ASSESSMENT OF DIFFICULTY INDEX DURING SURGICAL REMOVAL OF IMPACTED TEETH IN PATIENTS OVER 40 YEARS OF AGE

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ABSTRACT:

Introduction: Impaction is cessation of eruption of tooth caused by a physical barrier or ectopic positioning of tooth. The mandibular third molars are the most common impacted teeth in the human dentition and their prevalence ranges from 27-68.8% in various parts of the world. The assessment of surgical difficulty of impacted teeth helps in better formulation of treatment plan by minimizing postoperative complications.

Aim: The aim of this study was to assess the difficulty index during surgical removal of impacted teeth in patients over 40 years of age.

Materials and methods: This study reviewed 257 radiograph/ orthopantomogram of subjects aged above 40 years of South Indian ethnic groups. Patient’s details include age, gender and ethnicity were extracted from the patient’s clinical record and all details related to impaction were obtained from the patient's panoramic radiograph that was individually examined by two investigators. The data collected was statistically analysed using SPSS 16 using Chi-square test.

Results: This study found that males recorded the highest number of patients with “very difficult” categories of impacted teeth. The most common age group involved was 42-45 years, mesioangular impaction, deep occlusal level and no ramus space for impacted molars were the most common findings observed. The study also revealed that the prevalence of impaction is higher in mandibular left third molar 38 with high difficulty score.

Discussion: The present study suggests that predicting the level of difficulty preoperatively for impacted teeth surgery will help in formulating the better treatment plan, thereby minimizing the postoperative complication for the ultimate benefit of the patient.

Keywords: Impaction; Maxilla; Mandible; Third molar; Difficulty Index.

I. INTRODUCTION:

Impaction is cessation of eruption of tooth caused by a physical barrier or ectopic positioning of tooth. The word impaction is from Latin origin. An impacted tooth is that has failed to erupt completely or partially to its correct position in the dental arch and its eruption potential has been lost.(Chen et al., 2020) An unerupted tooth is that in the process of eruption and is likely to erupt based on clinical and radiographic findings. An malposed tooth is an
unerupted or erupted tooth which is in an abnormal position in maxilla or in mandible. The impaction can be mesioangular, distoangular, horizontal, transverse or vertically angulated. It is often associated with pain, pericoronitis, root resorption, cystic lesions, etc (Passi et al., 2019). Commonly classified impacted teeth are mandibular third molar, maxillary third molar, maxillary canine, mandibular premolar, maxillary premolar, mandibular canine, maxillary central incisor and then maxillary lateral incisor. Among all the teeth, mandibular third molars are the most common impacted teeth.(Reddy, Jadaun and Bindra, 2018) Various studies from different part of the world have reported about the frequency of impacted third molar is 76%. (Hassan, 2010) Individuals from different ethnical background have different facial form, facial growth, jaw and tooth size and it affects the pattern of impaction. Various classifications have been given on impacted teeth such as WINTER'S classification, PELL AND GREGORY classification, KILLEY AND KAY, ARCHER'S classification of impacted maxillary teeth, etc. (Hattab, Rawashdeh and Fahmy, 1995) Winter's classification is classified based on the inclination of the impacted tooth to the long axis of the second molar into distoangular, mesioangular, horizontal, vertical and transverse. This classification is used for the study as it is simple and easily understandable. (Ryalat et al., 2018)Assessment of difficulty in impacted teeth surgical removals is an important factor in the treatment plan in order to reduce the chance of complications. Pederson has proposed difficulty index for impacted teeth which is classified as very difficult (7 to 10), moderate difficult (5 to 7), minimally difficult (3 to 4) and classified based on angulation depth and ramus relation. (Al-Shamahy, 2019) The difficulty of surgical removal will vary from routine mild discomfort to complex conditions requiring hospitalisation which may cause permanent damage to adjacent structures. (Vijayakumar Jain et al., 2019) Postoperative complications are affected by patient, tooth related and operative factors. (Osunde and Saheeb, 2015) Age, gender, built, habit, size and oral hygiene status are the patient factors. Type of impaction, depth of impaction, presence of impaction, morphology of roots, relation to inferior alveolar nerves and associated factors are tooth related factors (Cho, Lynham and Hsu, 2017). Surgeons experience, surgical time, use of drugs, type and extent of incision and wound closure are operative factors (Gbotolorun, Arotiba and Ladeinde, 2007). Duration of surgery is recorded differently, some authors believe that there is relation between surgical difficulty and radiographic factors such as type and depth of impaction and number of root. (Obimakinde et al., 2013) Duration of surgery has been affected by patient factors like age, sex, built, radiographic factor like angulation in terms of position namely vertical, horizontal, distoangular, mesioangular (Carvalho and do Egito Vasconcelos, 2011). Removal of impacted teeth is more difficult with advancing age. Younger patients will have relatively soft and more resilient bone whereas older patients will have stiff and harder bone. Bone removal in older patients during surgery requires more time and amount of bone removal is also more resulting in more postoperative complications following surgical extraction with patients above 0 years of age. (Patil et al., 2017) The purpose of the study is to assess the difficulty index during surgical removal of impacted teeth in patients over 40 years of age. Previously our team has a rich experience in working on various research projects across multiple disciplines (Neelakantan et al., 2015; Ramamoorthy, Nivedhitha and Divyanand, 2015; Abdul Wahab et al., 2017; Eappen, Baig and Avinash, 2017; Manivannan et al., 2017; Patil et al., 2017; Ezhilrasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; Ravindiran and Praveen Kumar, 2018; Wahab et al., 2018; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Rajeshkumar et al., 2019; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020).

II. MATERIALS AND METHODS:

This is the descriptive clinical study carried out in Saveetha Dental College and Hospitals, Chennai. All the patients who are fit for extraction under LA were selected. Age, gender, impaction side of each patient were recorded on proforma. All the patients aged above 40 years were included. Consecutive panoramic radiographs and clinical records of 257 patients who attended the Saveetha Dental College and Hospitals were retrieved for this study. To determine the angulation of impaction according to Winter classification by radiographs. All the surgeries were done under local anesthesia. A full thickness three sided mucoperiosteal flap was raised with the mesial relieving incision at distal side of impacted teeth. Buccal guttering osteotomy was performed by using a straight micro motor handpiece with straightening fissure bur under continuous irrigation of normal saline. The tooth was extracted by using a complaint elevator and whenever required the tooth was sectioned by bur and removed by elevator. Flap repositioning and suturing was done after thorough irrigation of socket. And post extraction instructions were given and with prescribed oral medications amoxicillin 500mg TDS, Zerodol P TDS, Flagyl 500mg TDS for 3 days. (Kumar and Sneha, 2016) Time taken for extraction was considered as the objective measures of difficulty. Study setting is done from the University ‘s predominantly South Indian population. Sample data from June 2019 to April 2020 was collected. Internal validity is a sample prescribed by incidence of impaction and the external validity is a prescriptive pattern. Data was collected by reviewing the case record of patients who attended the clinics for extraction of impacted teeth. Excel sheet tabulation was done

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and imported to SPSS with defined variables. The results of Pearson Chi square test were used to determine the incidence of impaction and correlation with difficulty as dependent variables.

III. RESULTS AND DISCUSSION:

The sample size was 257 that were referred for impacted teeth extraction during the study period. Among them 71.1% patients were males, 28.9% were females. Difficulty for impaction based on age is higher for 42 years with 14.5%. Based on teeth number, incidence of impaction is higher in teeth number 38 with 54.2%. And P value according to the Pearson Chi Square test is 0.249, P >0.05 which is not significant. The present study compared the effects of age, gender and angulation of impacted teeth to the operative difficulty which was determined by terms of Peterson’s difficulty index. Number of other studies have used surgical technique and surgical time as determinants of difficulty(Susarla and Dodson, 2005)

Statistically significant patient factors correlated with surgical difficulty in our study were gender and impacted teeth(Park, 2016). Gender is one of the predictors of difficulty of impacted teeth.(Joshi, 2001)There is a statistically significance relation between gender and surgical type which was also noted in the study undertaken by Susarla and Dodson, Ahmed SA, Sundus AM, Maha MA, khalwan TH. Our study shows that more frequent and more complications were associated in male population because of large crown size, thickness of root, length and curvature of root, thick buccal pad of fat.

Our study shows that a higher difficulty index is with the patient of age 42 to 45 years because of the difference in bone density. Older patients have stiff and hardened bone while younger patients have soft and resilient bone. According to many authors, age is the most consistent factor in determination of surgical difficulty-McGurk M, Renton T, Smeeton N showed that the patient age was relevant for predicting the difficulty of impacted teeth.(Renton and McGurk, 2001) Prevalence of impaction of teeth is in decreasing order of 38,48,28,18,37,17,47,36,23,43,33. Many authors asserted that the third mandibular molar is the most commonly impacted teeth in the oral cavity and surgical extraction of third molar is associated with varying degree of difficulty.(Yuasa, Kawai and Sugiura, 2002) Infact the radiographic factors such as angulation of impaction, depth of impaction, relationship with ramus, root formation and morphology of root have been considered the factors which affect the difficulty of impacted teeth surgery.(Hugoson and Laurell, 2000)

Previous studies discuss the local hemostatic agents intra and postoperatively to control the bleeding.(N et al., 2017) However, the patients who are on antiplatelet therapy can be continued with the prescribed drugs without any alterations and the bleeding site can be controlled with local hemostatic agents. (Amurdhavani et al., 2017) Previous studies report that preoperative anxiety is a major factor for pain post dental extraction. (Fathima et al., 2017) The pain, swelling and complications associated with the eruption and extraction of third molars has made its subject of interest to dentists.(Kumar, 2017a) The knowledge about the postoperative complications among undergraduate students were assessed and it was satisfactory according to the previous studies.(Ravichandran et al., 2017). Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc, Marimuthu and Devadoss, 2018; Ramesh et al., 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharisini, 2019; Mathew et al., 2020). In modern populations, the prevalence of the third molar impaction is higher than other teeth and mandibular third molar is by far the most frequently impacted tooth after the maxillary third molar(Jesudasan, Abdul Wahab and Muthu Sekhar, 2015). The reason for this is probably they are the last teeth erupting into the dental arch; therefore, the chance of space deficiency for their eruption is high. (Rao and Santhosh Kumar, 2018) In addition, the third molar varies more than the other molars in terms of shape, size, timing of eruption, and even tendency toward impaction. (Christabel et al., 2016) Most common type of angulation in impacted teeth is mesioangular impaction and is most commonly found in males according to this study(Putturaja and Pradeep, 2016). Periodontal diseases and caries of the lower second molars adjacent to impacted third molars were found in most of the cases.(‘Placing implants in a periodontally compromised patient’, 2017) The prevalence of root resorption and follicular enlargement was low overall. Wisdom teeth are the third and final set of molars that most people get in their late teens or early twenties. (Marimuthu et al., 2018) Partial eruption of the wisdom teeth allows an opening for bacteria to enter around the tooth and cause an infection, which results in pain, swelling, jaw stiffness, and general illness (Abhinav et al., 2019). Partially erupted teeth are also more prone to tooth decay and gum diseases because their hard-to-reach location and awkward positioning makes brushing and flossing difficult(Shunmugavelu, 2017). The knowledge of undergraduate students on the techniques, infection control,(Kumar and Rahman, 2017) pre and post operative complications, local anaesthesia(Baskran and Pradeep,
2016), swellings, anxiety, pain and waste disposal prevails. (Kumar, 2017a; Packiri, Gurunathan and Selvarasu, 2017) (Kumar, 2017b)

Graph 1 - Bar chart represents association of difficulty index during surgical removal of tooth. Y axis represents the number of patients who underwent surgical removal of the impacted tooth and X axis represents the tooth number. Blue colour denotes mild difficulty, red colour denotes moderate difficulty and green colour denotes very difficult. Surgical removal of the left mandibular third molar (tooth no. 38) had moderate difficulty than other teeth, however it is not statistically significant. Chi-square test, Pearson Chi Square value: 28.272, p value: 0.249 (p > 0.05 which is not statistically significant).

Graph 2 - Bar chart showing association of age and difficulty in surgical removal of teeth experienced by the patients. X axis represents the age of the patient and Y axis represents the number of patients who underwent
surgical removal of the impacted tooth. Blue color denotes mild difficult, red color denotes moderate difficult and green color denotes very difficult. Note that moderate difficulty is experienced by the patients who are at the age of 42 years during surgical removal of impacted teeth than any other age groups, however it is not statistically significant. Chi-square test, Pearson Chi Square value: 28.556, p-value: 0.867(p > 0.05 which is not statistically significant).

Graph 3- Bar chart showing association of gender and difficulty during surgical removal of impacted teeth experienced by the patients. X axis represents the gender and Y axis represents the number of patients who underwent surgical removal of impacted teeth. Blue color denotes mild difficult, red color denotes moderate difficult and green colour denotes very difficult. Male patients are significantly associated with mild to moderate difficulty during surgical removal of impacted teeth than female patients. Chi-square test; Pearson chi square value: 84.158, P value: 0.01 (P<0.05 which is statistically significant).

IV. CONCLUSION:

This study showed that there is no statistically significant correlation between age and difficulty index which is an objective measure of surgical difficulty that was assessed during surgical removal of impacted teeth experienced by the patients. The study also revealed that the surgical removal of the mandibular left third molar had a higher difficulty index than any other tooth. The present study suggests that predicting the level of difficulty preoperatively for surgical removal of impacted teeth will help in formulating the better treatment plan, thereby minimizing the postoperative complications for the ultimate benefit of the patients.

REFERENCES:


