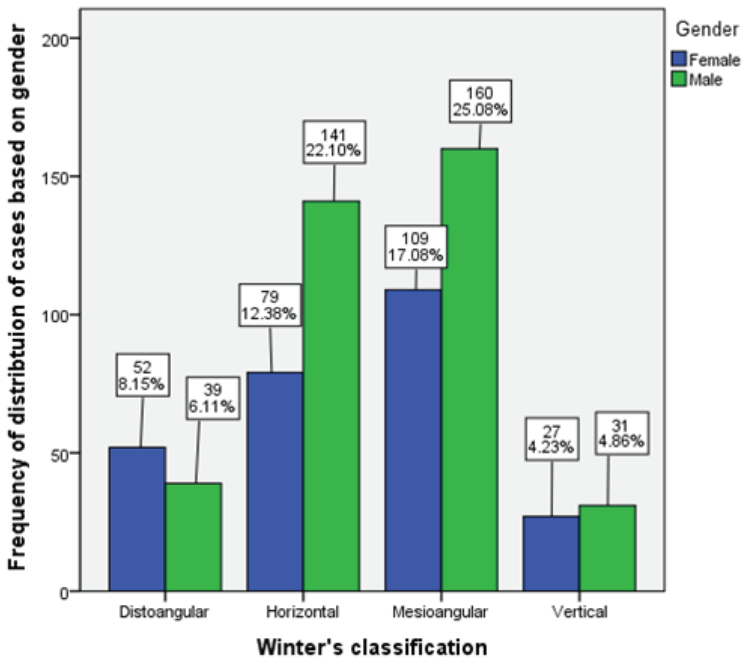

FIGURE 5 : This bar chart represents the correlation between Winter's classification and gender of patients. X-axis represents Winter's classification , Y-axis represents frequency of distribution of cases based on gender where blue represents female and green represents male.Chi- square test was done and association was found to be statistically significant . Pearson's Chi-square value:12.658, DF: 3, P value - 0.005 ($p<0.05$) hence statistically significant , showing that mesioangular angulation was most commonly associated with males.

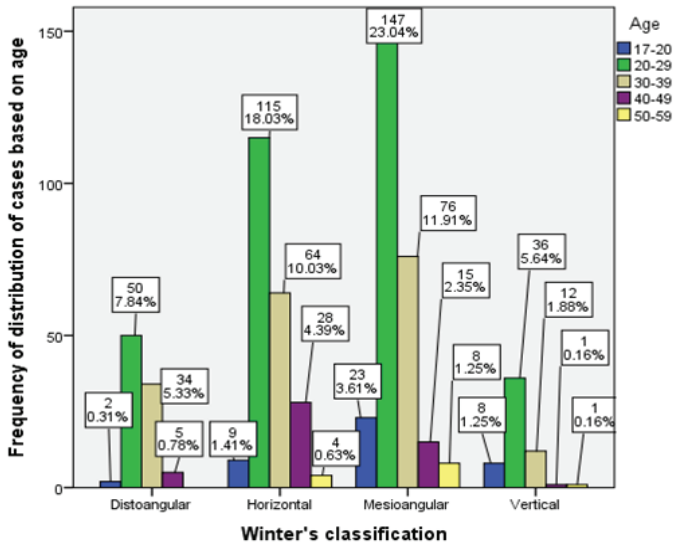

FIGURE 6: This graph represents the correlation of the Winter's classification and age of patients. X-axis represents Winter's classification , Y-axis represents frequency of distribution of cases based on age) where blue represents age group 17-20 years and green represents age group 20-29 years, grey represents 30-39 years , purple represents age group 40-49 years and yellow represents 50-59 years. Chi- square test was performed and association was found to be statistically significant . Pearson's Chi-square value:30.496, DF: 12, p value - 0.002 (<0.05) hence statistically significant , showing that mesioangular angulation was most commonly associated with patients in the age group of 20-29.

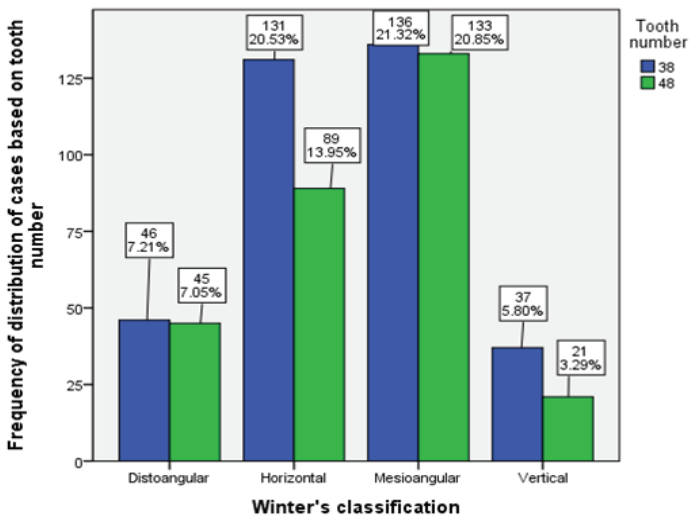

FIGURE 7: This graph represents the correlation of the Winter's classification and tooth number . X-axis represents Winter's classification , Y-axis represents frequency of distribution of cases based on tooth number) where blue represents tooth number 38 and green represents tooth number 48 , Chi- square test was performed and association was found to be statistically insignificant. Pearson's Chi-square value: 6.513, DF: 3, P value - 0.089 (>0.05) hence not statistically significant , showing that there is no association present between Winter's classification of angulation mandibular 3rd molar and tooth number.

Conclusion

Within the limitation of the present study, Correlation between tooth angulation and age, sex was found to be statistically significant, similar findings were also noted in studies done in other populations. These studies will be helpful in optimising treatment for a specific population.Further studies to be conducted to assess the treatment difficulty and option for impacted teeth.

Conflict of Interest : The author would like to declare there was no conflict of interest

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