

**EXTRACTION OF THIRD MOLAR AND IT'S RELATIONSHIP  
WITH GRADING OF PAIN****Ukrainian Medical Stomatological Academy (Poltava)****kiani.masoud98@gmail.com**

**Introduction.** Four types of teeth, being the eruption after another teeth are called wisdom teeth or third molar, start at the approximate age is 9 till 10 years old in the jawbone and crown completed in 14 years old and in the last years of adolescence begin to eruption inside the bone and after the age of 16 till 25 years old appear in the mouth. Due to lack of a natural form of wisdom teeth like many other teeth and perch at the end of the jaw and do not clean them when brushing, so vulnerable and usually sooner than other teeth are caries. Restoration and filling wisdom teeth are difficult; so, to extract the wisdom teeth [2,5,8].

Wisdom teeth surgery is one of the most common procedures performed in oral surgery. Nevertheless, this procedure requires accurate planning and surgical skills. With surgical procedures in general, complications can always arise. The reported frequencies of complications after removal third molar are reported between 2.7% and 29.9% [17].

Postpone the extraction of third molar into old age may cause the following complications [20]:

- Reduce recovery after tooth extractions;
- Dental caries on adjacent tooth;
- The possibility of welding jaw teeth;
- The roots were thicker, with increase age and may be more difficult tooth extractions.

Also, generally complications of removal wisdom teeth are: pain, swelling, trismus, malaise, hemorrhage, fractures of the mandible and the maxilla, damage to adjacent teeth, alveolar osteitis, periodontal damage, soft-tissue infection and temporary paresthesia (numbness of the lips, tongue and cheek) [21].

Although impacted third molar may remain symptom-free indefinitely, they may be responsible for significant pathology. Pain, pericoronitis, development of periodontal disease on the second molar, crown and/or root resorption of the second molar, caries in third or second molars and TMJ-symptoms are associated with retained third molars (**Figure 1**) [7].

There are numerous recent studies, which identify risk factors for intraoperative and/or postoperative complications [4,5,20]. Common intra- and postoperative complications and side effects associated with removal third molar are summarized in the **Table**.

For the general dental practitioner, as well as the dental surgeon, it is important to be familiar with all the possible complications. This improves patient education and leads to early recognition and management. In this study, complications are considered rare or unusual if the incidence is commonly quoted below 1%. The aim

of this systematic research is to remind us of the unusual complications associated with third molar surgery [2].

Prophylactic removal of third molars should be based on an estimate of the balance between the risks and advantages of retained wisdom teeth because there is no reliable research to suggest that the removal of disease-free, impacted third molars is beneficial to patients and because unnecessary surgery exposes patients to risks [21]. Surgical removal of third molars is often accompanied by complications such as: pain, swelling, bleeding, trismus and general oral dysfunction during the healing phase; less commonly, nerve damage, damage to adjacent teeth, fracture of the mandible and oro-antral communication can occur [1,6].

There are various indications for extraction, such as: prevention of pericoronaritis, this being the most frequent indication; prevention of caries in the third molar or in the distal region of the second molar; prevention of second molar root reabsorption; prevention of odontogenic cyst and tumor formation; and prevention of mandibular fractures [9].

Pain after the extraction third molar is a routine sequela due to trauma induced inflammation. Thus, third molar surgery is one of the most often used intervention to study acute analgesia, [19] but very few have evaluated factors that may predict the post surgery pain intensity [12,13].

**The aim of this prospective and exploratory study** was to evaluate the postoperative pain intensity in a diverse sample of individuals who had a single third molar removed and check whether some predictive variables could have influence over patients postoperative pain experience. Better understanding these specification of pain may guide the dentists through perioperative decisions or may launch an alert of developing complications which could help the professional to better and faster handle it.

**Materials and Methods.** Surgical extraction of a single third molar was performed on 100 continuous patients, between age range 18 to 45 years (37 males and 63 females). 45 third molars were removed from the maxilla (16 males and 29 females) and 55 from the mandible (21 males and 34 females).

The study was carried out under controlled conditions and performed in two similar surgical rooms. All the procedures were performed by undergraduate students with little of experience and under direct supervision of two oral surgeons. All extractions were made at same period of the day, between 10:00 to 16:00, and from 5th September of 2015 to 28th January of 2016.

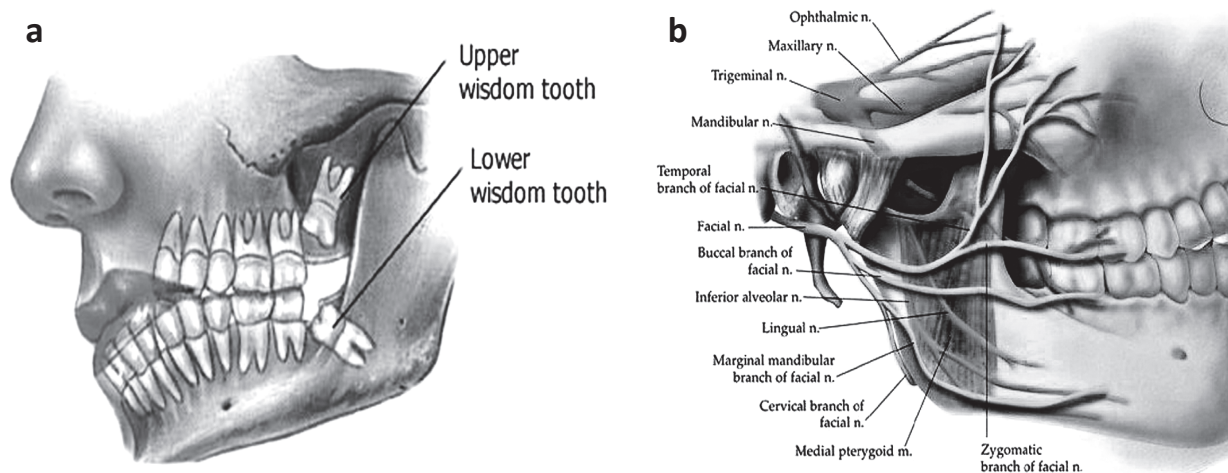


Figure 1. a) Upper and lower third molars. b) Nerves around the TMJ.

All procedures were performed under the meticulous hygiene conditions that included sterile surgical apron, mask, cap medical, gloves and sheets with dental hand pieces and surgical instruments sterilized in autoclave. Sterile saline solution was used for lavage of the alveolus socket and for bur refrigeration when ostectomy or odontomy was necessary.

Before surgery, patients had to rinse for 70 second with 15 ml of 0.02% Chlorhexidine solution.

Due to ethical reasons, selective non-steroidal anti-inflammatory drugs (NSAIDs) were prescribed to all patients (Tablet Meloxicam 15 mg, 3 times a day, for 2 days).

Tablet Diclofenac potassium 50 mg, 3 times a day, for 2 days were prescribed only to those patients whom the surgical trauma was considered extensive or to those whose pain was not controlled by the prescribed Meloxicam.

However, it was allowed to the patient to discontinue these drugs (Meloxicam or Diclofenac potassium) or even do not take it, if no symptoms were present but patients were advised to take the NSAIDs tablet as soon as their pain started.

Antibiotics Augmentin 625 (Amoxicillin 500 mg and Clavulanic acid 125 mg) were administrated in all patients 2 times a day during 5-7 days. The postoperative cares and recommendations were similar to all patients and were directed mainly to keep the blood clot in place, avoiding rigorous mouthwash, maintaining a sensible oral hygiene and keep at least 12 hours rest. The patients were evaluated clinically at the first, third and seventh day post-surgery or whenever necessary [16].

Data were collected by a dentist who was present in all procedures. Anamnestic data were collected by means of a questionnaire together with a panoramic radiograph and routine blood test. Data regarding the surgical procedure were collected instantly after the surgery.

Patients had to evaluate the pain intensity at the end of the first (day 1), second (day 2) and third (day 3) postoperative day by means of a visual analog scale (VAS) with the anchor points 0 (no pain) and 10 (ex-

treme pain). They had to grade the most severe pain felt during the day.

Differences in pain intensity at the three follow-up days were analyzed by means of the Spearman correlation test and Chi-square test ( $X^2$ ) as appropriate. For this, last evaluation pain level and age were dichotomized.

VAS 0-2 is pain free or light pain; VAS 3-10 is severe to moderate pain. The age was dichotomized at 24 years (median). The statistical analysis was performed by means of the *BioEstat* (version 5.0). Differences were considered as statistically significant with  $p \leq 0.05$ .

**Results.** The reported pain levels for the first postoperative day were significantly higher compared with second and third days (Figure 2). At first day, moderate and severe pain were observed predominantly in patients who had surgery in the mandible ( $p < 0.001$ ) and for patients younger than 24 years ( $p = 0.009$ ), while more patients who weekly consumed Meloxicam showed pain classified as none or light ( $p = 0.017$ ) (Table).

At second day, the profile of pain moderate/severe was more prevalent for patients who had surgery in the mandible ( $p < 0.001$ ) with the report of difficult surgery ( $p = 0.042$ ) and with odontotomy performed ( $p = 0.033$ ) (Table).

At third day, severe/ moderate pain was associated with surgery in the mandible ( $p < 0.001$ ) and with odontotomy ( $p = 0.021$ ) and ostectomy ( $p = 0.028$ ) performed, with report of long and difficult procedure ( $p = 0.023$ ), surgeries which last more than sixty minutes ( $p < 0.026$ ), and for those patients who developed postoperative complications ( $p < 0.001$ ) (Table).

The surgery time was weekly and positively correlated (Spearman correlation test) with the pain intensity for the first ( $r_s = 0.22$ ), second ( $r_s = 0.21$ ) and third ( $r_s = 0.27$ ) days.

The anatomical teeth position in the mandible or maxilla and its respective mean pain scores for first to third days can be seen in Figures 2 and 3.

**Discussion.** This study showed the potential suitability of Meloxicam and Diclofenac potassium for the

**Proportions and Pearson Chi-square test ( $p < 0.05$ , two sided) for some variables of interest and respective association with grading of pain dichotomized as none/light (VAS 0-2) and moderate/severe (VAS 3-10) for days 1 to 3, after third molar extraction (n: 100)**

Variables		Pain level (day 1)		c <sup>2</sup> (p-value)	Pain level (day 2)		c <sup>2</sup> (p-value)	Pain level (day 3)		c <sup>2</sup> (p-value)
		None/light (0-2)	Moderate/severe (3-10)		None/light (0-2)	Moderate/severe (3-10)		None/light (0-2)	Moderate/severe (3-10)	
Gender	Male	25	12	NS	33	4	NS	32	5	NS
	Female	38	25		46	17		48	15	
Age (median)	Up to 24	29	27	0.009	44	12	NS	47	9	NS
	More than 24	34	10		35	9		33	11	
Ostectomy	Yes	30	23	NS	38	15	NS	38	15	0.028
	No	33	14		41	6		42	5	
Odontotomy	Yes	15	10	NS	16	9	0.033	16	9	0.021
	No	48	27		63	12		64	11	
Report of difficult surgery	Yes	21	17	NS	26	12	0.042	26	12	0.023
	No	42	20		53	9		54	8	
Surgical accident (root fracture, etc.)	Yes	4	4	NS	6	2	NS	6	2	NS
	No	59	33		73	19		74	18	
Procedures time (median—in minute)	Up to 60	37	20	NS	47	10	NS	50	7	0.026
	More than 60	26	17		32	11		30	13	
Surgical site	Maxilla	36	9	0.001	43	2	< 0.001	43	2	< 0.001
	Mandible	27	28		36	19		37	18	
Post-operative infection or dry socket	Yes	4	1	NS	4	1	NS	0	5	< 0.001
	No	59	36		75	20		80	15	
Antibiotic prescription	Yes	23	9	NS	25	7	NS	22	10	NS
	No	40	28		54	14		58	10	

NS: Non-Significant

management of our patients who have undergone oral surgical procedures.

It was found to be superior in controlling post-operative pain and swelling with Diclofenac potassium in similar onset and prolonged duration of action when compared with Meloxicam.

In this study was to analyze how different individuals perceive the pain after a third molar extraction and to identify factors that may predict the post surgery pain intensity.

Besides the limitations of this exploratory study, we are able to raise some interesting questions and compare our results with the current literature. Interestingly, a regular Meloxicam consumption, especially when taken daily, reduced pain intensity during the first post-surgery day. This observation is likely explained by an anti-inflammatory and/or analgesic effect of Meloxicam [10,11].

The anti-inflammatory action was related with the decrease in inflammatory cytokine expression, cell influx and cellular metabolic activity and also with promotion of cell survival due to its prevention, interception and repair protection against peroxynitrite, which causes protein nitration, lipid peroxidation, DNA damage and cell death. Nitrosative stress is induced when-

ever the conditions are favorable for increased superoxide formation, like cellular damage due to trauma [7,8].

In **figure 4**, shows a large decrease in pain intensity after removal of a maxillary tooth from first day to third day, independently of the tooth position.

However, the postoperative pain course was more complex after the extraction of a mandibular tooth. Indeed, with a distoangular and a mesioangular tooth position pain increased from first day to second day and in the latter position also between second and third days (**Figure 3**).

This can be explained by the fact that this tooth position required a more complex surgery that therefore, caused a more severe trauma and subsequent increased inflammatory process. On comparing **figures 3 and 4**, it is visible that the highest mean pain scores for maxillary teeth were situated at the inferior baseline pain scores for mandibular teeth and, in fact, mandibular teeth were observed to be a more painful surgery for all three days recorded. The use of postoperative antibiotics for the removal of asymptomatic third molars is controversial [5,18,21].

We concluded to recommend routine oral antibiotic prophylaxis in third molar surgery. In the present study

observed that the use of antibiotics show a beneficial effect over pain's response, in accordance with the literature.

At second and third days, it becomes more apparent that higher pain levels are related with the increase of surgical trauma in mandibular surgery, with more difficult surgeries implying in ostectomy and odontotomy and for a low experienced student who conducted the surgery, that means increase in time spent for accomplish the procedure.

Regarding to the period of infection development, our study is in accordance with the results found by Alexander and Thronson (2000) [3] which, in a review manuscript, suggested that infection arise usually at the second or mainly at third day postoperative and are related with increase of pain complaint. Similarly, to what was found in the present study, Kim et al (2006) [14] showed that patients who had deeply impacted teeth which implies in more difficult procedure and larger operation time have significantly higher pain scores compared with short operation times. Baqain et al (2008) [6] observed that postoperative pain was associated with tooth angulations, bone removal, tooth sectioning, lingual flap retraction and operation time, which was basically very resembling to our consequence, except to lingual flap (not evaluated). Also, Sudarshan et al (2011) [11] showed that Meloxicam is an appropriate analgesic in postoperative complications (pain and swelling) than Diclofenac potassium with prolonged analgesia and low side effects, which was analogous to our consequence.

It may be virtually impossible to preview how someone will behave concerning pain after third molar surgery since, pain can have several modulators and that can range from sex, age, psychological status, previous pain experience, patient's daily medicines and habits, surgical site, health status, the surgery trauma itself and also the postoperative prescriptions [15].

**Conclusion.** This study showed the potential suitability for the management of our patients who have undergone oral surgical procedures. Third molar extraction performed in maxilla and mandible is unequal concerning pain response. Higher pain complains could be expected for patients who have difficult mandibular surgery and that means increase of trauma and procedure time spent.

In this study, prescribed Meloxicam for three days was preferably due to the low side effects in compare with Diclofenac potassium. According to our research, surgeon must be prescribing antibiotics (Amoxicillin/Clavulanic acid) for all patients with ostectomy or ostectomy and odontotomy procedure in open extraction lower third molar.

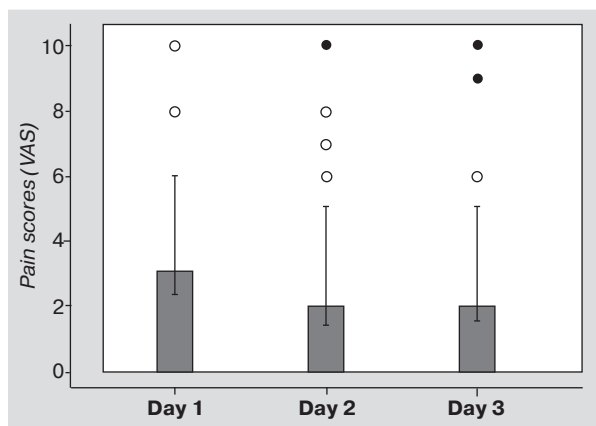


Figure 2. Mean pain scores for first to third days after third molar surgery (n=100).

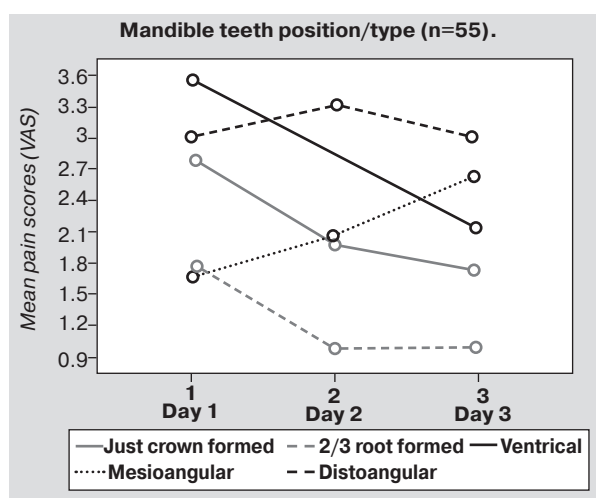


Figure 3. Mandible mean pain scores for first to third days according to teeth position (n=100).

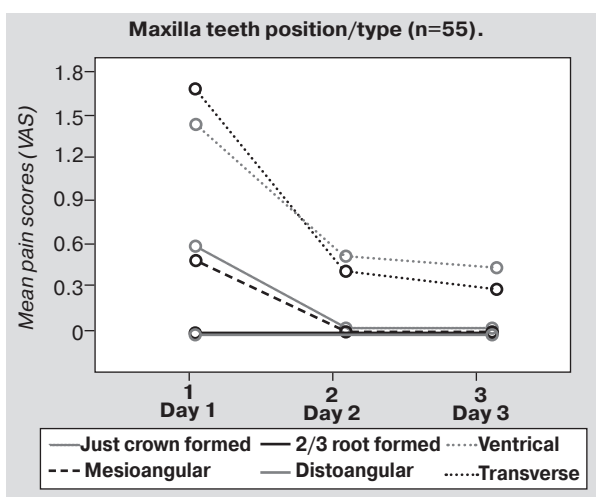


Figure 4. Maxilla mean pain scores for first to third days according to teeth position (n=100).

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### ВИДАЛЕННЯ ТРЕТЬОГО МОЛЯРА ТА ЙОГО ЗВ'ЯЗОК ЗІ СТУПЕНЕМ БОЛЮ

Масуд Кіані, Панькевич А. І.

**Резюме.** Треті моляри, або «зуби мудрості» починають формуватися у 9-10 років, формування коронки завершується приблизно у 14 років, а у останні роки підліткового віку починають переміщення у кістці і лише у віці від 16 до 25 років з'являються в роті. Через те, що ці зуби часто мають неправильну форму та розміри, вони можуть займати неправильне положення, недостатньо піддаються гігієнічним заходам, тому швидко уражаються карієсом та його ускладненнями. Їх консервативне лікування, як правило є безперспективним, тому одним з основних методів залишається видалення. Після хірургічних маніпуляцій нерідко виникають ускладнення.

Метою даного дослідження стало порівняння ефективності диклофенаку натрію та мелоксикаму на нівелювання післяопераційного болю, набряку після атипичного видалення нижнього і верхнього третього моляра.

Вибірка складалася з 100 пацієнтів. Це дослідження показало потенційну придатність мелоксикама і диклофенаку натрію для зниження больового синдрому наших пацієнтів, що перенесли хірургічну процедуру атипичного видалення зуба мудрості.

У цьому дослідженні, показано, що застосування Мелоксикаму дозволяє зменшити інтенсивність болю протягом післяопераційного періоду і не супроводжується побічними ефектами, тоді, як диклофенак натрію має більш виражений знеболюючий ефект. За даними нашого дослідження, хірург повинен застосовувати антибіотики (амоксцилін з клавулановою кислотою) у всіх пацієнтів з проведеною остеотомією після операції атипичного видалення зуба мудрості на нижній щелепі, що не є обов'язковим при видаленні зуба на верхній щелепі.

**Ключові слова:** третій корінний зуб, біль, диклофенак натрію, Мелоксикам, хірургічна стоматологія.

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### УДАЛЕНИЕ ТРЕТЬЕГО МОЛЯРА И ЕГО СВЯЗЬ СО СТЕПЕНЬЮ БОЛИ

Масуд Киани, Панькевич А. И.

**Резюме.** Третьи моляры, или «зубы мудрости» начинают формироваться в 9-10 лет, формирование коронки завершается примерно в 14 лет, а в последние годы подросткового возраста начинают перемещение

в кости и только в возрасте от 16 до 25 лет появляются во рту. Так как эти зубы часто имеют неправильную форму и размеры, они могут занимать неправильное положение, недостаточно поддаются гигиеническим мероприятиям, поэтому быстро поражаются кариесом и его осложнениями. Их консервативное лечение, как правило, является бесперспективным, поэтому одним из основных методов остается удаление. После хирургических манипуляций нередко возникают осложнения.

Целью данного исследования стало сравнение эффективности диклофенака натрия и мелоксикама на нивелирование послеоперационной боли, отека после атипичного удаления нижнего и верхнего третьего моляра.

Выборка состояла из 100 пациентов. Это исследование показало потенциальную пригодность мелоксикама и диклофенака натрия для снижения болевого синдрома наших пациентов, перенесших хирургическую процедуру атипичного удаления зуба мудрости.

В этом исследовании, показано, что применение мелоксикама позволяет уменьшить интенсивность боли в течение послеоперационного периода и не сопровождается побочными эффектами, тогда, как диклофенак натрия имеет более выраженный обезболивающий эффект. По данным нашего исследования, хирург должен применять антибиотики (амоксциллин с клавулановой кислотой) у всех пациентов с проведенной остеотомией после операции атипичного удаления зуба мудрости на нижней челюсти, что не является обязательным при удалении зуба на верхней челюсти.

**Ключевые слова:** третий коренной зуб, боль, диклофенак натрия, Мелоксикам, хирургическая стоматология.

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### EXTRACTION OF THIRD MOLAR AND IT'S RELATIONSHIP WITH GRADING OF PAIN

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**Abstract.** Four types of teeth, being the eruption after another teeth are called wisdom teeth or third molars, start at the approximate age is 9 till 10 years old in the jawbone and crown completed in 14 years old and in the last years of adolescence begin to eruption inside the bone and after the age of 16 till 25 years old appear in the mouth. Due to lack of a natural form of wisdom teeth like many other teeth and perch at the end of the jaw and do not clean them when brushing, so vulnerable and usually sooner than other teeth are caries. Restoration and filling wisdom teeth are difficult; so, to extract the wisdom teeth.

The aim of this study was to compare the effects of Diclofenac potassium and Meloxicam on postoperative pain, swelling, etc. after surgical extraction of lower and upper third molars.

Third molar surgery is one of the most common procedures performed in oral surgery. Nevertheless, this procedure requires accurate planning and surgical skills. With surgical procedures in general, complications can always arise. Extraction of teeth is a common dental procedure. After tooth extraction the patient may experience pain, and there is a varying degree of severity between patients.

Postpone the extraction of third molar into old age may cause the following complications:

- Reduce recovery after tooth extractions;
- Dental caries on adjacent tooth;
- The possibility of welding jaw teeth;
- The roots were thicker, with increase age and may be more difficult tooth extractions.

Also, generally complications of removal wisdom teeth are : pain, swelling, trismus, malaise, hemorrhage, fractures of the mandible and the maxilla, damage to adjacent teeth, alveolar osteitis, periodontal damage, soft-tissue infection and temporary paresthesia (numbness of the lips, tongue and cheek).

Postoperative pain is related significantly to the amount of surgical trauma. Surgical removal of bony impactions and osseous periodontal surgery are more traumatic and produce more intense pain when compared with simple uncomplicated tooth extraction.

Most of the literature focuses on postoperative pain after surgical removal of impacted third molars or on the effectiveness of different pharmaceutical options in combating postsurgical pain.

A thorough understanding of the complications associated with this procedure will enable the practitioner to identify and counsel high-risk patients, appropriately manage more common complications and be cognizant of less common sequelae and the most effective methods of management.

Surgical extraction of third molars is often accompanied by complications. So, careful surgical technique and scrupulous perioperative care can minimize the frequency of complications and limit their severity. Third molar extraction performed in maxilla and mandible is unequal concerning pain response. Higher pain complains could be expected for patients who have difficult mandibular surgery and that means increase of trauma and procedure time spent.

The sample consisted of 100 consecutive patients. This study showed the potential suitability of Meloxicam and Diclofenac potassium for the management of our patients who have undergone oral surgical procedures.

In this study, prescribed Meloxicam for three days was preferably due to the low side effects in compare with Diclofenac potassium. According to our research, surgeon must be prescribing antibiotics (Amoxicillin/Clavulanic acid) for all patients with osteotomy or osteotomy and odontotomy procedure in open extraction lower third molar.

**Keywords:** third molar tooth, pain, Diclofenac potassium, Meloxicam, surgical dentistry.

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