INCIDENCE OF POSITION C IMPACTED MANDIBULAR THIRD MOLARS-AN INSTITUTIONAL BASED STUDY

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ABSTRACT:

This study is aimed to determine and evaluate the incidence the Position C impacted mandibular third molars based on Pell and Gregory Occlusal Classification in a sample of patients in Chennai City Population. This retrospective study involved 658 patients out of which 449 were male and 209 were female. Up to 782 orthopantomograms (OPG’s) along with data recorded were evaluated of all patients who reported to Saveetha Dental College, Chennai from June 2019- March 2020. Parameters such as age, gender, incidence of position C, side frequently showing Position C and nerve approximation were evaluated and assessed by a single examiner and reviewed by 2 independent investigators. In this study, we observed that out of 782 patients, 48 patients presented with position C impacted third molars (7.29%). There also seemed to be a significant male predilection (54.17%) and predilection towards the left side of the lower jaw (52.08%) presenting with Position C impacted third mandible molars. Within the limits of this study, there is a significant male predilection with an incidence of 7.29% in relation to impacted position C mandibular molars, the incidence being least among other positions classified by Pell and Gregory Occlusal Classification.

Key words: impaction, third molar, position, pell and gregory classification, orthopantomograms

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INTRODUCTION:

Impaction is defined as failure to erupt completely into a normal functional position of one tooth within normal time. This may be due to lack of space onto dental arch which may be caused by obstruction by another tooth or development in an abnormal position. The word impaction originated from the latin word “impact” means organ or structure, which because of an abnormal mechanical condition has been prevented from assuming its normal
position. (Passi et al., 2019) Tooth eruption is a complex process, made up of a series of physical and biological events that are synchronized with the growth of jaws. This complex process is influenced by local as well as systemic factors. (Polat et al., 2008) Various theories have also been proposed owing to causes of tooth impaction, one of them is the inadequate space in the dental arch for eruption as stated by Phylogenetic Theory. (Dimitroulis, 1997) Another popular theory is that the high incidence of mandibular third molar impaction is due to insufficient development of retromolar space. (Bishara and Andreasen, 1983; Grover and Lorton, 1985) The prevalence of third molar impaction in human race ranges from 27-68.6%. (Quek et al., 2003; Hassan, 2010; Reddy and Prasad, 2011) They are the last permanent tooth to erupt and most commonly impacted tooth in oral cavity, and usually are asymptomatic unless they are accidentally discovered on radiographic imaging.

The complications associated with impacted third molars include resorption or decay of adjacent teeth and crowding, while the potential pathological conditions include pericoronitis and dentigerous cyst formation. (Hasan, Ahmed and Reddy, 2014) To avoid development of these future complications or pathological conditions, prophylactic removal of impacted third mandibular molars is advised. The gold standard for investigation in order to examine impacted third mandibular molars is OPG’s. They are valid and objective and state as fixed records. They are used to evaluate the type of impaction, any anatomical impediments that are preventing its eruption, condition of adjacent second molars, relation of third molars to the inferior alveolar canal, so that a proper management can be planned. (Molander et al., 1991)

The Pell and Gregory occlusal classification is one of the common methods to assess the level of third molar impaction in relation to the occlusal level of adjacent second molars was used in this study.

Previously our team had conducted numerous studies which include in vitro studies (Marimuthu et al., 2018), review (Mh, 2017b; Packiri, Gurunathan and Selvarasu, 2017), survey (Kumar and Sneha, 2016; Patturaja and Pradeep, 2016; Mh and Rahman, 2017; Rahman and Mh, 2017) and clinical trials (Jesudasan, Wahab and Sekhar, 2015; Christabelet et al., 2016; Mh, 2017a; Patilet et al., 2017; Rao and Kumar, 2018; Abhinav et al., 2019; Jain et al., 2019; Sweta, Abhinav and Ramesh, 2019). Now we are focusing on retrospective studies, the aim of this study is to determine the incidence of impacted Position C mandibular 3rd molars based on Pell and Gregory Occlusal Classification in a sample of patients in Chennai City Population.

MATERIAL AND METHODS:

This retrospective radiographic study was conducted among patients reporting to Outpatient Dental Department of Saveetha Dental College, Chennai during the period between June 2019- March 2020. A total of 86000 patient records were reviewed and analysed. 658 OPG’s of patients were evaluated out of which 449 were male and 209 were female.

Inclusion Criteria:

● Patients between 18-50 years of age
● Both genders
● Patients with orthopantomograms as records requiring surgical removal of impacted teeth.
● Patients with no history of trauma

Exclusion Criteria:

● Patients below 18 years of age, as the eventual outcome of the third molar are still uncertain.
● Patients with incomplete clinical radiological records.
● Patients with incomplete root formation of a third molar.
- Patients with history of previous trauma or pathology.
- Patients with severe systemic diseases
- Patients with craniofacial anomalies or syndromes like Down’s syndrome, cleidocranial dysostosis, achondroplasia

Diagnostic Criteria:
The orthopantomograms that were taken as records for patients requiring surgical removal of impacted teeth were evaluated in order to assess the level of eruption, the side of jaw frequently showing Position C, the type of relation of inferior alveolar nerve to the impacted third molar as well as the difficulty index.

The position of impacted teeth was assessed and recorded using Pell and Gregory Occlusal Classification:

1. Position A: Highest portion of impacted mandibular third molar was on level with or above the occlusal plane of adjacent second molar
2. Position B: Highest portion of the impacted mandibular third molar was below the occlusal plane but above the cervical line of the adjacent second mandibular molar.
3. Position C: Highest portion of impacted mandibular third molar was below the cervical line of the adjacent second mandibular.

Preoperative radiographic assessment of impacted mandibular third molars to inferior alveolar canal was evaluated by following factors:

1) Darkening of root apex: Loss in density of root in radiograph when inferior alveolar canal impinge on root
2) Deflection of root: Deflection to mesial or distal aspect, if root reaches inferior alveolar canal.
3) Narrowing of root apex: Grooving/ perforation of the canal.
4) Bifid root apex: When inferior alveolar canal crosses apex of root, the shadow of periodontal ligament is seen as bifid apex.
5) Narrowing of canal: While crossing the apex of root, if diameter of inferior alveolar canal narrows
6) Deviation of mandibular canal: If inferior alveolar canal changes direction and gets displaced on crossing the mandibular third molar.
7) Interruption of white line: They are usually the roof and floor of inferior alveolar canal, any interruption of one or both lines are considered as perforation or deep grooving of the root.
8) No relation.

The Difficulty Index was assessed using the Pederson Difficulty Index Classification.
The findings were thereafter recorded and data was extracted and assessed at a later date.

Study Parameters:
The following data were extracted for the purpose of the study:

- Age of the patient
- Gender of the patient
- Level of impaction- Position determined by Pell and Gregory Occlusal Classification
- Type of Nerve Approximation
- Difficulty Index

The subjects were divided into four age groups: Group 1: 11-20 years, Group 2: 21-30 years, Group 3: 31-40 years, Group 4: 41-50 years.

Data Collection:
The data related to the study parameters were obtained from among patients who reported to the Outpatient Department in Saveetha Dental College, Chennai from June 2019- March 2020. Approval for the study was obtained from the Institutional Ethical Committee of Saveetha University (SDC/SIHEC/2020/DIASDATA/0619-0320). All
assessments were done by a single examiner and the findings were reviewed and recorded by two investigators. Informed consent was obtained from the patients.

Statistical Analysis:
The data was tabulated and analysed using IBM SPSS version 23.0 software. Non-parametric data were analysed using descriptive statistics measuring frequency and percentage. Pearson’s Chi Square Test was used to assess the association between side of the lower jaw frequently affected and difficulty index of impacted third molars.

RESULTS AND DISCUSSION:

Incidence of Position C:
Out of 658 patients included in the study, the distribution of study subjects based on the level of impaction(position) revealed that 348 (52.89%) were positioned with highest portion of impacted mandibular third molar on level with or above occlusal plane of adjacent second mandibular molar (Position A). Position C occurred less frequently, 48 patients (7.29%) as compared to other positions.

![Pell and Gregory Occlusal Classification](image)

Figure 1: This pie chart depicts the incidence of Position C impacted Mandibular 3rd Molars. The incidence of Position C based on Pell and Gregory Occlusal classification was least (7.29%)(pink)

Age Distribution, Gender Distribution and Side of Lower Jaw Frequently affected:
The distribution of study subjects based on gender and age, revealed a significant male predilection (54.17%) with the age group of 21-30 years (56.25%) frequently showing Position C. Based on the distribution of study subjects on the side of lower jaw frequently showed position C (52.08%).

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Figure 2: The above pie chart represents the age as baseline characteristics. From this pie chart we can infer that age group frequently showing Position C was between 21-30 years (56.25%) (Green).

Figure 3: This bar graph represents the gender related baseline characteristics of patients showing position C. X axis represents the gender and Y axis represents the number of patients. From this bar graph we can infer that there was a significant male predilection (54.17%) showing Position C as compared to females (45.83%).
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Figure 4: This bar graph represents the side of lower jaw (tooth number) frequently showing Position C. X Axis represents the tooth number (side of lower jaw frequently showing position C), Y Axis represents the Number of patients. From this bar graph we can infer that there is a significant predilection for left side (52.08%) of lower jaw frequently showing Position C.

Type of Nerve Approximation:

Preoperative radiological signs suggestive of nerve involvement in relation to impacted position C mandibular third molars, were seen in 41.67% of cases. 58.33% of the cases were found to have no relation with inferior alveolar canal. The most significant sign was darkening of root (16.67%), followed by interruption of white line of the canal (14.58%), narrowing of root (6.25%) and lastly deflection of root (4.17%).

Figure 5: This pie chart depicts the type of nerve relation seen in relation to Position C. From this pie chart we can infer that there was no significant nerve relationship (58.33%) seen in relation to impacted position C.
Pederson Difficulty Index:
Based on Pederson Difficulty Index in relation to impacted position C mandibular third molars, Moderately difficult index (58.33%) was frequently seen as compared to very difficult (37.50%) and minimally difficult (4.17%). Also, Pearson’s Chi Square Test was done to assess the association between the side of the lower jaw frequently affected and the Pederson difficulty index associated with position C. However, the p value was >0.05, thus it was statistically insignificant.

Figure 6: This pie chart depicts Pederson Difficulty Index seen in Position C. The type of difficulty index seen highest in relation to Position C was Moderately Difficulty Index (58.33%)

Figure 7: The above bar graph depicts the association between the side of lower jaw affected and the Pederson Difficulty Index associated with Position C. X- Axis represents Pederson Difficulty Index associated with position C and Y-Axis represents the number of patients. Pearson’s Chi Square Test was done to assess the association between the side of the lower jaw frequently affected and the Pederson difficulty index associated with position C, and P=0.184(P>0.05), which was considered statistically insignificant, proving that that side of lower jaw frequently affected by position C does not have an association with the pederson difficulty index associated with position C.
Management of impacted third molars is the most common minor oral surgical procedure in oral and maxillofacial surgery. The prevalence and types of impactions vary in different racial and ethnic groups. These may be due to racial genetic characteristics as well as epigenetic factors. (Kumar Pillai et al., 2014) Thus, the pattern of impactions varies according to different ethnic groups.

The pattern of impacted third molars have been studied by Kramer (1970) in Harlem Hospital, New York (Kramer and Williams, 1970), Schersten et al (1989) in Sweden (Scherstén, Lysell and Rohlin, 1989), Hattab et al (1995) in Jordanian students (Hattab, Rawashdeh and Fahmy, 1995), Quek et al (2003) in Singapore Chinese Population (Queket al., 2003). This study showed that out of 658 cases the incidence of position C was the least, 48 patients (7.29%) as compared to Position A, 348 patients (52.89%) which showed the highest frequency. Pillai et al (Kumar Pillai et al., 2014), did a similar study in which the incidence of Position A was highest (43.8%) as compared to the incidence of Position C (21.2%) which was the least. Obiechina et al (Obiechina, Arotiba and Fasola, 2001) reported the most common position as A (31%), while Monaco et al (Monaco et al., 2004) identified the most common position as A also (56.29%) in Italian Population, Hashemipour et al (Hashemipour, Tahmasbi-Arashlow and Fahimi-Hanzaei, 2013) revealed Position C as least common (2.5%).

However, Blondeau et al (Rajasuo, Murtomaa and Meurman, 1993) from Canada and Marques et al (Almendros-Marqués, Berini-Aytés and Gay-Escoda, 2006) from Spain reported Position B as the most common position of Mandibular third molar. Among our chosen population, there was a significant male predilection showing impacted Position C (54.17%).

However, this finding is not in accordance with previous reports regarding gender distribution which showed significant female predilection (Alhadi et al., 2019) Some studies, however have revealed no significant sex predilection. The incidence of the left side of the lower jaw frequently showing Position C (52.08%) is in accordance with the study by Alhadi et al (51.42%) (Alhadi et al., 2019).

Pillai et al (Kumar Pillai et al., 2014) however revealed in his study, that the right side of lower jaw (52.77%) frequently showed an incidence of position C as compared to the left side (47.29%). In our study there was no significant relation to Position C (58.33%), which is in accordance to the study performed by Pillai et al. This is in contrast to the study by Jyodzbalys et al (Juodzbalys and Daugela, 2013) which revealed that the risk of nerve injury increases with increased level of impacted third molar.

**LIMITATIONS OF THE STUDY**

This study was restricted to a single study niche.

**FUTURE SCOPE**

An advanced intervention will help in better patient management and decision making as to whether retain or remove these teeth.

**CONCLUSION**

Assessment of third molars in terms of its position and level in relation to gender and arch is necessary to assess the difficulty level. It also gives an insight about the never relation with injury predictability and association with any pathological condition.
Within the limits of this study, there is significant male predilection with an incidence of 7.29% in relation to impacted Position C mandibular third molars, the incidence being the least among other positions classified by Pell and Gregory Occlusal Classification.

REFERENCES


