



# Oral surgical procedures and pain, postoperative after use the ibuprofen or acetaminophen

Alex Semenoff-Segundo<sup>1</sup>, Fernanda Zanol Matos<sup>2†</sup>, Alessandra Nogueira Porto<sup>1†</sup>, Álvaro Henrique Borges<sup>1†</sup>, Vinicius Canavarros Palma<sup>1†</sup> and Tereza Aparecida Delle Vedove Semenoff<sup>1†\*</sup>

\*Correspondence: [semenoff@uol.com.br](mailto:semenoff@uol.com.br)

<sup>†</sup>These authors contributed equally to this work.

<sup>1</sup>Master Program in Integrated Dentistry Science, University of Cuiabá, UNIC, Cuiabá/MT, Brazil.

<sup>2</sup>Student in integrated dental sciences, University of Cuiabá, UNIC, Brazil.

## Abstract

**Aim:** The aim of this study was to compare the effects of anti-inflammatory (ibuprofen, 600 mg) and analgesic (Acetaminophen, 750 mg) drugs on postoperative pain.

**Material and methods:** Patients with indications for surgery were selected, and a total of 57 patients, 20 male (35.1%) and 37 female (64.9%) were included in the study. Of these, 26 patients were placed in the acetaminophen group, and 31 were placed in the ibuprofen group. The average age of the patients was 30 years. The following types of surgeries were included in the evaluation: clinical crown lengthening, gingivectomy, pre-prosthetic surgery, labial frenum and frenum lingual. The surgeries were performed by students in a postgraduate training program in periodontics. Subsequent surgery, postoperative period orientations were provided by the researcher, and the medication to be prescribed was selected at random allocation. Both medications were administered for 48-h periods. A visual analogue scale with values ranging from 0 to 10, where 0 represented no pain and 10 represented maximum pain, was provided to the patients, and the patients were asked to rate their pain using this scale each time they took the medication. At the time of the follow-up visit, the patient data were given to the researcher and subsequently tabulated and applied to the statistical analysis (Mann-Whitney,  $p < 0.05$ ).

**Results:** The results showed no significant difference in pain between medications ( $p > 0.05$ ).

**Conclusions:** There was no difference in postoperative periodontal surgery pain after the use of anti-inflammatory or analgesic drugs.

**Keywords:** Ibuprofen, acetaminophen, postoperative, surgery, oral, pain

## Introduction

Dentistry is one area of science that is actively pursuing the search for pain relief and control. Difficulties associated with pain control are experienced in various areas of dentistry, including endodontic and postoperative treatments, trauma, and joint and muscle conditions [1,2]. From research focused on understanding the mechanisms involved in pain, resources such as medications to control pain have been developed, and many of these have also been shown to reduce inflammation [2].

The availability of pain medications is variable. In this study, two low-cost medications with easy access, known safety and pharmacology profiles, and wide acceptance in the medical field were selected [3,4]: the analgesic drug acetaminophen (750 mg) and the nonsteroidal, anti-inflammatory drug ibuprofen (600 mg). Ibuprofen acts by inhibiting cyclooxygenase, which produces prostaglandin through the arachidonic acid cycle [3,4]. Prostaglandins are potent agents, and their control prevents pain by preventing hyperemia in the microcirculation resulting from surgical trauma to soft and hard tissues [5].

Oral surgeries are performed for various reasons, such as

for rehabilitation and/or functional purposes, disease prevention and/or treatment, or for improving the aesthetics of the smile. Given the clinical situations faced by dentists in daily practice, this study sought to further understand the control of postoperative pain in oral surgery.

The aim of the current study was to investigate the effect of anti-inflammatory (ibuprofen, 600 mg) or analgesic (acetaminophen, 750 mg) drugs on the control of postoperative pain in oral surgical procedures of relatively slight extent and not in itself hazardous to life.

## Material and methods

This manuscript has been conducted in full accordance with ethical principles, including the World Medical Association Declaration of Helsinki (2008) and it was approved by the Research Ethics Committee of the University General Hospital (Hospital Geral Universitário-HGU) under protocol number N. 2011-053.

The study was conducted in University of Cuiabá-UNIC-in the state of Mato Grosso, Brazil. Initially, the study size sample consisted of 134 patients, although several subjects were ex-

cluded during the study period for their lack of engagement or their desire to discontinue the research study. In total, this study assessed a sample of 57 patients with an average age of  $30 \pm 6,3$  years. Of these, 26 patients were administered acetaminophen (AG), and 31 subjects were administered ibuprofen (IG).

The patients included had spontaneously visited the clinic for dental treatment and were then referred to the specialization course for screening. All patients were evaluated and received dental treatment, including those without indications for surgery. However, only those patients with indications for surgical procedures, such as an in clinical crown lengthening, gingivectomy, labial and lingual frenum, and pre-prosthetic surgery, participated in the study. The surgical procedures were routinely performed with mepivacaine hydrochloride 2% HCl at a ratio of 1/100,000 to epinephrine (Mepiedre, 100 DFL).

The exclusion criteria included the following: underage patients; those allergic to substances present in the medications; those with peptic ulcers, gastritis, or suspected pregnancy; those who did not take the medications or follow the postoperative recommendations; and those with underlying conditions that could pose health risks.

The professionals who performed the surgeries were students in the specialization course. However, the same professional was responsible for all postoperative care in all cases. All patients were provided guidance on post-surgical care and were told to contact the hospital by phone if they had any doubts or symptoms after surgery. Moreover, to assess general patient health, the patients were called during the first 24 h after surgery.

The patients were instructed to self-administer either 750 mg acetaminophen every 8 hours for 2 days or 600 mg ibuprofen every 8 hours for 2 days.

Pain assessment was performed using a visual analog scale (Figure 1). The chart was provided to the patients during the immediate postoperative period, and the patients were instructed how to use the chart to rate their pain on a scale from 0 and 10 when taking the medication. According to this scale, 0 represented no pain, while 10 represented the greatest level of pain possible. These scores were applied only during the first 2 days after the procedure. When the patients returned for the postoperative visit, they returned the scales with the completed score assessments. At this time, patients were excluded if they had not taken the medications or failed to follow the guidelines.

The data were organized and divided according to the AG and IB patient groups. The statistics tests used was Mann-

Whitney, Kruskal-Wallis, and Chi-square statistical tests, and the 5% significance level was applied for all analyses.

## Results

Initially, 134 patients were invited to participate in the study. Of these, 77 were excluded, which resulted in a total patient sample of 57 individuals. Of these, 20 were male (35.1%) and 37 (64.9%) were female patients. For the comparison of gender, a larger sample of women was analyzed ( $p < 0.05$ ). The minimum age of the patients was 21 years, and the maximum age was 40 years (Table 1).

**Table 1. Relative frequency of patient gender in the study.**

	Frequency	Percentage
Male	*20	35.1%
Female	*37	64.9%
Total	57	100.0%

\*Statistical significance between groups ( $p < 0.05$ ). Chi-square test.

Regarding the data on pain scores (Table 2), 31 patients were administered ibuprofen, and 26 individuals were administered acetaminophen. The comparison between groups did not reveal a significant difference in the average pain score ( $p > 0.05$ ).

**Table 2. Pain scores of patients in the study.**

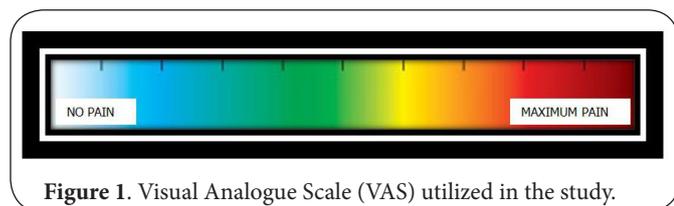
	N	Mean	Standard Deviation
Ibuprofen	31	0.36	0.63
Acetaminophen	26	0.24	0.48

\*N—Number of patients. Mean pain scores of the groups involved in the study. Mann-Whitney U test (5% significance level).

The data were ranked according to the type of procedure performed to analyze potential differences in pain related to surgery type (Kruskal-Wallis). However, these results showed no significant differences ( $p > 0.05$ ).

## Discussion

This study compared the efficacy of acetaminophen (750 mg) and ibuprofen (600 mg) for the control of postoperative pain following oral surgical procedures and found no differences between pain drugs. Similar results have been observed in studies with comparable methodology [6,7] as well as in studies focused on other areas of health with greater systemic involvement. It should be noted that these two medications can be used as antipyretic drugs and can also be used by lactating women [3]. Moreover, ibuprofen has satisfactory anti-inflammatory mechanisms of action. These drug profiles are due to the low molecular weights of the compounds and their low liposolubility [8-10].



The results of a randomized, double-blind clinical study that examined several medications found that the two medications evaluated exhibited few stomach or kidney problems when used therapeutically [11]. Moreover, in general, adverse drug reactions are poorly reported [11-13]. These results are consistent with those of the current study, as no side effects were observed in our sample of 134 patients.

Acetaminophen was selected due to its widespread use as an analgesic and because it has been thoroughly studied by many researchers. In comparison to other drugs, its systemic mechanism of action is satisfactory, although large-scale use has been shown to cause serious liver damage [14,15]. However, this side effect is not as relevant for the field of dentistry, as drugs for this use are generally administered for only a short period. Moreover, a study with rats evaluated the use of this drug for 4, 7, and 10 days and observed a significant decrease in the cellularity of the inflammatory infiltrate, consisting of monocytes, eosinophils, neutrophils, and natural killer (NK) lymphocytes, from the bronchoalveolar lavage fluid. Moreover, in addition to its drug safety profile, acetaminophen has been shown to aid cicatrization [16]. In addition, ibuprofen has also been shown to promote the closing of the arterial canal in premature children and has demonstrated few adverse reactions for the renal, brain, and mesenteric circulation. Interestingly, patients monitored over time showed no recurrence of the condition, which indicates that ibuprofen also appears to aid in cicatrization [17,18].

Similar to acetaminophen, ibuprofen has also gained research interest due to its low rates of gastrointestinal discomfort and its low toxic potential [3]. The pharmacokinetics of ibuprofen demonstrate its short half-life with rapid elimination from the circulation [19] as well as its high anti-inflammatory potential. Together, these effects of ibuprofen provide patients with a more comfortable and, in many cases, pain-free postoperative period [20,21].

The oral surgical procedures in this study were not very extensive and lasted approximately only 30-50 min. No relevant edema occurred, and no major incisions were performed. These facts may explain the similarity in the results observed between the drugs, as some patients may not have taken the medication if they did not have any painful symptoms. However, it should be noted that drug usage decisions were made by the patients themselves, and patients who did not follow the study guidelines were excluded from the sample.

The largest number of surgical procedures performed was for an increase in clinical crown size followed by gingivectomy of the anterior teeth with aesthetic indications. As the preponderance of these procedures may have represented a bias that could have interfered with the study design, the type of surgery performed and the pain levels associated were ranked in decreasing order to resolve this question. However, the statistical analyses demonstrated no significant differences in terms of post-operative pain between surgeries.

In addition, this study lost a significant portion of the sam-

ple population. As a result, more careful attention was paid to the sample selection, patient involvement, the provision of postoperative recommendations, and patient motivation to participate in the study.

## Conclusion

Based on the methodology of this study, both medications were shown to be effective for controlling postoperative pain after periodontal surgery.

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

Authors' contributions	ASS	FZM	ANP	AHB	VCP	TADVS
Research concept and design	✓	--	--	--	✓	--
Collection and/or assembly of data	✓	✓	✓	--	--	--
Data analysis and interpretation	✓	--	--	--	--	--
Writing the article	✓	--	--	--	✓	✓
Critical revision of the article	--	--	✓	✓	--	✓
Final approval of article	--	--	--	✓	--	✓
Statistical analysis	✓	--	--	--	--	--

## Acknowledgement and funding

The authors thank the Master Program in Integrated Dentistry Science, University of Cuiabá, UNIC, Cuiabá/MT, Brazil.

## Publication history

EIC: Thimios A. Mitsiadis, University of Zurich, Switzerland.

Received: 09-Oct-2013 Revised: 07-Nov-2013

Accepted: 21-Nov-2013 Published: 10-Dec-2013

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**Citation:**

Semenoff-Segundo A, Matos FZ, Porto AN, Borges ÁH, Palma VC and Semenoff TADV. **Oral surgical procedures and pain, postoperative after use the ibuprofen or acetaminophen.** *Oral Biol Dent*. 2013; **1**:4. <http://dx.doi.org/10.7243/2053-5775-1-4>