



Assessment of intraoperative risk factors for surgical difficulty in surgical extraction of impacted mandibular third molar – A prospective study.

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ABSTRACT

The extraction of impacted third molars is among the most common surgical procedures carried out in the field of Oral and Maxillofacial Surgery. For proper planning of surgical extraction, especially for impacted mandibular third molars the estimated level of surgical difficulty of the case is important. This study was conducted to evaluate the intraoperative risk factors contributing to surgical difficulty in extraction of impacted mandibular third molars and consequently the post-operative outcome. Here, we have undertaken a study in which the intraoperative variables were considered, to evaluate their contribution for surgical difficulty and postoperative complications in surgical removal of 100 impacted mandibular third molars. Three variables were found significant associated with total surgical time intervention, i.e., surgeon's experience ($p=0.006$), Inter-incisal opening ($p=0.032$), and cheek flexibility ($p=0.004$). Total surgical time intervention for 'right side' was higher with 49.20 ± 17.94 minutes ($p=0.691$). Total surgical time intervention for 'gagging reflex present' was 50.21 ± 17.812 ($p=0.674$). Multiple linear regression shows that surgeon's experience was the only predictor ($p<0.001$). The surgical difficulty of impacted mandibular third molar are likely to depend on the intraoperative factors like Surgeon's time, surgeon's experience, cheek flexibility, and inter incisal mouth opening.

Keywords: Impacted, mandibular third molar, Intraoperative, surgical difficulty, risk factors.

INTRODUCTION

Mandibular third molars are also called wisdom tooth because of their eruption time i.e. 17 to 21 years of age and this is the age of adulthood (Rauf, 2015). Due to evolution of human jaws, the size of jaws has reduced leading to impacted third molars. Mostly these are the last teeth to erupt in the oral cavity. The surgical extraction of an impacted mandibular third molar is the most common procedure performed in dentistry. Accordingly, the impacted mandibular third molars are more common followed by maxillary third molar, maxillary canine and mandibular premolars. Mostly mandibular third molars are impacted, and the level of difficulty of surgical extraction is classified according to the degree of impaction, position in the mandibular ramus, and the angulation of long axis of the tooth (Lee et al., 2013).

The goal of third molar surgery includes, pain relief, prevention of caries and periodontal diseases, orthodontic treatment and orthognathic surgery, prevention of pathological conditions such as dentigerous cyst and external resorption of the adjacent second molar (Lee et al 2015).

Like other surgical procedures, third molar surgery has its own risks of postoperative sequelae and complications. Pain, swelling and trismus are the most common post-operative sequelae. Complications may be the risk of nerve damage, particularly the inferior alveolar and the lingual nerve, followed by paraesthesia of chin, lower lip, and/or tongue can be reported. The quality care should be given to the patient as to prevent post-operative complications. Moreover, an evaluation of patient's satisfaction

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on the quality of treatment and post-operative care should be taken into consideration (Lee et al., 2015).

This study was conducted, to evaluate the intraoperative risk factors contributing to surgical difficulty in extraction of impacted mandibular third molars and consequently the post-operative outcome.

MATERIALS AND METHODS

In this present study, intraoperative parameters were considered for surgical difficulty: Experience of surgeon and time required for surgery, Operation Site, Interincisal mouth opening, Cheek flexibility, and Gagging reflex.

A total of 100 patients were randomly selected from OPD, referred for extraction of mandibular third molar to the Department of Oral & Maxillofacial Surgery. Patients fit to undergo extraction under local anaesthesia without any contraindication, and with mandibular third molars that were either fully or partially impacted in bone were included. Medically compromised patients, and with only soft tissue impacted mandibular third molars were excluded.

Preoperative assessment of patient was done with thorough case history followed by clinical examination, radiographic interpretation and necessary laboratory investigations.

After obtaining informed written consent from each patient, the surgical procedure was carried out with standard surgical protocol under local anaesthesia. The patient was randomly allotted to available surgeon. All the surgeries were performed by Professor, reader, lecturer or post graduate students of Oral and Maxillofacial Surgery department.

In this study, the time of surgery was considered, from the time when incision was placed to the placement of last suture and it was measured with stop watch. Interincisal mouth opening (Figure 1) and cheek flexibility (Figure 2) were measured.

A modified Ward's incision was used for access. After full thickness mucoperiosteal flap was elevated, bone surrounding the third molar was removed with a round bur in a straight hand piece using a copious amount of saline irrigation. In majority of cases, the third molar was split using a straight fissure bur as the routine technique. The tooth was then carefully removed. The alveolus was inspected and curetted for granulation tissue followed by copious irrigation with saline. Closure was accomplished with 3/0 black silk suture. A gauze pack was pressed against the surgical site and the patient was instructed to bite on it for an hour. The time of completion of the surgical procedure was recorded. For each surgery patient was given the usual postoperative instructions and guidelines.

Data was coded and analysed in STATA version 10.4 (StataCorp, USA). Univariate analysis was performed where descriptive statistics like Mean and SD or frequency and percentage were calculated. Multiple linear regression analysis was used to assess relationship between continuous outcomes (Surgical Time) with a set of predictors.



Figure 1. Pre-operative measurement of interincisal mouth opening.



Figure 2. Pre-operative measurement of cheek flexibility opening.

RESULTS

A total of 100 impacted mandibular third molars were removed surgically under local anaesthesia with adrenaline. Intraoperative risk factors and total surgical time intervention were evaluated.

Out of 100 impacted teeth, 20% were operated for >60 minutes, 63% for 30-60 minutes & 17% for <30 minutes. Total surgical time intervention was 48.46 ± 16.69 minutes. Three variables were found significant associated with total surgical time intervention: surgeon's experience ($p=0.006$), Inter-incisal opening ($p=0.032$), and cheek flexibility ($p=0.004$).

Total surgical time intervention for 'right side' was higher

with 49.20 ± 17.94 minutes ($p=0.691$). Total surgical time intervention for 'gagging reflex present' was 50.21 ± 17.812 ($p=0.674$).

Multiple linear regression shows that surgeon's experience was the only predictor ($p<0.001$).

DISCUSSION

The assessment of difficulty in third molar surgery is fundamental to make an optimal treatment plan in order to minimize complications. Though the procedure is so common, the overall complication rate is low and complications are mostly minor. It is likely that the difficulty during surgery cannot be accurately assessed preoperatively but has to be done intraoperatively. It has been suggested that patient factors also have an important impact on increasing difficulty of third molar surgery (Tanglikar *et al.*, 2017).

The purpose of this study was to recognise risk factors associated with the difficulty of mandibular third molar extractions intraoperatively. Renton *et al.* (2001) have stated that the surgical difficulty of extraction also depends on the experience of the surgeon. In this study also, the mean time required to extract the tooth is less for senior and well experienced surgeon than post graduate student. It's been established that the prolonged duration of a surgery is associated not only to a more complex procedure but also to a poorer postoperative period. The selection of surgical technique used in the extraction of third molar plays a crucial role in the postoperative period (Alvira-Gonzalez *et al.*, 2017).

Cheek flexibility can be defined as the distance between the maxillary dental midline and the corner of mouth after retraction. According to Susarla & Dodson (2005), cheek flexibility has statistical significance with operating time. In our study, cheek flexibility of <5cm in 3% of cases in the present study required >60 minutes for surgical extraction of impacted mandibular third molars.

Inter-incisal opening was stated to be significant by Renton *et al.* (2001) for extended operation time during surgery. The same variable was also found significant in the present study with 4% of patients with <5cm of mouth opening, required >60 minutes for surgical extraction of impacted mandibular third molar. On the contrary, Susarla & Dodson (2004) did not find inter-incisal opening as a significant variable.

Santana-Santos (2013) has stressed that, the operating time and also the intraoperative sectioning are the risk factors that lead to greater surgical difficulty and also increases the extent of the postoperative complications. Thus, it has been estimated that intraoperative factors are to be considered and

evaluated properly to limit and prevent post-operative complications.

CONCLUSION

The surgical difficulty of impacted mandibular third molar are likely to depend on intraoperative factors like surgical time, surgeon's experience, cheek flexibility, and inter incisal mouth opening. Further studies with larger cohort should be conducted to assess the contributing intraoperative risk factors.

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