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EFFICACIES OF NON-PHARMACOLOGICAL PAIN CONTROL METHODS AFTER IMPACTED THIRD MOLAR SURGERY

FARMAKOLOJİK OLMAYAN AĞRI KONTROL METODLARININ GÖMÜLÜ ÜÇÜNCÜ MOLAR CERRAHİSİ SONRASI ETKİLERİ

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Öz

Amaç
Bu çalışmada mentollü krem ile masaj uygulaması gibi farmakolojik olmayan ağrı kontrol metodlarının üçüncü molar cerrahisi sonrası ağrı üzerine etkinliğinin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem
Çalışmaya, 18-48 yaşları arasında gömülü üçüncü molara sahip 100 sağlıklı birey dahil edildi. Hastalar, rutin medikal analjezik tedavisi yapılan grup (n:50) ve cerrahi sonrası mentollü krem ile masaj yapılan grup (n:50) olmak üzere randomize olarak 2 gruba ayrıldı. Postoperatif ağrı değerlendirmesi, postoperatif 2., 6., 8., 12., 24. ve 48. saatlerde ve 3., 5. ve 7. günlerde 100 mm'lik Görsel Analog Skalası (VAS) kullanılarak yapıldı.

Bulgular
Olguların yaş ortalamaları ile cinsiyet dağılımları arasında istatistiksel olarak anlamlı bir fark bulunmamıştır (p>0.05). Ağrı düzeyleri (VAS skorları) değerlendirilmesinde, rutin medikal analjezik tedavisi yapılan grup ile masaj grubu arasında ve grup içi değerlendirmelerde istatistiksel olarak anlamı farklar tespit edilmiştir (p<0.05, p:0.001; p<0.01).

Sonuç
Bu çalışmada, mentollü kremle yapılan masaj uygulaması gibi farmakolojik olmayan ağrı kontrol yöntemlerinin oral cerrahi işlem sonrası postoperatif ağrı üzerinde anlamlı bir etkisi olduğu belirlendi. Bu sonuç ışığında, alternatif ağrı kontrol yöntemlerinin postoperatif destek tedavisi olarak güvenle kullanılabileceği düşünülmektedir.

Anahtar Kelimeler: Ağrı, masaj, ağrı yönetimi, mentol, üçüncü azı dişi.

Abstract

Objective
The aim of this study was to evaluate the effectiveness of non-pharmacological pain control methods, such as massage application with menthol cream, on pain after the third molar surgery.

Material and Methods
100 healthy individuals who were 18-48 years old with impacted third molars were included in study. The patients were randomly divided into two groups as routine medical analgesic treatment group (n: 50) and the group of massage application with menthol cream postoperatively (n: 50). Postoperative pain assessment was performed on the 2nd, 6th, 8th, 12th,

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24th and 48th hours and on the 3rd, 5th and 7th days postoperatively using a 100 mm Visual Analogue Scale (VAS).

Results
There was no statistically significant difference between the mean ages and gender distributions of the cases ($p>0.05$). In the evaluation of pain levels (VAS scores), statistically significant differences were found between the group receiving routine medical analgesic treatment and the massage group and in the intra-group evaluations ($p <0.05$, p:0.001; $p<0.01$).

Conclusion
In this study, non-pharmacological pain control methods such as massage application with menthol cream had a significant impact on the postoperative pain after oral surgical procedures. In this result, it is thought that alternative pain control methods can be safely used as postoperative supportive treatment.

Keywords: Pain, massage, pain management, menthol, third molar

Introduction

Impacted tooth operations are one of the most commonly procedures in the oral surgery practice (1). After impacted teeth operations patients frequently experience discomforts which include pain, edema and trismus. Although atraumatic operations and postoperative recommendations reduce such discomforts to a certain extent, they can not eliminate discomforts thoroughly. A great many of studies have been conducted in order to prevent discomforts that emerge following impacted tooth surgery and to this end, different agents like non-steroid anti-inflammatory drugs, steroids, enzymes and antihistaminic have been used (2-4).

After operations pain starts after the effect of local anesthesia disappears (1-4 hours) and pain reaches its zenith within the first 6-12 hours (5,6). Exudative fluid creates pain by putting pressure on the nerve endings. The other factor that creates pain is the release of chemical mediators. A great many mediators (potasyum, serotonin, substance P, nitrik oksit, bradykinin etc.) that lead to vascular reaction lowers the pain threshold by having an impact upon nerve fibers (7).

Analgesic agents are the most commonly preferred method in eliminating pain due to their short impact time and easy use and studies also suggest that pharmacological methods are commonly employed in pain control (8,9). Non-pharmacological methods are also used for pain control. Recently, individual usage of non-pharmacological methods or their use in combination with pharmacological methods has begun to be preferred widely due to their effect on relieving pain. Non-pharmacological methods stand for controlling pain with methods different than medications. The aim of using non-pharmacological pain-relieving methods is reducing the usage rate of analgesics and enhancing the life quality of the patient. These methods have advantages such as being easy to be applied by the patients and not having side effects (10-12).

Non-pharmacological methods can be classified as Peripheral Techniques which include massage, hot-cold compress, menthol application on the skin, vibration, transcutaneous electrical nerve stimulation (TENS), therapeutic touch, and Cognitive-Behavioral Techniques which include relaxation, music, distraction, dreaming, cognitive strategies, and other techniques that do not fall into these two categories (acupuncture, placebo application, surgical treatment) (10,13-15).

Massage is a technique that had been used in various civilizations since ancient times due to its therapeutic and rehabilitative effects. Massage leads to an increase in the pumping capacity of the heart by enhancing circulation. Thus, provide pain-relieving, help muscles relaxing and individual feel at ease by resolving the muscle spasms (15-17).

- Blood circulation is increased in compression areas via vasodilation that occurs in the massage area and metabolites accumulating in the region are removed and pain can be relieved (15-17).

- Touch receptors on the skin are stimulated via massage. Touch receptors transmit the stimuli to the cortex faster than pain fibers due their larger diameters than the fibers that transmit pain and since cortex receive these stimuli primarily, it sends a message to substantia gelatinosa and help pain gate be closed (15-17).

- Mechanic stimuli on the skin activate gate-control mechanism and raise beta endorphin level. Beta endorphins release increases pain threshold and eases or eliminates the sense of pain (15-17).

Menthol obtained from mentha plant is an agent that has both relaxing and pain-relieving impact. Agents containing menthol can be in the form of cream, lotion, liquid or gel (18). When menthol containing agents are applied on the skin they create an impact like heat and cool. Also, the local application of the materials containing menthol enables a sort of external analgesia. Menthol application relieves the pain by diverting the attention or easing the perception of pain. Besides, past studies suggest that menthol eases pain by closing the pain gate via stimulating the cortex or increasing endorphin release (18).

The aim of this study was to evaluate the efficacy of application of massage with menthol cream on postoperative pain after mandibular third molar surgery.

Material and Methods

This study was conducted in line with Helsinki Human Rights Declaration and the relevant guiding principles. Permission for the study was received from Karabuk University Ethics Committee (Date: 29.03.2017, Decision Number:3/10). All patients were included in the study after they were informed about the study in a detailed manner and after they signed the patient consent form and the study was carried out on 100 patients (n:50 for each group) who applied to Karabuk University Faculty of Dentistry, Department of Oral and Maxillofacial Surgery. In all patients included in the study, it was considered that the impacted teeth should be in the mesioangular or vertical position and with full bone retention. Patient ages ranged between 18-48 and they did not have any systemic diseases.

Patients with systemic disorders that contraindicated for surgical operation, allergies to non-steroidal anti-inflammatory drugs, aspirin and dermatological creams and lotions, nursing and pregnant mothers, and those using antibiotics and anti-inflammatory drugs in the last 3 weeks were excluded.

Operation started with n. alveolaris inferior and buccal nerve anesthesia (Ultracain DS forte-Aventis İlaç Sanayi Tic. A1, Turkey) then, buccal flap was elevated via horizontal and vertical incisions, and the third molar was removed via elevators and dental forceps after eliminating the bone tissue with steel drills under serum irrigation. The flap was closed primarily with 3-0 silk suture primarily. The duration of all operations did not exceed 20±5 minutes.

Patients included in the study, were divided into Group A (n:50) and Group B (n:50) randomly. The routine treatment group was named A, while the routine treatment and menthol cream massage group B. Amoxicillin clavulanic acid (Augmentin 625 mg Glaxo Smith Kline Pharmaceuticals Industry and Trade Co) and diclofenac potassium (Dolorex, 50 mg, Abdi İbrahim, Turkey) were administered to the patients in both groups as 2x1 daily for a week. Also chlorhexidine gluconate 2% (Chlorhex Gargle 200ml, Drogsan Pharmaceutical Industry) taken 3x1 daily were administered for 7 days.

Additionally, menthol cream (Vicks Vaporub, Eczacıbası Pharmaceutical Industry, Turkey) was prescribed to patients in study group and they were recommended to apply the cream for 10–minute periods 3 times a day as in the morning, noon and evening with massage with circular movements, extraorally on the masseter muscle on the operated area and nearly operated area by applying it. Massage was applied to the masseter muscular region extraorally because the patients said that the most feeling pain on there. Also, the first massage application was started at the 6th hour after the operation.

Postoperative pain evaluation was carried out by helping patients mark the degree of pain on the 100 mm Visual Analogue Scale (VAS) on the post-operative 6th, 8th, 12th, 24th and 48th hours and also on 3rd, 5th and 7th days.

The statistical analyses were performed using the statistical package ‘Minitab 17’. Statistical analysis was performed using Student t-test for comparison of the normally distributed parameters between two groups, while Mann Whitney U test was employed to conduct the comparison of the parameters that were not normally distributed. Significance value was taken at the level of $p<0.05$ and $p<0.001$.

Results

The study was carried out on a total of 100 patients whose ages ranged between 18 and 48, the mean age of the patients was 24.94±6.50. Out of 70% were females (Table 1).

No statistically significant difference exists between the mean ages and gender distributions of the cases in the groups ($p>0.05$) (Table 1).

There is statistically significant difference between the groups with regard to VAS levels on 6th, 8th, 12th, 24th, 48th hours, and 5th and 7th days ($p<0.05$) (Table 2). There is only no statistically significant difference between the groups in terms of VAS levels on the 3rd day. 6th, 8th, 12th, 24th, 48th hour and 5th and 7th

day VAS levels of Group A are statistically significantly higher than Group B (p<0.05; p<0.01) (Table 2).

In Group A, statistically significant difference was found between mean values of 6th, 8th, 12th, 24th, 48th hours and 3rd, 5th and 7th day VAS levels (p:0.001; p<0.01) (Table 3). There was no difference between VAS levels at 2nd hours, VAS levels at 6th and 8th hours, however, decreases observed on 12th, 24th, 48th hours, and 3rd, 5th and 7th days VAS levels were found to be statistically significant (p<0.05, p<0.01). In comparison with the VAS level on the 6th hour decreases observed on 8th, 12th, 24th, 48th hours and 3rd, 5th and 7th days VAS levels were found to be statistically significant (p<0.01). While no statistically significant difference was found on the 12th hour compared to the 8th hour VAS level (p>0.05) decreases seen in 24th and 48th hours, and 3rd, 5th and 7th days VAS levels were statistically significant (p<0.05, p<0.01). In comparison with the 12th hour VAS level, decreases observed on 24th and 48th hours, 3rd, 5th and 7th days VAS levels were statistically significant (p<0.01). While no significant change was observed in the 48th hour VAS level compared to the 24th hour VAS level (p>0.05), decreases observed in the 3rd, 5th and 7th days VAS levels were statistically significant (p<0.05, p<0.01). In comparison with the 48th hour VAS level, decreases observed in 3rd, 5th and 7th days VAS levels were statistically significant (p<0.01). In comparison with the 3rd day VAS level, decreases observed in 5th and 7th days VAS levels are statistically significant (p<0.01). No significant change was observed in the 7th day VAS level compared to the 5th day VAS level (p>0.05) (Table 3).

In Group B, statistically significant difference was found between mean values of 6th, 8th, 12th, 24th and 48th hours and 3rd, 5th and 7th days VAS levels (p:0.001; p<0.01) (Table 3). While no statistically significant change was observed on 12th, 24th and 48th hours and 3rd day VAS levels in comparison with the

Table 1 Evaluation of the groups in terms of age and gender

Age Mean±SS	**B Group**	**A Group**	**p**
	26.08±8.25	23.80±3.94	**0,203**
Gender n,%			
Female	36 (%72)	34 (%68)	**0,219**
Male	14 (%28)	16 (%32)	

Student t test Continuity (yates) correction

Table 2 Postoperative pain intensity values measured by VAS post surgery

VAS (mm)	**A Group**	**B Group**	**[1]p**
	Mean±SS	**Mean±SS**	
6th hour	60,4±28,21	38±26,7	0,00062**
8th hour	45,6±24,17	29,2±24,82	0,0204*
12th hour	38,8±23,33	22,8±18,6	0,015*
24th hour	29,6±20,91	11,6±14,35	0,0009**
48th hour	30±22,91	14,8±19,6	0,025*
3rd day	20,4±18,59	9,6±16,7	0,06
5th day	11,6±15,46	3,6±6,38	0,031*
7th day	10,0±13,84	2±4,09	0,008**
p	0,001**	0,001**	

Student t test Mann Whitney U test
*p<0.05 ** p<0.01

2nd hour (p>0.05), increases observed on 6thand 8th hours VAS levels and decreases seen on the 5th and 7th days VAS levels were found to be statistically significant (p<0.05, p<0.01).In comparison with the VAS level on the 6th hour, no statistically significant change was observed on the 8th hour (p>0.05), whereas decreases observed on 12th, 24th, 48th hours and, 3rd, 5th and 7th days VAS levels were found to be statistically significant (p<0.01). While no statistically significant difference was found on the 12th hour compared to the 8th hour VAS level (p>0.05), decreases found on 24th and 48th hours, and 3rd, 5th and 7th days VAS levels were statistically significant (p<0.05, p<0.01). While no statistically significant decrease was observed on the 48th hour in comparison with the 12th hour VAS level (p>0.05), decreases observed on the 24th hour and 3rd, 5th and 7th days VAS levels were statistically significant (p<0.01). While no significant change was observed on the 48th hour and the 3rd day compared to the 24th hour VAS level (p>0.05), decreases observed on 5th and 7th days VAS levels are statistically significant (p<0.05, p<0.01). While no statistically significant change is observed on the 3rd day in comparison with the 48th hour VAS level, decreases observed on 5th day and 7th days VAS levels were statistically significant (p<0.01). In comparison with the 3rd day VAS level, decreases observed on 5th and 7th days VAS levels were statistically significant(p>0.05) No statistically significant change was observed on the 7th day VAS level compared to the 5th day VAS level (p>0.05) (Table 3).

Discussion

Impacted tooth operations are one of the most commonly practiced procedures in oral surgery and postoperative rate of pain, edema and trismus experience is high. For this reason, these operations are the first

Table 3 Evaluation of VAS measurement of intragroup

	A Grubu	B Grubu		A Grubu	B Grubu
	p	p		p	p
2nd hour-6th hour	0,055	0,0005**	12th hour-24th hour	0,008**	0,003**
2nd hour -8th hour	0,632	0,008**	12th hour-48th hour	0,029*	0,105
2nd hour-12th hour	0,048*	0,069	12th hour - 3rd day	0,001**	0,0094**
2 nd hour-24th hour	0,006**	0,804	12th hour - 5th day	0,001**	0,0007**
2 nd hour-48th hour	0,021*	0,68	12th hour - 7th day	0,001**	0,0002**
2 nd hour-3rd day	0,001**	0,48	24th hour - 48 th hour	0,681	0,507
2 nd hour-5th day	0,001**	0,016*	24th hour - 3rd day	0,012*	0,661
2 nd hour-7th day	0,001**	0,0033**	24th hour - 5th day	0,001**	0,018*
6th hour-8th hour	0,002**	0,12	24th hour - 7th day	0,001**	0,003**
6th hour -12th hour	0,001**	0,005**	48th hour - 3rd day	0,003**	0,061
6th hour -24th hour	0,001**	0,00004**	4 th hour-5.gün	0,001**	0,003**
6th hour-48th hour	0,001**	0,0004**	48 th hour -7th day	0,001**	0,00017**
6th hour-3rd day	0,001**	0,0001**	3rd day-5th day	0,005**	0,021*
6th hour -5th day	0,001**	0,00002**	3rd day-7th day	0,003**	0,016*
6th hour 7th day	0,001**	0,0000007**	5th day-7th day	0,279	0,103
8th hour-12th hour	0,085	0,068			
8th hour-24th hour	0,003**	0,0007**			
8th hour-48th hour	0,016*	0,014*			
8th hour -3rd day	0,001**	0,0018**			
8th hour-5th day	0,001**	0,0003**			
8th hour-7th day	0,001**	0,0001**			

Student t test Mann Whitney U test
*p<0.05 ** p<0.01

choice for testing postoperative medications, investigating the inflammatory period and pain relief methods. (19). In our study, in parallel with the literature, the effectiveness of a non-pharmacological pain control method on impacted third molar operations was evaluated.

Various factors which include patient age, gender and medical history, poor oral hygiene and presence of infection in the operation area, impaction level of the tooth in the bone, surgical techniques used in the operation and operation duration can affect potential postoperative complications (1,20). In our study, patient groups were formed taking into the consideration that patients do not have any systemic diseases, they do not take any medications, and there is no infection in the operation area.

Neal et al. stated that they gave a 100 mm long VAS to the patient groups in their study in order to evaluate the pain emerged after impacted third molar tooth extraction and patients recorded the pain they felt on these pain scale 4 times a day for 7 days postoperatively (21). Likewise, in our study, a 100 long VAS was employed in order to evaluate the pain scores that emerged after impacted third molar surgery.

The study by Van Der Dolder and Roberts reported that massage yielded beneficial results in improving the range of motion and reducing the shoulder pain in patients with shoulder pain within 2-week period (22). In parallel with this result, our study also found that massage was effective in relieving the pain emerging following impact tooth operation.

A systemic review of the studies on the effect of massage on the patients with lower backache by Furlan et al concluded that massage was efficient in terms of improving both the symptoms and functions for the patients with lower acute and chronic lower back pain (23). Similarly, our study elucidated that massage lowers postoperative pain to a significant extent and has a positive impact on the pain.

In the study conducted by Hernandez et al., on the efficiency of massage therapy in migraine type headaches, a 30-minute massage was applied to 26 patients with migraine pain weekly for 5 weeks. It was reported that patients experienced less pain at the end of the massage therapy and suffered less from trouble sleeping (24). Also, in our study impacted teeth surgical operation was carried out on 100 patients, 10-minute periods of massage three times a day was applied on half of these patients extra orally with menthol containing creams from over the masseter muscles in the operation area. Pain levels in the massage group were found to be statistically significant lower compared to the other group.

The study conducted by Winters et al. reported in their study that the combination of exercise, massage and physical applications were less effective in relieving pain than steroid injection and bone mobilization (25). In our study, all patients who had impacted tooth surgeries were prescribed the same medications. Additionally, only a group of patients (n:50) was recommended to have a massage with menthol cream. As a result, when both of the groups were examined, pain scores in the massage group was found statistically significantly lower compared to the other group.

Gemmel et al. applied the topical cream containing menthol and capsaicin to the patients with hand and knee osteoarthritis for 42 days and reported a 35-38% rated decrease in pain of the patients (26). Johar et al. conducted a study on 16 patients and carried out menthol and ice applications following an exercise designed to activate muscle pain. They reported that topical menthol application was more effective in relieving pain than ice application in delayed onset muscle soreness (DOMS) (27). In our study, postoperative pain scores examination demonstrated that the menthol group had statistically significant lower pain scores were obtained than the group which did not receive menthol application.

Conclusion

Consequently, in this study non-pharmacological pain control methods such as massage application with menthol cream had a significant impact on the postoperative pain after oral surgical procedures. It is thought that such alternative pain control methods can be used in addition to post-operative medication for postoperative pain control.

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