

# CORRELATION BETWEEN DIFFICULT EXTRACTION PROCEDURE AND RELATED AGE GROUP - A RETROSPECTIVE STUDY

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**Abstract:** Difficult extraction procedures are those wherein the teeth cannot be removed only with the help of extraction forceps. These types of procedures require direct access and minimal reduction of the alveolar bone. This study discusses the necessity of surgery in case of difficult extraction procedures and their correlation with the related age group. Difficult extraction procedures such as impaction and trans alveolar extraction or open extraction type procedures inflicts trauma to the tissues which inturn leads to inflammatory reaction culminating in postoperative complications. The most common postoperative complications are trismus or lockjaw and neurological disturbances. In recent days, there is a necessity for minimizing trauma in terms of difficult extraction procedures for a better outcome, thereby aiding in the reduction of postoperative complications. When there is an insufficient retromolar space development or developmental anomaly of the ramus, there lies a complication for extraction, thereby leading to impaction of the associated tooth. This article focuses on the age group in which these difficult extraction procedures are carried out. It also demonstrates the intra operative and the postoperative complications associated with the surgeries. In this study, about 1080 patients, who have undergone difficult extraction procedures such as impaction and trans alveolar extraction, were selected. The number of male patients were 662 and the number of female patients were 418. The patients were sub-categorized according to the type of extraction such as impaction or transalveolar extraction and into 3 age groups. The predominant gender was male. The predominant type of extraction was impaction removal. The predominant age group range was from 18-30 years.

**Keywords:** Extraction, Impaction removal, Inferior alveolar nerve, Mandibular canal, Neurosensory disturbances, Transalveolar extraction

**INTRODUCTION:**

Open extraction or any extraction that requires a surgical intervention or that requires the reduction of alveolar bone for the purpose of the extraction is termed as transalveolar extraction. This method is commonly employed when there's not a possibility for normal forcep extraction. Moreover, whilst normal forcep extraction procedure, if a tooth fractures, or a part of the tooth fragment is embedded in the alveolar bony socket, open extraction comes into play. The general health and age of the patient associated, are the major factors for determining the type of extraction procedure.<sup>1</sup> This type of extraction procedure is also indicated for any tooth that offers excessive resistance to normal forcep extraction. In those cases, the associated tooth is bound to fracture leading to complications of extraction. This type of extraction is also implemented in cases of hypercementosis of tooth, sclerosis and ankylosis of the bone associated with the tooth.

Impaction refers to the condition whereby the tooth fails to erupt and attain a proper level of occlusion.<sup>2</sup> Some of the well-known classification systems for determining the difficult extraction procedures based on radiological evaluation are Wharfe, Winters lines, and Pell and Gregory classification<sup>3,4</sup>. Pell and Gregory's classification established nine groups of impacted lower third molars utilizing the various levels of impaction and their relationship with the ramus. This classification does not consider the angulation of impacted teeth.<sup>5</sup> Winter's classification of impacted lower third molars is based on their axial angulation such as mesioangular, vertical, distoangular and horizontal. Pederson's index uses both the classifications of Winters and Pell and Gregory to determine the level of difficulty of surgical extraction<sup>6</sup>. However, these classifications aren't the only sources that can be relied for determining the difficulty of extraction procedure because there are other factors that can affect the mandibular canal such as age, body mass index, root morphology, bone quality, and tooth proximity to the mandibular canal of the patient.<sup>7</sup>

Complications associated with impaction and transalveolar extraction in accordance with the degree of extraction include iatrogenic nerve injury mainly involving the inferior alveolar nerve thereby leading to complete or partial paraesthesia of the nerve, trismus and other major complications.<sup>8</sup> Surgical extraction difficulties also vary from mild routine discomfort such as pressure pain, anxiety, fear to severe complications such as facial pain, loss of sensation of one half of the face that require hospitalization<sup>9</sup>. Patient compliance and cooperation are very much required whilst treatment. Hysterical patients would require proper and detailed information about the treatment and its protocols. Medical history of the patient such as diabetes, hypertension, hyperthyroidism, hypothyroidism and surgical history such as bypass surgery, stent placement, prosthetic valve placement or any other surgery, are some of the major factors that can make extraction procedures almost impossible.<sup>10</sup> Previously our team has done many researches, systematic reviews and surveys which has led to the idea of the current topic on impaction removal<sup>11-25</sup>. The aim of the study is to correlate the relationship between difficult extraction procedures of the patients and their related age groups.

## MATERIALS AND METHODS:

### Sampling:

Non-probability sampling was collected from June 2019 to March 2020. The case sheets of the patients above 18 years of age who had reported to Saveetha Dental college for difficult extraction procedures were reviewed. The data was verified using the DIAS software to prevent sampling bias. The external validity was good, as it is generalisable among patients of the same ethnic origins within the state and country.

### Ethical approval

Ethical approval was obtained from the Institutional Ethical Committee and scientific review board [SRB] of Saveetha Dental College. SDC/SIHEC/2020/DIAS/DATA/0619-0320

### Data collection:

The data was obtained from the dental information archiving software - DIAS, patient management software. The data collected included parameters such as the patient's name, age, gender and diagnosis. Patient data obtained was cross verified with the DIAS treatment photographs. The data was collected and tabulated in the excel sheet and imported to spss software for statistical analysis.

### Statistical analysis:

The data was imported to spss software by IBM version 25.0 for Windows OS in which the output variables were defined. The independent variables were age and gender whereas the dependent variables were the extraction procedures performed and the statistical mean value obtained. The statistical test used was correlation test to establish the results.

### Methodology

The data was imported to spss software by IBM version 25.0 for Windows OS in which the output variables were defined. The independent variables were age and gender whereas the dependent variables were the number of cases with impaction removal, transalveolar extraction and the statistical mean value obtained for the prevalence. The study patients diagnosed with impaction removal were collected from DIAS records and a chi-square test was performed to obtain the results.

## RESULTS AND DISCUSSION:

In this study, 1079 patients who underwent difficult extraction procedures which included impaction removal and transalveolar extraction were chosen for the study. To estimate the predominant age group, patients were divided into 3 age groups wherein 18-30 years were considered as group-1, 31-45 years were considered as group-2 and 46-70 years were considered as group-3. Among the age groups, group 1 (18-30 years) had 647 patients, group 2 (31-45 years) had 333 patients and group 3 (46-70 years) had 100 patients. The number of patients who underwent impaction removal were 760 and trans alveolar extraction were 320. From the statistics, it can be estimated that predominant age group was found to be group 1 (18-30 years), predominant gender was male and predominant type of extraction is impaction removal. Chi square test was done and p value obtained was 0.046 which was statistically significant thus inferring that impaction removal procedures and trans alveolar procedures are most likely to happen among people of younger age group due to better anchorage in patients with relatively younger age group.

In recent studies, tooth position, morphology, adjacent bone, age and gender of the patients were considered to be the factors determining the difficulty of extraction.<sup>26,27</sup> Few studies also indicated that the most common age group that underwent extraction is from 16-38 years of age.<sup>28,29</sup> A study by Haralabakis H et al discussed that almost 2% of the observed cases had congenital absence of mandibular 3rd molars.<sup>30</sup>

In other studies, it had been indicated that the wisdom tooth's depth and angulation served to be major factors for determining the level of difficulty of extraction.<sup>31</sup> According to Elsey and Rock, impaction of third molars is common in about 73% of young adults.<sup>32</sup> Generally the age for the eruption of the mandibular 3rd molars is 3-6 months late, in males, when compared to females. Historically dental extractions were carried out by a variety of methods before the introduction of antibiotics. In spite of the newer advancements in the techniques and instrumentation, the postoperative complications are still uncommon, among which the most commonest complications is a dry socket in which there is delayed healing from the site of extraction which can be observed.<sup>33,34</sup>

The main cause for the formation of dry socket includes diabetes, smoking, improper sterilization protocol and other systemic illness of the patient. A study by Silver-Stein P determined that smoking leads to delayed wound healing in almost 80% of patients who undergo extraction.<sup>35</sup> Atraumatic removal of teeth is made possible in recent days via techniques that involve the lasers which will carry out the extraction procedure. A study by Johnson et al had demonstrated the atraumatic modality of treatment for the impaction removal and those teeth indicated for transalveolar extraction. LASERS used in dentistry are mainly soft tissue lasers and these are known to selectively cause genetic disintegration of the cells in the tissue thereby leading to minimal trauma, therefore no bleeding and pain will be experienced by the patient during the procedure making it much more convenient for both doctor as well as the patient.<sup>36</sup> A study by Bui CH et al discussed the complications following impaction surgery and have stated that dry socket is the most commonest complication preceding a difficult extraction and males were the predominant gender group undergoing higher number of impaction removal procedures. This study coincides with our study.<sup>37</sup> Another study by Tenbosch JJ et al, also discussed the gender predominance of transalveolar extraction in which males were the predominant age group to undergo extraction procedures which also coincided with our study.<sup>38</sup> Few studies have discussed on the complications of such difficult extraction procedures, precautions to be taken while doing extraction for patients with high blood pressure, hyperglycemia, hypoglycemia and other systemic illness such as cardiovascular disorders and the need to prescribe patients with post operative antibiotics.<sup>39</sup> Studies by other authors have also indicated that postoperative bleeding to be the most common complication of difficult extraction procedures.<sup>40</sup> Following the surgical extraction, it is necessary for a surgeon to make the patients aware of the postoperative complications and it is important for the patient to have sufficient knowledge regarding proper oral hygiene maintenance so that most of the complications can be reduced significantly.

#### LIMITATIONS:

The data may have discrepancies since the study is retrospective. It is limited to impaction removal and transalveolar extraction procedures that are confined to a specific geographic location and does not include any other criteria other than age and gender groups.

#### FUTURE SCOPE:

This study gives a vast idea on impaction, transalveolar extraction procedures, their difficulties and postoperative complications. It also gives a broad idea on the management of these procedures in a minimally traumatic and effective way, thereby preventing postoperative complications.

#### CONCLUSION:

Awareness on difficult extraction procedures, their complications and need for treatment has to be promoted among young adults by performing regular oral screening camps to diagnose the impacted tooth. Patients must also be instructed on proper oral hygiene maintenance to prevent future repercussions. Patients of all ages should be educated for the significance of regular dental checkups so that diagnosis can be done at the earliest to take necessary steps and precautions to treat the patient and also to save the adjacent tooth structures.

#### Author Contributions:

First author [Nivesh Krishna R] performed analysis, interpretation and wrote the manuscript. Second author [Dr. Bala Krishnan] contributed to conception, data designs, analysis, interpretation and critically revised the manuscript. Third author [Dr. Arvind S] participated in the study and revised the manuscript. All the three authors have discussed the results and contributed to the final manuscript.

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**Conflict Of Interest:** Nil.

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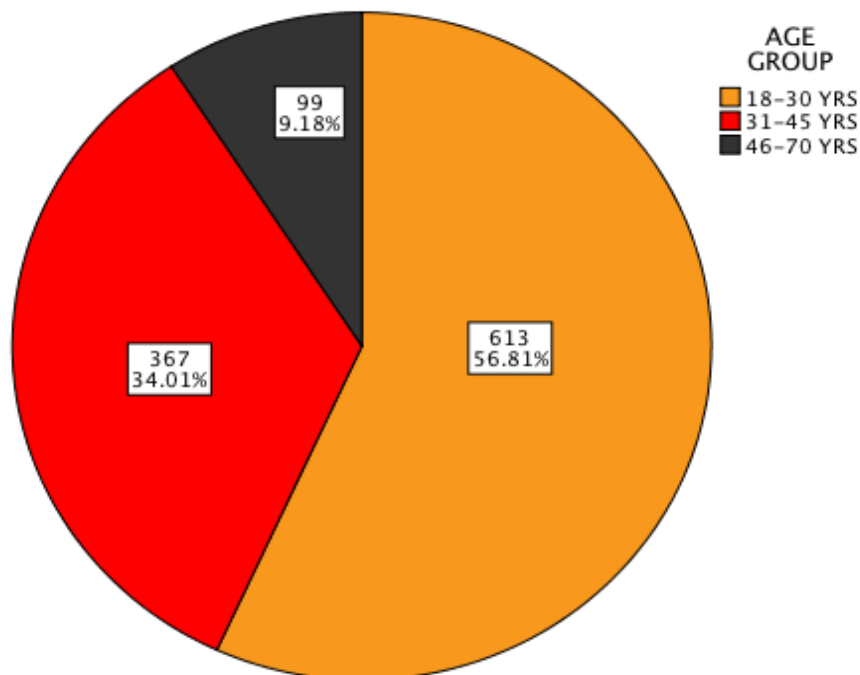
**FIGURES:**

Figure 1 pie chart showing the distribution of the patients across the three age groups. Considering the age groups, group-1(18-30 years) includes 613 patients, group-2 (31-45 years) includes 367 patients and group-3 (46-70 years) includes 99 patients. The predominant age group with the highest number of difficult extraction procedures is 18-30 years i.e. group-1.

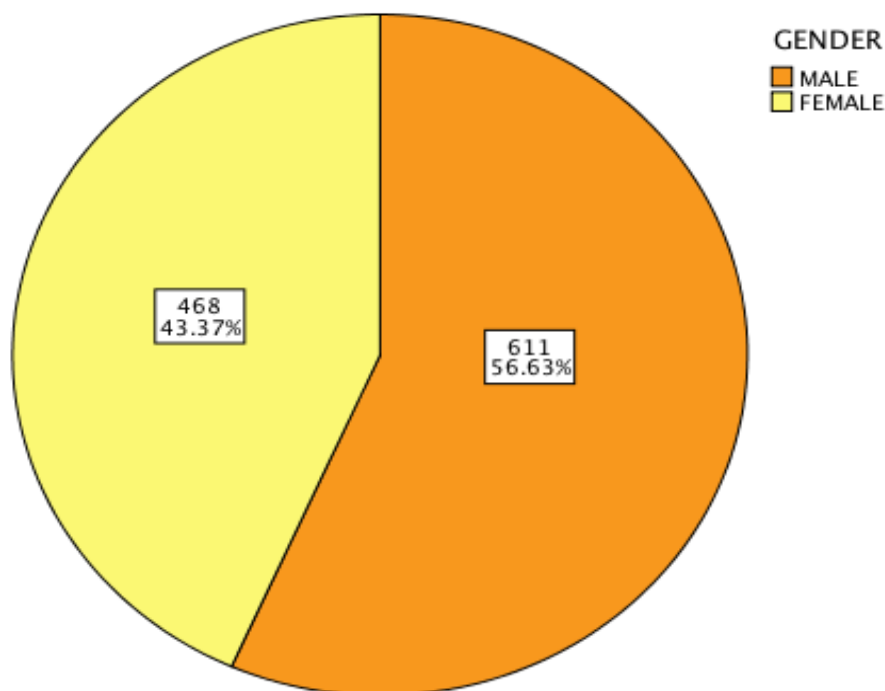


Figure 2 pie chart showing the distribution of the patients based on gender. From the study it can be estimated that among 1080 patients who have undergone difficult extraction procedures, the number of male patients were 611 and the number of female patients were 468. The predominant gender was males with the highest frequency.

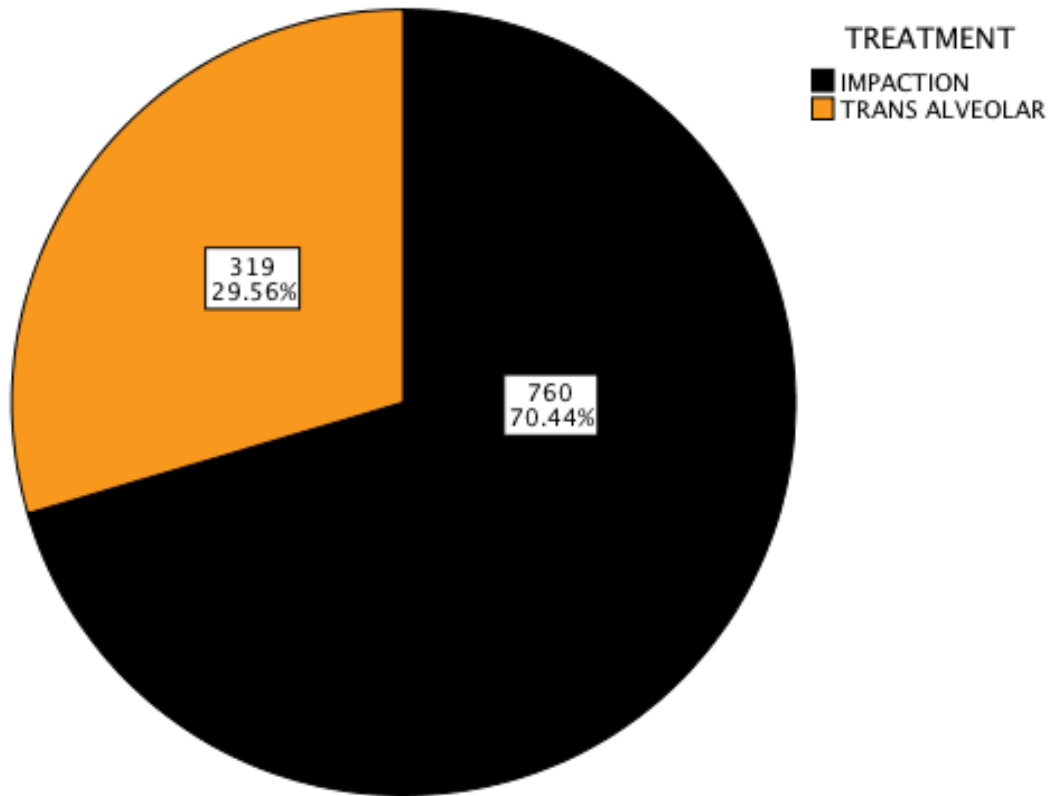


Figure 3 pie chart showing the distribution of the patients based on the type of difficult extraction procedure undergone. From the study it can be estimated that among 1080 patients who have undergone difficult extraction procedures, the number of patients who have undergone impaction removal were 760 and the number of patients who have undergone trans alveolar extraction were 319. The predominant type of difficult extraction procedure was impaction removal with the highest frequency.

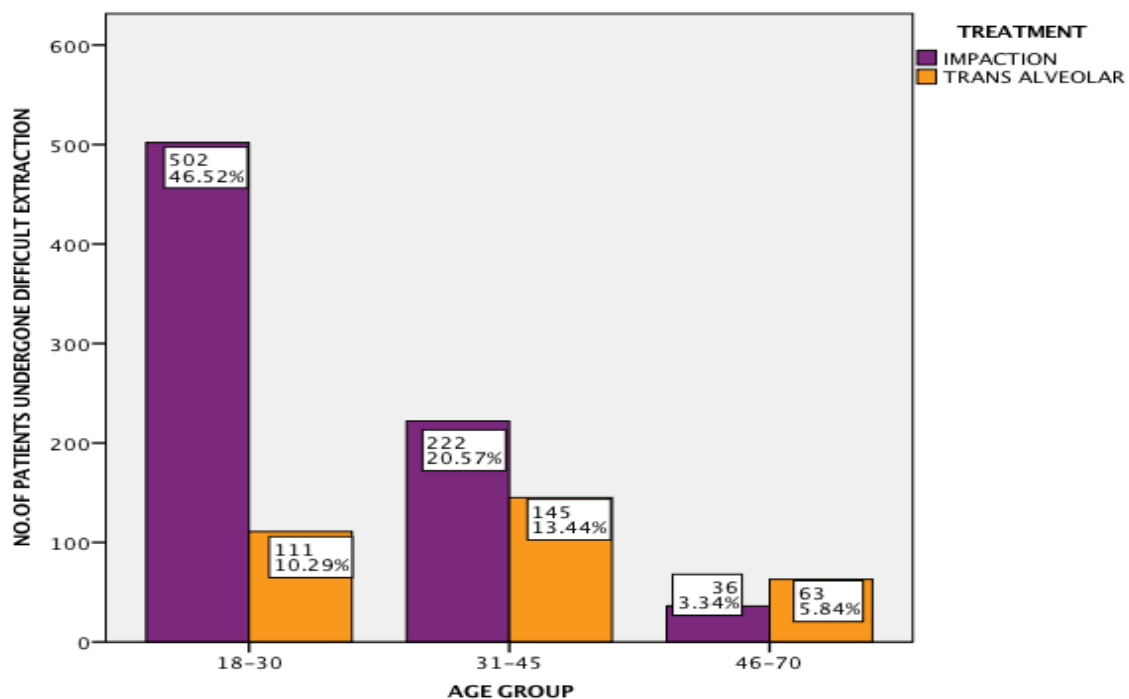


Figure 3: Bar graph showing the association between age group and gender prevalence of impaction removal and trans alveolar extraction. X axis represents the age group and Y axis represents the number of patients. The number of patients who underwent impaction removal were 760 and trans alveolar extraction were 320. From the statistics, it can be estimated that the predominant age group was found to be group 1 (18-30 years) and the predominant type of extraction is impaction removal. Chi square test was done and p value obtained was 0.046 which was statistically significant