Original Article

Relationship between Operative Time and Complications for Impacted Mandibular Third Molar Removal

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ABSTRACT

OBJECTIVE: To identify relationship between operative time and surgical complications encountered during and soon after removal of impacted 3rd Molar teeth.

METHODOLOGY: This cross-sectional study was conducted at the department of Oral & Maxillofacial Surgery, Faculty of Dentistry, Liaquat University of Medical & Health Sciences, Jamshoro from February 2017 to July 2017. Total ninety two surgical removals were done after pre-operative assessment of impaction. Operative time was recorded. Any intra-operative complication was noted during surgery and postoperative complications were recorded on 3rd, 5th and 7th day. The Data was analysed by statistical software package SPSS version 20.0 Qualitative variables were expressed as absolute frequencies and percentages. The variables were presented as mean, frequencies/percentages.

RESULTS: The results of this study showed that surgical removal of third molar was more common in females (58%) with the highest percent of mesioangular (39%).The pre-operative pain was more in females and older patients. In intraoperative complication, injury to soft tissue was more common than other complications. In postoperative complications, swelling and trismus were more on the 3rd day.

CONCLUSION: The inflammatory complications that can be considered (pain, swelling and trismus) after third molar surgery remain an important factor at the early postoperative periods. The intraoperative and postoperative complication also depends on surgeons experience and duration of procedure which may increase or decrease the sequela of removal impacted teeth.

KEY WORDS: Operative Time, Impaction, Impacted mandibular, Third molar.

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INTRODUCTION

Teeth that are unable to erupt in an expected time in the dental arch are known as impacted or a tooth which is placed against soft tissues or hard tissue (bone) or both and its unlikely to erupt further in the dental arch is called impacted tooth[1]. Generally, the eruption time of this tooth is between 17 to 21 years[2].

A tooth may become impacted but the most common and the highest impaction rate is of mandibular third molar followed by maxillary 3rdmolar, maxillary canine and mandibular premolar[3,4]. Lower third molar is the last tooth which erupts between the age of 17 to 25 years and most of the times maligned, with curved or hooked roots all this happen due to lack of space between mandibular ramus and second molar[2].

The problems which can occur due to impaction are pericoronitis the most common followed by dental caries of third molar or adjacent second molar, root resorption of the second molar, periodontal problems, odontogenic cysts and tumors, other factors that need considered is bad oral hygiene[5,6].

Mandibular third molar surgery is the most common surgical procedure performed after simple extraction in the outdoor patients[7,8]. During surgical removal of impacted lower 3rd molar intra-operative accidents and postoperative complications are not uncommon. The intra-operative complications can occur like profuse bleeding, injury to inferior dental canal, injury to adjacent tooth, displacement of tooth in the adjacent structure, fracture of the root apex, fracture of mandible and jaw dislocation[9,10].

Type of impaction, existing infection (pericoronitis), relationship with the inferior alveolar nerve, root morphology, density of the bone surrounding the impaction or any pathology associated with impaction are the tooth related factors which may cause the postoperative complications[11].

The factors involving surgery are the use of drugs i-e local anaesthesia, type of extent of the incision, bone removal or tooth sectioning, the technique of closure of the wound, surgeons experience and time spent during the surgery[12,13]. The bone density also needs attention, difficulty level of impaction[14].

The postoperative complications are divided into immediate tissue reaction and delayed complications. Immediate complications which occur on the first day following surgery include pain, trismus, swelling, dysphagia[15-18] while delayed complications include bleeding, dry socket, wound dehiscence, delayed wound healing, infections, periodontal pocketing of adjacent tooth and nerve injury[2]. In addition, other rare complications such as fracture and jaw dislocation also have been reported[19,20].

This study was aimed to determine the effect of operative time on immediate post-surgical tissue reactions following lower third molar surgery which are common and also patient's primary concern and to reduce, prevent such complications in future.

METHODOLOGY

Total ninety two patients were enrolled in this study by the approval of ethical review committee of Liaquat University of Medical and Health Sciences Jamshoro with reference No/ LUMHS/ERC 575 dated 27-01-2017. This clinical cross-section descriptive, prospective trial was done at department of Oral & Maxillofacial Surgery, Faculty of Dentistry, Liaquat University of Medical & Health Sciences, Jamshoro from February 2017 to July 2017. The patients included of both the genders with the sample technique of simple randomization method, patient's age range from 18 to 35 years and patients having impacted clinically & radio-graphically proven mandibular third molar. Patients not willing to participate in the study, signs of infection (acute pericoronitis), smoker patient, patient on oral contraceptives, mentally retarded patients, patients with any co-morbid and patients with broken down roots of impacted mandibular third molar were excluded from this study.

Under local anaesthesia the surgical procedure was performed by giving inferior alveolar nerve and lingual nerve block along with local infiltration. 2% Xyolcaine with 1:10000 epinephrine (Medicaine; Made in Korea) was used to give local anaesthesia. The operative duration was determined by the time lapse between incision and completion of suturing from low to high i-e. Low 1 (10-20 minutes), 2 (20-40minutes) and high 3(more than 40 minutes). With the help of blade #15 (Feather safety razor co. Ltd Japan), the releasing incision was given an envelope flap was raised. Slow hand piece was used to remove buccal cortical bone and extraction of tooth was done by either the use of an elevator or sectioning the tooth and roots where necessary. A sterile normal saline 0.9% (Searle Ltd. Pakistan) irrigation was used during the tooth sectioning and bone removal. After removal of the tooth, the wound was irrigated and sharp areas were smoothened with the bone file. A 4-0 Vicryl (Johnson & Johnson; Made in the USA) was used to close the wound.

Duration of the surgery was recorded and during the surgical procedure, trans-operative complications occur like soft tissue injury, injury to the inferior dental canal, adjacent tooth injury, fracture of tooth apex and fracture of the mandible were recorded whenever occurred. Finally, compressive gauze was placed for 30-45mins.The patients were given appropriate postoperative instructions. Each patient was given standard antibiotics (Amoxi-clav 625mg BD GSK Pharma Made in Pakistan) and analgesics (Ibuprofen 400mg TDS Abbott Pharma Made in Pakistan) for 5 days. Each patient was re-examined on the 3rd, 5th and 7th post-operative days. The postoperative complications were recorded on Proforma. Postoperative assessment of pain [using Visual Analogue Scale from zero (no pain) to 10 (worst pain imaginable)], degree of swelling [using criteria published by Amin & Laskin] [21] and limited mouth opening [using millimetre ruler (measuring the maximum distance between Upper and lower central incisor)] associated with impacted mandibular third molar is performed. The intra-oral examination was carried out for any other complication such as a dry socket, wound dehiscence or any other soft tissue injury.

RESULTS

Total ninety two patients were included in this study based on inclusion criteria. The age range of the patient was from 18 years to 35 years. In this study, the mean age was 26.43±5.20 with the predilection of female's i-e 53 patients (58%) than males 39 patients (42%). Table I.

Surgical removal of impacted lower 3rd molar was classified on angulation and mesioangular was most common impaction 36 patients (39%) followed by vertical angulation 28 patients (31%), then horizontal 19 patients (20%) and least common angulation in this study were distoangular 09 patients (10%).

In the present study, preoperative assessment of pain, swelling, and trismus was done. Pain assessment was done on the visual analog scale (VAS). According to gender distribution, in females, the complaint of pain was more (mild 10 patients, moderate 20 patients and severe 23 patients) when compared with males (mild 6 patients, moderate 16 patients, and 17 severe patients). Table II.

Surgical procedure took minimum upto 10 minutes and maximum was more than 40 minutes (Relation of Pre and Post Operative Pain Assessment as shown in Table III).

Table IV and V show pre and post operative comparison of mouth opening and swelling
Surgical procedure for removal of impacted tooth was also evaluated according to surgeon's experience as shown in Table VI.
During the postoperative assessment of patients, pain swelling and trismus were assessed. Pain was initially more on 3rd postoperative day which gradually decreased and was mild to moderate on 5th and 7th day postoperatively. The p-value of pain calculated by chi-square test was 0.079. Preoperative maximum mouth opening was 32.29±4.31. On 3rd postoperative day, maximum mouth opening was 28.67±2.85 which increased on the7th day with mean 34.94±3.16. The p-value was 0.022 calculated using ANOVA. Figure I.
The swelling was found more on the 3rd postoperative day with mean 8.45±2.50. On the 5th postoperative day, the swelling was less with mean 6.27±4.33 and on 7th day decreased to 3.44±1.29. The p- value was 0.045. Figure II.

TABLE I:
DESCRIPTIVE STATISTICS OF AGE (n=92)

Statistics	Age (Year)
Mean ± SD	26.43±5.20
Median (IQR)	26
Minimum Age	18
Maximum Age	35

TABLE II: PRE-OPERATIVE PAIN ASSESSMENT

Pre-Operative Pain Assessment (Gender Distribution)			n= 92
	Male	Female	Percentage
Mild	6	10	17.39%
Moderate	16	20	37.73%
Severe	17	23	43.47%

TABLE III: RELATION OF PRE AND POST OPERATIVE PAIN ASSESSMENT

Pain Assessment			n= 92
	Pre Operative	Post Operative	P-value
Mild	16	25	0.072*
Moderate	36	41	
Severe	40	26	
Total	**92**	**92**	

TABLE IV: PRE AND POST OPERATIVE COMPARISON OF MOUTH OPENING

Mouth Opening		n= 92
	Mean±SD	P-value
Pre Operative	32.29±4.31	0.022*
3rd Postoperative Day	28.67±2.85	
5th Postoperative Day	31.03±2.44	
7th Postoperative Day	34.94±3.16	

**Significant at 0.05 levels using ANOVA*

TABLE V: PRE AND POST OPERATIVE COMPARISON OF SWELLING

Mouth Opening		n= 92
	Mean±SD	P-value
Pre Operative	7.83 ±1.78	0.045*
3rd Postoperative Day	8.45±2.50	
5th Postoperative Day	6.27±4.33	
7th Postoperative Day	3.44±1.29	

**Significant at 0.05 levels using ANOVA*

TABLE VI: RELATION OF OPERATIVE TIME OF SURGERY WITH SURGEON'S EXPERIENCE (n= 92)

Surgeon's Experience					
Time of Surgery	2 years	3 years	5 years	Total	P-value
10-20 minutes	3	7	11	18	0.008*
20-40 minutes	16	12	7	35	
> 40 minutes	19	15	5	39	

** Significant at 0.05 levels*

FIGURE I: PREOPERATIVE AND POSTOPERATIVE MAXIMUM MOUTH OPENING ASSESSMENT IN MILLIMETRES

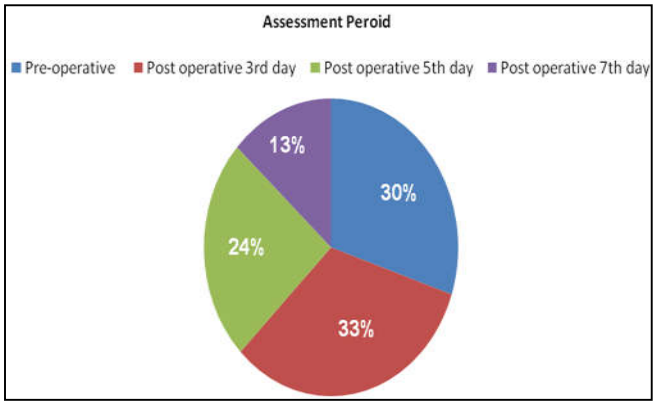
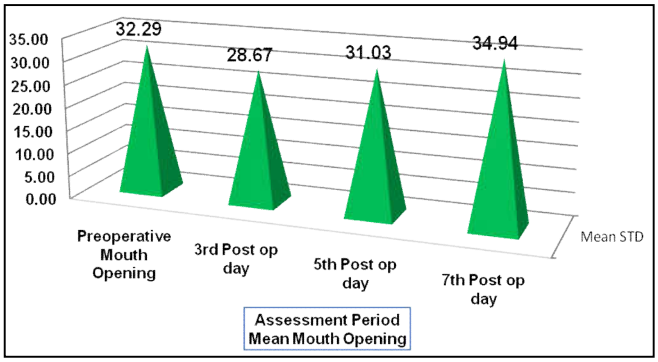


FIGURE II: PREOPERATIVE AND POSTOPERATIVE SWELLING ASSESSMENT IN MILLIMETERS



DISCUSSION

Among the dentoalveolar surgeries impacted teeth were commonly removed as compared to other procedures at oral surgery clinics and hospitals[7,8].

The mean age of impaction removal in this study was 26.43±5.20. The common reasons for presenting third molar impaction removal in this age range was pain, swelling, trismus because of pericoronitis and dental caries. The mean age was 27.2±6.177 years, and the 3rd decade is the dominant age group, like other studies[6,22].

It has been reported that during removal of impaction, patient's age is an important factor because many studies have reported that postoperative complications are increased in older patients. Operative time was found more in elderly patients. The elderly groups was more than twice likely to be the risk of the lengthening of the operational time they had met with the younger age group[22]. Increase in duration of surgery chances of experiencing pain (VAS>1)[23].

Some studies showed, impaction of lower 3rd molar was more common in males than females [6,21,24] however as many studies showed female predilection in patients with impacted lower 3rd molar[22,25].

After the presenting complaint of patient another reason for surgical removal of impaction were the common pathologies which were caries to distal aspect of 2nd molar followed by periodontal disease (12.84%)[26]. Prophylactic removal of asymptomatic impaction were 6.73% [27].

Bui CH 2003[7]. reported complications 2.2% during the surgical removal of lower 3rd molar and Chiapasco M 2006[28] in his research found the incidence of accidents during operation 1.1%. Khan A 2010[25] investigated the rate of accidents and complications in both the genders. The rate of complications was seen more in female patients 73.91% when compared with male patients 27.28%.

Complexity of surgical procedures also increases the rate of accidents and complications. Other authors showed increase of postoperative morbidity with increase in duration of surgery[29].

Pain and swelling after extraction are due to the inflammatory process of oral tissue. The commonest complication was mild pain (41%) in a study while the frequency of swelling after third molar impaction removal after 7 days was 40%. These results are supported by Ayaz H 2012[19] and Ali YA 2013[30].

Postoperative pain was less in men compared to the women. Average pain in 24 hours following surgery was 4.01±0.76 (range 2-5) based on VAS system. The pain reported among men (3.84) is significantly lower than in women (4.24). After surgery the pain starts as the effects of the local anaesthesia subside and reach peak levels in 6 to 12 hours postoperatively. 37.7% patients reported mild pain on the third postoperative day and 43.4% patients had no pain on the seventh postoperative day[31].

In another study, the absence of trismus after the extraction of partially bony impacted tooth was 49.6%, presence of edema was 62.5%, while these means were 0% and 37.2% for trismus after the extraction of mucosal impacted teeth and 13.3% and 37.5% for trismus after the extraction of complete bony impacted teeth[32].

Complications other than pain; swelling and trismus may also be seen. Other postoperative complications include alveolar osteitis, infection, secondary bleeding, wound dehiscence, temporomandibular dysfunction or inferior alveolar nerve paresthesia[29].

Alveolar osteitis varies widely, from lowest range (0.5%) to highest range (68.4%) but few studies indicated range between 5-10%. The diagnostic criteria for alveolar osteitis vary from author to author according to their studies[29].

Damage to the lingual or inferior alveolar nerve (IAN) is one of the delayed and least desired complications of impacted mandibular 3rd molar. Sensory deficits may present as anaesthesia, hypoesthesia, hyperesthesia, or dysesthesia in the distributions of the lingual nerve inferior alveolar nerve, with or without taste disturbance, if the lingual nerve is also affected. After 4-8 weeks of surgical removal of lower 3rd molar, injuries to inferior alveolar nerve (IAN) recovered around 96%[33,34].

CONCLUSION

It was concluded that, the inflammatory complications that can be considered (pain, swelling and trismus) after third molar surgery remain an important factor at the early postoperative periods. The intraoperative and postoperative complication also depends on surgeons experience and duration of procedure which may increase or decrease the sequela of removal impacted teeth.

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