TÜBİTAK

Turkish Journal of Medical Sciences

http://journals.tubitak.gov.tr/medical/

Research Article

Turk J Med Sci
(2018) 48: 271-278
© TÜBİTAK
doi:10.3906/sag-1702-100

Comparison of the effects of diclofenac potassium and tenoxicam on postoperative pain, swelling, and trismus following third molar surgery

Ahmet Taylan ÇEBİ[1,*], Metin Berk KASAPOĞLU[2], Selin EREN[3], Çetin KASAPOĞLU[2]

[1]Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Karabük University, Karabük, Turkey
[2]Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, İstanbul Unıversity, İstanbul, Turkey
[3]Private Practice, İstanbul, Turkey

Received: 17.02.2017 • **Accepted/Published Online:** 31.12.2017 • **Final Version:** 30.04.2018

Background/aim: This study aimed to compare two nonsteroidal antiinflammatory agents in relation to pain, swelling, and trismus following impacted third molar surgery.

Materials and methods: The study was a randomized and a double-blinded study and included 50 healthy individuals. After the operation, patients were randomly assigned to 2 groups in which diclofenac potassium and tenoxicam were used. Impacted third molars were surgically extracted with local anesthesia. Pain was assessed postoperatively by visual analog scale at the 2nd, 6th, 8th, 12th, 24th, and 48th hours and on the 3rd, 5th, and 7th days. Swelling was evaluated using the method of Üstün et al. and trismus was measured with calipers on the postoperative 3rd and 7th days.

Results: There was statistically significant difference between the groups in VAS levels at the 2nd and 6th hours; however, VAS levels of the tenoxicam group were significantly lower as compared to diclofenac potassium at the 8th, 12th, 24th, and 48th hours and on the 3rd, 5th, and 7th days ($P < 0.05$, $P < 0.01$). No difference was noted regarding trismus and swelling between the groups.

Conclusion: Diclofenac potassium and tenoxicam are similarly effective for reduction of swelling and trismus following the extraction of mandibular third molars; however, tenoxicam surpasses diclofenac potassium for controlling pain.

Key words: Pain, diclofenac, tenoxicam, swelling, trismus

1. Introductıon

The surgical extraction of impacted third molars is a standout among the most frequently performed procedures in oral surgery. After a short time, some complications such as postoperative pain, swelling, and trismus may occur (1). It has been reported that the quality of life of patients with complications such as pain, trismus, and swelling is affected more negatively than asymptomatic patients (2–4). Numerous clinicians have subsequently accentuated the need for better pain, swelling, and trismus control in patients who experience third molar surgery (5,6).

Nonsteroidal antiinflammatory drugs (NSAIDs) are used for avoiding short-term complications such as postoperative pain, swelling, and trismus. NSAIDs indicate their therapeutic impact by inhibition of cyclooxygenase (COX), which inhibits prostaglandin creation, whose synergistic collaborations with different mediators add to local inflammatory reactions (7–9).

Tenoxicam is typical of NSAIDs. Tenoxicam has a place with the class of NSAIDs known as oxicams. It is used to reduce inflammation, swelling, and pain related to rheumatoid joint inflammation, osteoarthritis, ankylosing spondylitis, tendinitis, bursitis, and periarthritis of the shoulders or hips. Like all NSAIDs, the system of activity of tenoxicam is obscure. Included in the system of activity is a hindrance to cyclooxygenase (COX-1 and COX-2), which prompts the potential adverse effect of increased bleeding. Oral absorption of tenoxicam is rapid and complete. After oral administration, the peak plasma concentration is reached within 2 h. The recommended dosage regimen is 20 mg once a day for oral surgical procedures (10,11).

Diclofenac is an NSAID taken to decrease inflammation and relieve pain in specific conditions. Diclofenac has two forms, which are sodium- and potassium-salted. The essential system in charge of its antiinflammatory, antipyretic, and analgesic activity is thought to be the

* Correspondence: ahmettaylancebi@karabuk.edu.tr

restraint of prostaglandin synthesis by inhibition of COX. Inhibition of COX additionally diminishes prostaglandins in the epithelium of the stomach, making it more sensitive to consumption by gastric acid. This is likewise the principle symptom of diclofenac. Diclofenac potassium is utilized to treat pain, inflammatory disorders, and dysmenorrhea. Inflammatory disorders may incorporate musculoskeletal grievances, particularly arthritis, rheumatoid arthritis, polymyositis, dermatomyositis, osteoarthritis, dental pain, temporomandibular joint pain, spondyloarthritis, ankylosing spondylitis, gout assaults, and pain in instances of kidney stones and gallstones. It is used orally and parenterally in doses of 25–50 mg and 75 mg (12–16).

The target of this study is to elaborate the preemptive organization of tenoxicam and diclofenac potassium on postoperative administration of pain, swelling, and trismus after removal of impacted mandibular third molars.

2. Materials and methods

The study was conducted in accordance with the guidelines of the Helsinki Declaration for human subjects. The İstanbul University Ethics Committee approved the design of the study. This double-blind and randomized clinical study was performed with 50 patients. Patients between the ages of 18 and 40 years who presented for surgical extraction of mandibular third molars to the İstanbul University Faculty of Dentistry's Oral and Maxillofacial Surgery Clinics were included in the study. The number of patients to be included in the study was determined as the result of power analysis. This study lasted for 1 year. Exclusion criteria from the study were heart disease; hepatic or renal disease; blood dyscrasias; gastric ulcer; known hypersensitivities, sensitivities, or reactions to any of the medicines; pregnancy and lactation; infection of the surgical area; and smoking or alcohol addiction. Patients who had taken any nonsteroidal antiinflammatory or antibiotic drugs within the last 3 weeks before surgery were also excluded from the study.

The study protocol was disclosed to all the patients in detail and written informed consent was obtained from each patient. Patients were separated into two groups randomly in a double-blinded manner as Group A (diclofenac group) and Group B (tenoxicam group). In brief, a total of 50 patients were randomly allocated to 2 groups according to 25 third molar teeth. Patients in Group A were given diclofenac potassium (Dolorex, 50 mg, Abdi İbrahim, Turkey), while Group B was administered tenoxicam (Tilcotil, 20 mg Deva Drug, Turkey). Antibiotics (625 mg amoxicillin, Augmentin, Glaxo Smith Kline Drug, Turkey) and 0.2% chlorhexidine gluconate (Klorhex Mouthwash, 200 mL, Drogsan Drug Industries, Turkey) were also given to all patients after the surgery. Patients in the groups were noted according to the Pell-Gregory and Winter classification. Vertical or mesial angulation and bone retention or semi-bone retention were taken into consideration.

2.1. Surgical procedure

Surgery of the impacted third molars was completed under local anesthesia (2% articaine hydrochloride with 1:100,000 adrenaline) with buccal guttering technique after sufficient height and impression of the buccal mucoperiosteal flap. Dental extraction was performed under irrigation of physiologic saline (0.9%). The three-sided mucoperiosteal flap was repositioned and sutured. A solitary experienced surgeon performed every surgical step. Patients whose operation times exceeded 25 min were not included the study.

2.2. Measurement of pain intensity

Postoperative pain was detected utilizing a visual analog scale (VAS). Pain intensity was recorded as 'no pain' (no distress, VAS: 0), 'mellow pain' (practically unnoticeable pain, VAS: 10–20), 'moderate pain' (noticeable pain, yet the patient can take part in routine everyday activities, VAS: 30–40), 'heavy pain' (extremely noticeable pain, yet the patient can take part in routine everyday activities, VAS: 50–60), 'severe pain' (significant pain, but the patient can perform everyday activities, VAS: 70–80), and 'intolerable pain' (persistent, the patient cannot perform everyday activities and needs to take pain-relieving medicine, VAS: 90–100). For every patient, the subjective VAS score was recorded by a questionnaire at the 2nd, 6th, 8th, 12th, 24th, and 48th hours and on the 3rd, 5th, and 7th days postoperatively. Before leaving the clinic, the surgeon guaranteed that all the patients were taught the most proficient method to complete the pain self-appraisal journal and when to take medications.

2.3. Measurement of maximum mouth opening ability (trismus)

Mouth opening capacity was measured in millimeters with calipers preoperatively and on the postoperative 3rd and 7th days. The incisal edge of the maxillary focal teeth and incisal edge of mandibular focal teeth were utilized as reference focuses for the most accessible maximum mouth opening (Figure 1).

2.4. Measurement of swelling

Soft tissue measurements were made in order to evaluate swelling preoperatively and on the postoperative 3rd and 7th days using the method of Üstün et al. (17). Points on the face were used for measurement of swelling: eye cantus – angulus mandibula, tragus – corner of mouth, and tragus – pogonion. The distances between these points were marked, measured, and recorded (Figure 2).

2.5. Statistical analysis

For the statistical analyses, IBM SPSS Statistics 22 (IBM SPSS, Turkey) was used while the findings obtained

Figure 1. Mouth opening ability was measured with calipers.

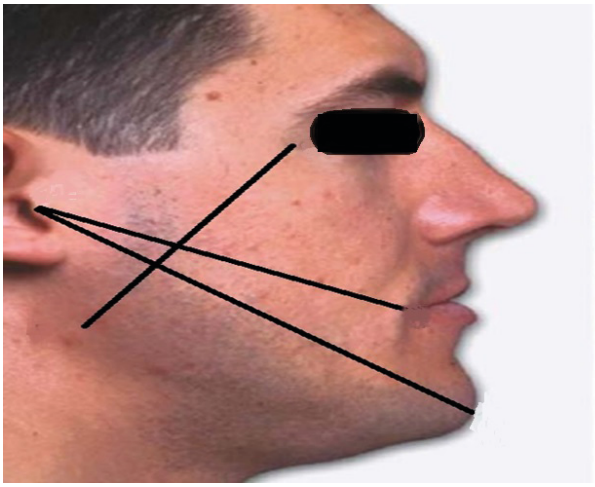

Figure 2. Swelling measuring points on the face.

in the study were evaluated. The Shapiro–Wilks test, descriptive statistical methods, Student t-test, Mann–Whitney U test, variance analysis, Bonferroni test, Friedman test, and Wilcoxon signed-rank test were used. In comparison of the qualitative data, continuity (Yates) correction was used. Significance was assessed at $P < 0.05$.

3. Results

A total of 50 patients (13 males and 37 females; ages ranging from 18 to 40 years; mean age: 23.20 ± 4.26 years) who had impacted molars that were in vertical or mesioangular positions were included in this study. The study was carried out in a prospective, randomized, and double-blinded manner.

There was no statistically significant difference between the mean age and sex distributions of the groups (Table 1).

3.1. Postoperative swelling assessment

1) There was no significant statistical difference between the groups preoperatively or on the postoperative 3rd and 7th days ($P > 0.05$) (Tables 2–4).

2) On the 3rd and 7th postoperative days, the facial swelling in both groups was significantly increased when compared with the values before surgery (Tables 2–4).

3.2. Postoperative trismus assessment

1) There was no statistically significant difference between the drug groups preoperatively and on the postoperative 3rd and 7th days ($P > 0.05$) (Table 5).

2) On the 3rd and 7th postoperative days, the trismus values were significantly increased when compared with the values before surgery in each group (Table 5).

3) The group using tenoxicam had lower trismus values than the diclofenac group (Table 5).

3.3. Postoperative pain assessment

1) Tenoxicam was more effective on pain than diclofenac potassium (Table 6).

2) There were no statistically significant differences between the groups in terms of VAS levels at the 2nd and 6th hours ($P > 0.05$) (Table 6).

3) The diclofenac potassium group had higher VAS levels than the tenoxicam group in the 8th, 12th, 24th, and 48th hours and on the 3rd, 5th, and 7th days ($P < 0.05$; $P < 0.01$).

Table 1. Baseline characteristics of the two compared drug groups.

	Diclofenac potassium	Tenoxicam	P
Age, mean ± SD	23.80 ± 3.95	22.60 ± 4.56	[1]0.325
Sex, n (%)			
Female	20 (80%)	17 (68%)	[2]0.519
Male	5 (20%)	8 (32%)	

[1] Student t-test, [2] continuity (Yates) correction.

Table 2. Postoperative swelling measurements in millimeters (eye cantus – angulus mandibula) preoperatively, on the 3rd day, and on the 7th day following molar surgery.

Eye cantus/angulus mandibula	Diclofenac potassium	Tenoxicam	[1]P
	Mean ± SD	Mean ± SD	
Preop.	100.84 ± 5.54	100.04 ± 6.88	0.653
3rd day	106.36 ± 7.69	104.72 ± 7.06	0.436
7th day	101.32 ± 5.44	101.2 ± 8.42	0.953
[2]P	0.001**	0.001**	
Preop – 3rd day [3]P	0.001**	0.001**	
Preop – 7th day [3]P	0.046*	0.658	
3rd day – 7th day [3]P	0.001**	0.024*	

[1] Student t-test, [2] analysis of variance, [3] Bonferroni test, * P < 0.05, ** P < 0.01.

Table 3. Postoperative swelling measurements in millimeters (tragus – pogonion) preoperatively, on the 3rd day, and on the 7th day following molar surgery.

Tragus/pogonion	Diclofenac potassium	Tenoxicam	[1]P
	Mean ± SD	Mean ± SD	
Preop	148.52 ± 10.97	147.4 ± 9.74	0.704
3rd day	155.08 ± 12.44	152.8 ± 9.61	0.472
7th day	149.68 ± 10.93	147.64 ± 9.55	0.486
[2]P	0.001**	0.001**	
Preop – 3rd day [3]P	0.001**	0.001**	
Preop – 7th day [3]P	0.001**	0.092	
3rd day – 7th day [3]P	0.001**	0.001**	

[1] Student t-test, [2] analysis of variance, [3] Bonferroni text, * P < 0.05, ** P < 0.01.

Table 4. Postoperative swelling measurements in millimeters (tragus – corner of mouth) preoperatively, on the 3rd day, and on the 7th day following molar surgery.

Tragus/corner of mouth	Diclofenac potassium	Tenoxicam	[1]P
	Mean ± SD	Mean ± SD	
Preop	112.08 ± 7.87	110.88 ± 6.06	0.549
3rd day	117.88 ± 8.67	115.44 ± 6.05	0.254
7th day	113.28 ± 7.93	111.36 ± 6.0	0.339
[2]P	0.001**	0.001**	
Preop – 3rd day [3]P	0.001**	0.001**	
Preop – 7th day [3]P	0.009**	0.331	
3rd day – 7th day [3]P	0.001**	0.001**	

[1] Student t-test, [2] analysis of variance, [3] Bonferroni text, * P < 0.05, ** P < 0.01.

Table 5. Postoperative trismus measurements in millimeters preoperatively, on the 3rd day, and on the 7th day following molar surgery.

Trismus	Diclofenac potassium	Tenoxicam	[1]P
	Mean ± SD	Mean ± SD	
Preop	41.56 ± 4.48	43.0 ± 6.51	0.368
3rd day	30.12 ± 6.88	32.36 ± 7.22	0.267
7th day	38.08 ± 5.9	40.28 ± 7.08	0.239
[2]P	0.001**	0.001**	
Preop – 3rd day [3]P	0.001**	0.001**	
Preop – 7th day [3]P	0.002**	0.015*	
3rd day –7th day [3]P	0.001**	0.001**	

[1] Student t-test, [2] analysis of variance, [3] Bonferroni text, * P < 0.05, ** P < 0.01.

Table 6. Postoperative pain intensity values measured by VAS after surgery.

VAS (mm)	Diclofenac potassium	Tenoxicam	[1]P
	Mean ± SD	Mean ± SD	
2nd hour	46.8 ± 30.24 (40)	49.6 ± 32.47 (60)	0.853
6th hour	60.4 ± 28.21 (70)	48.4 ± 27.94 (50)	0.108
8th hour	45.6 ± 24.17 (50)	32.8 ± 22.08 (30)	0.045*
12th hour	38.8 ± 23.33 (50)	22.8 ± 18.15 (20)	0.012*
24th hour	29.6 ± 20.91 (40)	16 ± 14.14 (10)	0.023*
48th hour	30 ± 22.91 (30)	13.2 ± 17.01 (10)	0.003**
3rd day	20.4 ±18.59 (20)	10.8 ± 15.79 (0)	0.040*
5th day	11.6 ±15.46 (10)	2.4 ± 7.23 (0)	0.003**
7th day	10.0 ±13.84 (10)	0.4 ± 2 (0)	0.001**
[2]P	0.001**	0.001**	

[1] Mann–Whitney U test, [2] Friedman test, * P < 0.05, ** P < 0.01.

4) There were statistically significant differences within the diclofenac potassium group in terms of VAS levels at the 2nd, 6th, 8th, 12th, 24th, and 48th hours and on the 3rd, 5th, and 7th days (P: 0.001; P < 0.01) (Table 7).

5) There were statistically significant differences within the tenoxicam group in terms of VAS levels at the 2nd, 6th, 8th, 12th, 24th, and 48th hours and on 3rd, 5th, and 7th days (P: 0.001; P < 0.01) (Table 7).

4. Discussion

In the present study, the efficacies of diclofenac potassium and tenoxicam on pain, swelling, and trismus following third molar surgery were investigated. This surgical procedure is an accepted, sensitive, and highly predictable model for determining the effects of different drugs and is especially suitable for the assessment of NSAIDs (17–19). The analgesic and antiinflammatory efficacy of many of the current NSAIDs has been documented using this surgery model (19).

Although there are many reports in the literature about the use of drugs in the prevention of postoperative pain, edema, and trismus after impacted third molar extraction, to the best of our knowledge, this is the first study comparing the effects of 2 very commonly used drugs, diclofenac potassium and tenoxicam, for this purpose. Moreover, even though this procedure is a very common oral surgical procedure, there is still no consensus about the optimal type, time, method of administration, and

Table 7. Evaluation of intragroup VAS measurements. * P < 0.05, ** P < 0.01.

	Diclofenac potassium	P		Diclofenac potassium	Tenoxicam
	P			P	P
2nd hour - 6th hour	0.055	0.984	12th hour - 24th hour	0.008**	0.014*
2nd hour - 8th hour	0.632	0.017*	12th hour - 48th hour	0.029*	0.020*
2nd hour - 12th hour	0.048*	0.001**	12th hour - 3rd day	0.001**	0.008**
2nd hour - 24th hour	0.006**	0.001**	12th hour - 5th day	0.001**	0.001**
2nd hour - 48th hour	0.021*	0.001**	12th hour - 7th day	0.001**	0.001**
2nd hour - 3rd day	0.001**	0.001**	24th hour - 48th hour	0.681	0.175
2nd hour - 5th day	0.001**	0.001**	24th hour - 3rd day	0.012*	0.058
2nd hour - 7th day	0.001**	0.001**	24th hour - 5th day	0.001**	0.001**
6th hour - 8th hour	0.002**	0.001**	24th hour - 7th day	0.001**	0.001**
6th hour - 12th hour	0.001**	0.001**	48th hour - 3rd day	0.003**	0.059
6th hour - 24th hour	0.001**	0.001**	48th hour - 5th day	0.001**	0.009**
6th hour - 48th hour	0.001**	0.001**	48th hour - 7th day	0.001**	0.001**
6th hour - 3rd day	0.001**	0.001**	3rd day - 5th day	0.005**	0.004**
6th hour - 5th day	0.001**	0.001**	3rd day - 7th day	0.003**	0.003**
6th hour - 7th day	0.001**	0.001**	5th day - 7th day	0.279	0.180
8th hour - 12th hour	0.085	0.002**			
8th hour - 24th hour	0.003**	0.001**			
8th hour - 48th hour	0.016*	0.001**			
8th hour - 3rd day	0.001**	0.001**			
8th hour - 5th day	0.001**	0.001**			
8th hour - 7th day	0.001**	0.001**			

dose of drugs to use in the prevention of complications. In this respect, the results of this study are important (20).

There are various methods used in the evaluation of swelling after oral surgeries, including administering a VAS, measuring with silk sutures on the face, or by the aid of plethysmography (20). Many studies have reported that postoperative swelling may be precisely evaluated by the methods of Üstün et al. (17). Diclofenac potassium and tenoxicam were both effective in controlling the swelling in the present study. This effect may be explained by the long duration of action and high antiinflammatory potencies of both drugs. Both drugs may be preferred for the purpose of reducing edema after impacted third molar extraction.

Limited mouth opening is another unwanted effect commonly reported after impacted third molar surgery. In investigations, interincisal distance measurements before and after the operation are commonly used for the evaluation of trismus, as in our study (21,22). In this study, tenoxicam administration was observed to cause less trismus than diclofenac potassium administration. Trismus impedes eating and talking and reduces the quality of daily life of patients; in this sense, decreased trismus means decreased discomfort as well as increased life-quality for the patients. Therefore, tenoxicam may be preferred to diclofenac potassium for patients.

Pain observation is a considerably subjective and variable experience managed by numerous physical and mental components. Along these lines, the estimation of pain is difficult. In our study, a VAS was used for measuring postoperative pain, since this scale is a legitimate and dependable technique, effortlessly comprehended by patients and reproducible and broadly utilized in the literature (23). In pain control, tenoxicam was more effective than diclofenac potassium in this study.

Seymour et al. emphasized that women were more experienced in bearing pain than men and perceived pain at higher levels, which is why results for women may vary in the assessment of pain severity compared to men (24). In our study, there was no distinction between each gender.

Hyrkas et al. compared 50 mg of diclofenac with a combination of 50 mg of diclofenac and 40 mg of methylprednisolone and reported that the pain scores

were diminished in the combined group but there was no significant difference between the groups in terms of trismus (22). In our study, tenoxicam was more effective than diclofenac potassium in pain control and there was significant difference between the groups in term of pain, but there was no significant difference between the groups in terms of trismus.

The doses of drugs examined in this study were based on reports of previous studies that used the maximum effective dosages without any adverse effects. Kumara and Zacharias gave 40 mg of tenoxicam to impacted third molar teeth surgery patients (the first group) orally one night before the operation and intravenously to the second group during the operation; they reported that the methods were equally effective in healthy young patients. There was no significant difference between using 20 mg or 40 mg of intravenous tenoxicam in terms of pain relief after oral surgery (25). In light of these data, we used 20 mg of tenoxicam in our study.

Postoperative complications have been found to be related to extended operation time in some studies. In our study, there was no significant difference between the operation times of the groups so there was a similar effect between the groups for pain (26).

Roelofse et al. compared tenoxicam with diclofenac sodium and reported that tenoxicam showed better analgesic efficacy than diclofenac sodium in third molar surgery (12). In our study, tenoxicam was more effective than diclofenac potassium in pain control and there was a significant difference between the groups in terms of pain.

Orozso-Solis et al. reported that meloxicam was better for postoperative pain management and trismus than diclofenac sodium in their study (27). In the present study, tenoxicam was better in postoperative pain management than diclofenac potassium, but tenoxicam and diclofenac potassium had similar effects on trismus.

It was reported that diclofenac sodium was better than tramadol and ketorolac in controlling postoperative pain, but less effective than piroxicam, nimesulide, and tenoxicam (12,28). In our study, tenoxicam showed better analgesic efficacy than diclofenac potassium.

In a single-blind randomized study, the analgesic efficacy and tolerability of a single dose of 100 mg of diclofenac potassium, 100 mg of diclofenac sodium soft gel, or a placebo for postoperative pain after third molar extraction were analyzed and it was presumed that the soft gel provided better pain alleviation. This could be due to the fact that the soft gel gets quickly absorbed and may emphatically influence the time of onset and duration of inflammation (13).

In conclusion, the results of this study indicate that although diclofenac potassium and tenoxicam are both effective in diminishing complications of impacted third molar extraction, postoperative administration of tenoxicam achieves better control of pain than diclofenac potassium without any differences in swelling or trismus. In light of these data, we conclude that tenoxicam may be a better alternative than diclofenac potassium in the prevention of complications associated with impacted third molar extraction.

Acknowledgment
We would like to thank Varyans Statistical Consultancy for statistical support.

References

1. Blondeau F, Daniel NG. Extraction of impacted mandibular third molars: postoperative complications and their risk factors. J Can Dent Assoc 2007; 73: 325.
2. Ruta DA, Bissias E, Ogston, Ogden GR. Assessing health outcomes after extraction of third molars: postoperative symptom severity (PoSSe) scale. Br J Oral Maxillofac Surg 2000; 38: 480-487.
3. McGrath C, Comfort MB, Lo ECM, Luo Y. Changes in life quality following third molar surgery--the immediate postoperative period. Br Dent J 2003; 194: 265-268.
4. Slade GD, Foy SP, Shugars DA, Phillips C, White RP Jr. The impact of third molar symptoms, pain and swelling on oral health-related quality of life. J Oral Maxillofac Surg 2004; 62: 1118-1124.
5. Odgen GR. Third molar surgery and postoperative pain relief. Br Dent J 2003; 194: 261.
6. Tiwana PS, Foy SP, Shugars DA, Marciani RD, Conrad SM, Phillips C, White RP. The impact of intravenous corticosteroid with third molar surgery in patients at high risk for delayed health-related quality of life and clinical recovery. J Oral Maxillofac Surg 2005; 63: 55-62.
7. Morrison BW, Fricke J, Brown J, Yuan W, Kotey P, Mehlisch D. The optimal analgesic dose of rofecoxib: overview of six randomized controlled trials. J Am Dent Assoc 2000; 131: 1729-1737.
8. Lee Y, Rodriguez C, Dionne RA. The role of COX-2 in acute pain and the use of selective COX-2 inhibitors for acute pain relief. Curr Pharm Des 2005; 11: 1737-1755.
9. Barden J, Edwards JE, McQuay HJ, Wiffen PJ, Moore RA. Relative efficacy of oral analgesics after third molar extraction. Br Dent J 2004; 197: 407-411.
10. Nilsen OG. Clinical pharmocokineties of tenoksikam. Clin Pharmacokinet 1994; 26: 16-43.

11. Merry AF, Webster CS, Holland RL, Middleton NG, Schug SA, James M, McGrath KA. Clinical tolarility of perioperative tenoxicam in 1001 patients--a prospective, controlled, double-blind, multicentre study. Pain 2004; 313-322.

12. Roelofse JA, Van Der Bıjl P, Joubert JJ. Analgesic and anti-inflammatory efficacy of tenoxicam and diclofenac sodium after third molar surgery. Anesth Prog 1996; 43: 103-107.

13. Zuniga JR, Phillips CL, Shugars D, Lyon JA, Peroutka SJ, Swarbrick J, Bon C. Analgesic safety and efficacy of diclofenac sodium softgels on postoperative third molar extraction pain. J Oral Maxillofac Surg 2004; 62: 806-815.

14. Özbayrak T, Katiboğlu AB, Öner B, Yalçın S, Tanyeri H. Diklofenak potasyum ve tiaprofenik asit'in gömük alt akıl dişlerinin ameliyatlarından sonra postoperatif ağrı üzerindeki etkilerinin karşılaştırılması. İstanbul Üniversitesi Diş Hekimliği Fakültesi Dergisi 1994; 17: 254-258 (in Turkish).

15. Markovic AB, Todorovic L. Postoperative analgesia after lower third molar surgery: contribution of the use of long-acting local anesthetics, low-power laser, and diclofenac. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2006; 102: 4-8.

16. Dastidar SG, Ganguly K, Chaudhuri K, Chakrabarty AN. The anti-bacterial action of diclofenac shown by inhibition of DNA synthesis. Int J Antimicrob Agents 2000; 14: 249-251.

17. Üstün Y, Erdoğan Ö, Esen E, Karsli ED. Comparison of the effects of 2 doses of methylprednisolone on pain, swelling, and trismus after third molar surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2003; 96: 535-539.

18. Chiu WK, Cheung LK. Efficacy of preoperative oral rofecoxib in pain control for third molar surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2005; 99: 47.

19. Pektas ZO, Sener M, Bayram B. A comparison of preemptive analgesic efficacy of diflunisal and lornoxicam for postoperative pain management: a prospective, randomized, single-blind, crossover study. Int J Oral Maxillofac Surg 2007; 36: 123.

20. Gallardo F, Carstens M, Ayarza M. Analgesic and antiinflammatory effects of glucamethacin (a nonsteroidal antiinflammatory analgesic) after the removal of impacted third molars. Oral Surg Oral Med Oral Pathol 1990; 69: 157-160.

21. Sisk A, Bonnington G. Evaluation of methylprednisolone and flurbiprofen for inhibition of the postoperative inflammatory response. Oral Surg Oral Med Oral Pathol 1985; 60: 137-145.

22. Hyrkas T, Yhpaavalniemi P, Oikarmen VJ, Paakkan I. A comparison of diclofenac with and without single-dose intravenous steroid to prevent postoperative pain after third molar removal. J Oral Maxillofac Surg 1993; 51: 634-636.

23. Ryan J, Jureidini B, Hodges JS, Baisden M, Swift JQ, Bowles WR. Gender differences in analgesia for endodontic pain. J Endod 2008; 34: 552-556.

24. Seymour RA, Hawkesford JE, Weldon M, Brewster D. An evaluation of different ibuprofen preparations in postoperative pain after third molar surgery. Br J Clin Pharmacol 1991; 31: 83-87.

25. Kumara R, Zacharias M. Comparison of oral and intravenous of giving tenoxicam. N Z Dent J 1998; 94: 50-53.

26. Alcântara CE, Falci SG, Oliveira-Ferreira F, Santos CR, Pinheiro ML. Pre-emptive effect of dexamethasone and methylprednisolone on pain, swelling, and trismus after third molar surgery: a split-mouth randomized triple-blind clinical trial. Int J Oral Maxillofac Surg 2014; 43: 93-98.

27. Orozco-Solís M, García-Ávalos Y, Pichardo-Ramírez C, Tobías-Azúa F, Zapata-Morales JR, Aragon-Martínez OH, Isiordia-Espinoza MA. Single dose of diclofenac or meloxicam for control of pain, facial swelling, and trismus in oral surgery. Med Oral Patol Oral Cir Bucal 2016; 21: 127-134.

28. Pandit MK, Godhi S, Lall AB. Preoperative intravenous tramadol versus diclofenac for preventing postoperative pain after third molar surgery: a comparative study. J Maxillofac Oral Surg 2011; 10: 306-309.