

## ORIGINAL RESEARCH

# Analgesic prescription pattern in the management of dental pain among dentists in İstanbul

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## ABSTRACT

**OBJECTIVES:** To determine the pattern of analgesic prescriptions and the information given to their patients about use of these drugs by the dentists working in İstanbul.

**METHODS:** A questionnaire was distributed to 250 dentists working in İstanbul. The questionnaires consisted of open-ended questions about analgesic use in dentistry and were handed out directly to dentists. They were analyzed and responses to each question expressed as absolute frequencies. The cases and the analgesics prescribed by dentists for each case were determined by the descriptive statistics method; "frequency".

**RESULTS:** Responses to questionnaires were received from 130 (52%) dentists. The most commonly prescribed analgesic was naproxen, a nonsteroidal anti-inflammatory drug (NSAID). It is also estimated that dentists did not prescribe selective COX-2 inhibitors or opioid analgesics. Some dentists reported prescribing more than one NSAIDs for the same patient (n = 11 cases). Although more than 75% of the dentists reported that they gave information to their patients about the use of analgesics, the content of the information was limited.

**DISCUSSION:** The results of the questionnaires applied to the dentists showed that dentists most commonly prescribe naproxen for the management of dental pain and they rarely prescribe incompatible analgesic combinations. The results also showed that dentists informed their patients inadequately about analgesic use. Incomplete information given by dentists about drug interactions, storage conditions and price of the prescribed drugs is an important point of the study that may also affect the success ratio of the therapy and the compliance of the patients.

**KEY WORDS:** dentistry, analgesic use, rational drug use, questionnaire.

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## INTRODUCTION

Pain management has always been an important part of dental care. Nonopioid analgesics; paracetamol as an antipyretic analgesic and nonsteroidal anti-inflammatory drugs (NSAIDs) (i.e. ibuprofen, naproxen, flurbiprofen) are commonly used in dental pain. Rarely opioid analgesics (i.e. hydrocodone, oxycodone, meperidine, propoxyphene, pentazocine, tramadol) are also used in the management of moderate to severe dental pain (1-5).

NSAIDs are very effective in the initial pain with inflammation and they provide excellent analgesia for mild to moderate pain. Because of their

analgesic and anti-inflammatory effects these drugs are commonly used in dental pain (3, 4).

NSAIDs effects via inhibiting the cyclooxygenase (COX) enzymes which has primary role in the synthesis of prostaglandins and other eicozanoids. This pharmacologic effect of these drugs also causes irritation and bleeding in gastrointestinal tract (1-2, 4). In order to eliminate the gastrointestinal adverse effects of these drugs, selective COX - 2 inhibitor types were developed, but after a while increased risk of myocard infarction and other cardiac diseases (including sudden cardiac death, stroke) were determined in patients

using some of these type of drugs (i.e. rofecoxib). In a recent study it is mentioned that NSAIDs (both selective COX-2 and non selective COX inhibitors) should be used cautiously in patients with cardiac diseases. Widely use of these drugs in the management of dental pain increases the risk of adverse effects (including gastrointestinal, hematologic, broncopulmoner, renal etc.) due to these drugs (3).

On the other hand paracetamol which is also a widely used analgesic in dentistry, has no evident anti-inflammatory effect on peripheral tissues, and consequently provides little risk on gastrointestinal mucosa damage. The most serious adverse reaction due to paracetamol therapy is "hepatotoxicity" which can occur in high doses (1-2, 6-9).

Due to widespread use of analgesics, there are concerns about drug-induced toxicity (i.e. NSAID-induced toxicity) which can be significant health hazard. No drugs are without adverse effects or perfectly safe, but their safe use in clinical practice would entail maximizing the therapeutic efficacy and minimizing the adverse effects (1-2, 4).

An important increasing parameter of the effectiveness is to inform the patients adequately about the prescribed drugs. This information includes not only dose and dose interval of the drugs but also adverse reactions, drug interactions, storage conditions and the price of the prescribed drugs. When the dentists informed their patients about these subjects, it also required briefing of these explanations by patients. This prevents misunderstanding of the information given. On the other hand perfect information of the patient will increase the success ratio of the therapy, compliance of the patient, quality of the life and cost-effectiveness (10, 11).

There have been studies of analgesic prescribing in dentistry (1-4). The aim of this study is to evaluate the analgesic use in dental practice and the information given to their patients about use of these drugs by dentists in Istanbul, Turkey.

## MATERIALS AND METHODS

### Questionnaire

A questionnaire was devised to examine dentists' analgesic prescribing patterns. The questionnaire was anonymous but investigated the place of graduation, age (banded from 21 to 30, 31 to 40, 41 to 60 years and 60 years and older), sex, place of work and whether any postgraduate education had been attended.

The questionnaire investigated: a) 5 of the most analgesic prescribed indications from dentists, b) 3 indications they prescribed combined nonsteroidal anti-inflammatory drug therapy and c) The information given to patients about use of these drugs.

### Sample and data handling

Before starting this study, the approval of the health authority and the list of the dentists were received from "Chamber of Dentists of Istanbul". Dentists in the list were chosen from different regions of Istanbul in order to make a homogenous distribution. The questionnaires were handed out directly to the dentists. The delivery of the questionnaires started in June 2007 and the delivery and collecting processes finished in June 2008.

The questionnaires received were entered into a Statistical Package for Social Science® (SPSS) version 15.0. From this database the overall response rate was calculated, together with the percentage responses for each question. The cases and the analgesics dentists prescribe for each case was determined by the descriptive statistics method; "frequency".

## RESULTS

A total of 130 replies (out of 250 questionnaires sent) were received giving response a rate of 52%. Out of the 130 respondents, 68 (52.7%) were males and 61 (47.3%) were females (one of the respondents didn't check the gender box). Demographic and professional characteristics of respondents are shown in Table 1. Analysis of the graduation showed that majority of the respondents graduated from dental schools of Istanbul University and Marmara University (67 out of 128; 52.3% and 38 out of 128; 29.7% respectively). The number of those who had attended any postgraduate education is 73 (57.5%) (This mainly includes postgraduate courses). And as seen in Table 1 majority of the respondents works at dental practices (66 out of 94 respondents; 70.2%).

Table 2 shows the prescribing patterns of dentists in Istanbul. The answers given to our open-ended questions showed a wide variety. For this reason the analgesic prescribing indications given by dentists were grouped as; "periodontal procedures", "surgical procedures" and "endodontic procedures".

Periodontal procedures include; acute and chronic apical periodontitis, periodontal infection, gingival infections and inflammation, and flare up.

Surgical procedures include; dental abscess, bone infection, tooth extraction, postoperative pain, periapical ostitis and trauma.

Endodontic procedures include; acute and chronic apical abscess, pulpitis, tooth inflammation, dental pain with or without inflammation.

Endodontic procedures were the most common procedures dentists prescribed analgesics (237 out of 333 case given by dentists; 71.1%), followed by surgical (50 out of 333 case; 15.0%) and periodontal procedures (26 out of 333 case; 7.8%), and special conditions [including dental pain in pregnant women (12 out of 333 cases; 3.6%), temporomandibular joint (TMJ) problems and trismus (5 out of 333; 1.5%) and dental pain in pediatric patients (3 out of 333 cases; 0.9%)].

Naproxen was the most favored analgesic in periodontal, surgical and endodontic procedures. The cases respondents preferred combined nonsteroidal anti-inflammatory therapy and the drugs they chose were given in Table 3. Endodontic procedures and TMJ problems and trismus were the most common procedures the respondents preferred combined nonsteroidal anti-inflammatory therapy (6 out of 16 cases given by respondents; 37.5% for each cases), followed by and surgical procedures (4 out of 16 cases given by respondents; 25%).

Majority of the respondents (102 out of 130 respondents; 78.5%) reported they gave information to their patients about analgesic use. Table 4 shows the information given by respondents to their patients about analgesic use. As seen in the table; the most common information given by the respondents

**TABLE 1.** Demographics and professional characteristics of participating dentists.

VARIABLES	N (%)
Gender	
Male	68 (52.7)
Female	61 (47.3)
Age (years)	
21-30	25 (19.3)
31-40	55 (42.6)
41-60	47 (36.4)
Over 60	3 (2.3)
Place of graduation	
Istanbul University	67 (52.3)
Marmara University	38 (29.7)
Hacettepe University	7 (5.5)
Ege University	6 (4.7)
Gazi University	4 (3.1)
Ankara University	4 (3.1)
Atatürk University	1 (0.8)
Süleyman Demirel University	1 (0.8)
Postgraduate education	
Yes	73 (57.5)
No	54 (42.5)
Postgraduate education taken (out of 73 respondents)	
Postgraduate courses	52 (71.2)
Doctorate	16 (21.9)
Master	2 (2.7)
Master and postgraduate courses	2 (2.7)
Doctorate and postgraduate courses	1 (1.4)
Place of work	
Dental practice	66 (51.2)
Private institution	35 (27.1)
University	17 (13.1)
Private institution and dental practice	3 (2.3)
Governmental healthcare facilities	2 (1.5)
University and dental practice	1 (0.8)
Private corporation and university	1 (0.8)
Other (i.e. polyclinic etc.)	4 (3.1)

to their patients were "warning about the adverse reactions of these drugs on gastrointestinal system" (69 out of 252 information given; 53.5%) and "to obey the dose and dose interval rules given" (60 out of 252 information given; 46.5%).

## DISCUSSION

NSAIDs are commonly used in pain medication in dentistry because of their analgesic and anti-inflammatory properties (1 - 4, 7). In our study, it has been estimated that the most commonly analgesic prescribed cases by respondents were endodontic (237 out of 333 cases; 71.1%), surgical (50 out of 333 cases; 15.0%) and periodontal procedures (26 out of 333 cases; 7.8%). The most commonly prescribed analgesics were naproxen, flurbiprofen and paracetamol in endodontic procedures

**TABLE 2.** Analgesics prescribed in the management of dental pain among dentists in Istanbul.

Cases	n (%)
1. Endodontic procedures (n = 237)	
Naproxen	90 (37.9)
Flurbiprofen	32 (13.5)
Paracetamol	32 (13.5)
Diclofenac	27 (11.4)
Paracetamol cafein combination	17 (7.2)
Etodolac	9 (3.8)
Ketoprofen	6 (2.5)
Ibuprofen	5 (2.1)
Lornoxicam	4 (1.7)
Metamizol	4 (1.7)
Aspirin	3 (1.3)
Meloxicam	3 (1.3)
Tenoxicam	2 (0.8)
Benzidamin HCl	1 (0.4)
Mefenamic acid	1 (0.4)
Piroxicam	1 (0.4)
2. Surgical procedures (n = 50)	
Naproxen	23 (46.0)
Diclofenac	6 (12.0)
Flurbiprofen	6 (12.0)
Paracetamol cafein combination	5 (10)
Lornoxicam	3 (6)
Benzidamin HCl	2 (4)
Etodolac	2 (4)
Ketoprofen	2 (4)
Mefenamic acid	1 (2)
3. Periodontal procedures (n = 26)	
Naproxen	12 (46.1)
Diclofenac	5 (19.2)
Flurbiprofen	2 (7.7)
Benzidamin HCl	1 (3.8)
Etodolac	1 (3.8)
Ibuprofen	1 (3.8)
Ketoprofen	1 (3.8)
Meloxicam	1 (3.8)
Paracetamol	1 (3.8)
Paracetamol cafein combination	1 (3.8)
4. Special conditions (n = 20)	
Dental pain in pregnant women (n = 12)	
Paracetamol	8 (66.7)
Paracetamol cafein combination	2 (16.7)
Ibuprofen	1 (8.3)
Flurbiprofen	1 (8.3)
TMJ and trismus (n = 5)	
Diclofenac	1 (20.0)
Etodolac	1 (20.0)
Naproxen	1 (20.0)
Paracetamol	1 (20.0)
Tenoxicam	1 (20.0)
Dental pain in pediatric patients (n = 3)	
Paracetamol	1 (33.3)
Paracetamol cafein combination	1 (33.3)
Flurbiprofen	1 (33.3)

**TABLE 3.** Combined analgesic prescribing patterns in the management of dental pain among dentists in Istanbul.

		Diclofenac	Meloxicam	Naproxen	Paracetamol	Tenoxicam	Total
Endodontic procedures	Diclofenac	1			1		2
	Etodolac			1			1
	Flurbiprofen	1			1		2
	Paracetamol			1			1
	Total						6
TMJ problems and trismus	Meloxicam			1			1
	Naproxen					2	2
	Paracetamol	1					1
	Tenoxicam			1			1
	Total					1	6
Surgical procedures	Diclofenac		1		1		2
	Flurbiprofen	1					1
	Naproxen					1	1
	Total						4

**TABLE 4.** Information given by dentists to their patients about analgesic use.

Informed issues	n (%)
Adverse reactions of the prescribed drugs on gastrointestinal system	69 (53.5)
Use and administration of the drug and giving advice about obeying the using and administrating rules given	60 (46.5)
Whether the drugs should be taken fasting or fed and the interactions between food and these drugs	45 (34.9)
Dental-medical interactions (examining the systemic illnesses (i.e. liver diseases, kidney diseases etc.) and systemic conditions of the patient (i.e. pregnancy, lactation etc.)	23 (17.8)
Other adverse reactions of the prescribed drugs	20 (15.5)
Interactions between analgesics prescribed and other drugs	19 (14.7)
Informing his/her dentist if an adverse reaction occurs while using these drugs	14 (10.9)
Storage conditions of the prescribed drugs	2 (1.6)

and naproxen, diclofenac and flurbiprofen in surgical and periodontal procedures (Table 2). Propionic acid derivatives naproxen, flurbiprofen and an acetic acid derivative NSAID diclofenac provides excellent analgesia for dental pain (2, 4, 12 - 16) and these findings are consistent with the literature. In addition, results of the study also showed that respondents don't have selective COX - 2 inhibitors prescribing pattern. Selective COX-2 inhibitors (coxibs) were developed based on the hypothesis that selective COX-2 inhibition would induce the desired anti-inflammatory effects without the undesirable side effects (particularly at gastric level) associated with COX-1 inhibition, but clinical use of these drugs was associated with cardiovascular risks (i.e. myocardial infarction and stroke) and as result, the marketing company removed rofecoxib, a selective COX-2 inhibitor, from the market in September 2004 (17). The clinical experience with these drugs has been limited and use of these drugs in the therapy of acute pain is still being discussed (4, 18 - 20).

In the use of NSAIDs in dentistry, it has been suggested that ibuprofen is an ideal prototype for consideration for pain with dental origin unless a patient identifies a particular agent that has been effective previously (2). Ibuprofen has been showed to be as safe as paracetamol on gastrointestinal tract, in both adult and pediatric patients. Even in prescribed doses ibuprofen rarely cause bleeding in upper gastrointestinal tract and it is one of the safest drugs on gastrointestinal tract (21). However, the re-

sults of our study showed that ibuprofen prescribing patterns among the respondents was low (7 out of 333 cases; 2.1%).

On the other hand, paracetamol which has no proven anti-inflammatory effects on peripheral tissues and has low risk on gastrointestinal bleeding and irritation, is one of the most commonly used analgesic in dentistry. In this study the prescription proportion of paracetamol was 12.9% (43 out of 333 cases, excluding "paracetamol cafein combination"), especially in pediatric and pregnant patients it was the most commonly prescribed analgesic, and this finding is also consistent with the literature (2, 6, 7, 14).

In our study it was also estimated that respondents do not prescribe opioid analgesics for dental pain. Opioid analgesics are used in the therapy of moderate to severe pain and use of these drugs is not generally advised in dental pain because of their serious adverse effects (i.e. respiratory depression, sedation, dependence, miosis, nausea, constipation and vomiting) and addiction potential unless the pain is severe and can not be relieved by other analgesics (1, 7, 12).

Another important particularity in the results was the analgesic combination patterns of the respondents (n = 16 cases). 11 out of 16 cases showed irrational combination of two NSAIDs (Table 3). It is irrational to combine two or more NSAIDs in therapy. When a combination is required in severe pain, para-

cetamol or opioid analgesics are suitable alternatives for combination with these drugs (1, 2).

Apprising of the patients about prescribed agents by dentists seems to be high (78.5%) but the most common information the respondents gave their patients were "warning about the adverse reactions of these drugs on gastrointestinal system" (69 out of 252 information given; 53.5%) and "to obey the dose and dose interval rules given" (60 out of 252 information given; 46.5%). The first information is important for apprising information to patient about the most frequent and important adverse effect of NSAIDs (2, 4). And the second information has considerable importance on the compliance of therapy (10, 11). On the other hand, it is of interest that the other information given by the respondents to their patients [(i.e. examining the systemic diseases and systemic conditions of the patients (23 out of 252 information given; 9.1%), the other adverse reactions (20 out of 252 information given; 7.9%); drug interactions (19 out of 252 information given; 7.5%)] were relatively low.

Patients need information, instructions and warnings in order to make them understand and follow the therapy and take the drugs appropriately. In some studies less than 60% of the patients understood how to take the drugs they received.

Information should be given in clear, common language and the patients should be asked to repeat some of the "core information" to be sure that the information given is understood.

World Health Organization (WHO) declares that; the six points given below summarize the minimum information that should be given to the patients should include;

- 1) The effect of the drug,
- 2) Side effects,
- 3) Instructions,
- 4) Warnings,
- 5) Future consultations,
- 6) Is everything clear?

WHO also mentioned that, it is the prime responsibility of the doctor to ensure that the treatment is understood by the patient, and this responsibility can not be shifted to the pharmacist or a package insert (10).

The results of our study showed that respondents do not inform their patients (especially about adverse reactions other than that on gastrointestinal system, drug interactions) or examine their systemic conditions or illnesses adequately. Less or lack apprising about adverse reactions and storage conditions of the drugs and drug interactions will effect the success of the therapy, increase the risk of adverse reactions and the

cost of the therapy. As mentioned before drug induced toxicity, especially NSAID-induced toxicity can cause serious health hazard due to widespread use of these drugs. NSAIDs, the most commonly chosen drugs for dental pain management in our study, are also one of the most commonly used medicines without ask for prescription (OTC drugs). Inappropriate information given to patients about use of these drugs may cause serious results (i.e. increase in adverse reaction risk and drug interactions) (22-24).

It has been estimated that NSAIDs cause acute renal failure secondary to renal vasoconstriction. These drugs also cause fluid and sodium retention (which is an important risk especially in patients with hypertension), allergic reactions, post-operative bleeding and a variety of serious drug interactions. For this reason these drugs should be used cautiously especially in elderly and patients with renal and/or cardiovascular diseases (1, 2, 4, 25).

In conclusion, the results of the present study have demonstrated that dentists rarely prescribe incompatible analgesic combinations, and they inform their patients inadequately about use of analgesics. The results of the study also showed that naproxen was the most commonly prescribed analgesic among dentists in Istanbul. It is also estimated that dentists did not prescribe selective COX-2 inhibitor agents or opioid analgesics for dental pain. In the light of these data; insufficient briefing of the patients about analgesic use and incompatible combination of NSAIDs will attribute to the educational requirements. Update of educational requirements should be considered. We believe that the more the patients are informed properly, the more successful the dental therapy will be.

#### **LIMITATIONS OF THE STUDY**

As given in the "Materials and Methods" part, the delivery and collecting process of the questionnaires lasted for almost one year. There were two main reasons for this long lasting delivery and collecting process; the first reason is the difficulty to reach the respondents while the questionnaires were all handed out directly to the dentists. And the second reason is that their completion of the questionnaires given took very long time (i.e. sometimes a few days or a week for a questionnaire). We here accept that this long time period might cause variation/difference in the responses for the questions between the respondents.

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## Dental ağrı tedavisinde İstanbul'daki diş hekimleri arasında ağrı kesici reçetelendirme profili

### ÖZET

**AMAÇ:** İstanbul'daki diş hekimleri tarafından ağrı kesici reçetelendirme modelini ve bu ilaçların kullanımı konusunda hastaya verilen bilgileri belirlemek.

**YÖNTEM:** İstanbul'da çalışan 250 diş hekimine anket dağıtılmıştır. Anketler, diş hekimlerine elden verilmiştir. Anketteki sorular; diş hekimliğinde ağrı kesici kullanımı hakkında açık uçlu sorulardır. Anketler analiz edildi ve her bir soruya verilen yanıtlar, mutlak frekanslar olarak belirlendi. Vakalar ve diş hekimleri tarafından her bir vaka için reçete edilen ağrı kesiciler, tanımsal istatistik yöntemi olan "sıklık"la analiz edildi.

**SONUÇLAR:** Dağıtılan anketlerin 130 adedi yanıtlandı (%52). Başlıca yazılan ağrı kesici bir nonsteroidal antiinflamatuar ilaç (NSAİİ) olan naproksen idi. Bununla birlikte diş hekimlerinin dental ağrı için selektif COX-2 inhibitörlerini veya opioid analjezikleri reçetelendirmedikleri belirlenmiştir. Diş hekimlerinin bazıları aynı hasta için birden fazla NSAİİ reçetelendirdiklerini belirtmişlerdir (n=11 durum). Her ne kadar diş hekimlerinin %75'inden fazlası hastalarını ağrı kesici kullanımı konusunda bilgilendirdikleri belirtmiş olmalarına rağmen, bilginin içeriği sınırlıdır.

**TARTIŞMA:** Diş hekimlerine uygulanan anketlerin sonuçları; diş hekimlerinin dental ağrının tedavisi için en sık naprokseni yazdıklarını ve nadir de olsa uygun olmayan ağrı kesici kombinasyonlarını reçetelendirdiklerini göstermektedir. Sonuçlar ayrıca, diş hekimlerinin hastalarını ağrı kesici kullanımı konusunda yetersiz şekilde bilgilendirdiğini göstermiştir. Reçetelendirilen ilaçların ilaç etkileşimleri, saklama koşulları ve fiyatları konusunda diş hekimleri tarafından yetersiz bilgilendirilme, çalışmanın, tedavi başarı oranı ve hasta uyuncunu da etkileyebilecek önemli bir noktadır.

**ANAHTAR sözcükler:** diş hekimliği, ağrı kesici kullanımı, akılcı ilaç kullanımı, anket.

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