

Efficacy of Aceclofenac and Ibuprofen in Controlling Pain and Swelling following Periodontal Surgery: A Prospective Interventional Study

SHITAL V POPHALE¹, KAUSTUBH S THAKARE², PRIYANKA JAISWAL³, AISHWARYA RATHOD⁴, SIDDHANT BHUYAR⁵

ABSTRACT

Introduction: Postoperative pain and swelling are common sequelae of major periodontal surgery, including mucogingival surgeries and flap surgeries. In the first 24 hours after the procedure, pain is typically at its highest. Non Steroidal Anti-Inflammatory Drugs (NSAIDs) have emerged as a mainstream and effective option for alleviating pain and swelling.

Aim: To compare and evaluate the effectiveness of two medications, aceclofenac and ibuprofen, in the management of pain and swelling after periodontal surgery.

Materials and Methods: A prospective interventional study was conducted in the outpatient Department of Periodontology of Vidarbha Youth Welfare Society (VYWS) Dental College, Amravati, Maharashtra, India. A total of 76 patients undergoing periodontal surgery were enrolled. They were randomly divided into two groups: Group-A received 400 mg ibuprofen and

Group-B received 100 mg aceclofenac tablets. Pain intensity was assessed using a Visual Analogue Scale (VAS), and postoperative swelling was evaluated using the Tissue Oedema Index (TEI) on days 3 and 8 postsurgery. Data analysis was performed with the Wilcoxon signed-rank test for intragroup comparisons and the Mann-Whitney U test for intergroup comparisons.

Results: Pain intensity decreased significantly with the ingestion of both drugs. On day 3, pain intensity was 5.00 ± 1.73 , decreasing to 0.80 ± 1.79 on day 8 for Group-A (p -value=0.034). For Group-B, pain intensity on day 3 was 4.60 ± 0.55 , decreasing to 0.40 ± 0.89 on day 8 (p -value=0.041). The outcome for patients treated with 400 mg ibuprofen was not significantly different from that of patients treated with 100 mg aceclofenac ($p > 0.05$).

Conclusion: The results indicate that both ibuprofen and aceclofenac can be used effectively for pain control after periodontal surgery.

Keywords: Analgesia, Flap surgery, Mucogingival surgery, Tissue oedema

INTRODUCTION

Pain can be defined as an unpleasant sensation, an emotional experience, or an impact that triggers impulses activating various protective and negative reactions in the body [1]. Postoperative pain is common in patients who have undergone periodontal surgery and is associated with inflammatory processes initiated by surgical trauma, corresponding to actual or potential tissue damage. According to Seymour RA, pain levels typically reach their highest point within 24 hours post-procedure and then decline in the following days [2]. Pain is a well-documented consequence of periodontal surgery [3]. Managing postoperative pain is a critical aspect of comprehensive periodontal care. Surgical trauma leads to fluid accumulation, causing postoperative swelling, which results from the complex interplay of inflammatory mediators that induce vasodilation and increase vascular permeability, leading to fluid extravasation and oedema [4,5].

The NSAIDs have been shown to be efficacious in controlling post-surgical pain and inflammation in periodontal patients, according to multiple studies [6-8]. NSAIDs have become standard in dental care for managing pain and inflammation, with the ideal analgesic providing effective relief without adverse side-effects [2,9].

Aceclofenac, a phenylacetic acid derivative, is an orally active anti-inflammatory agent that targets multiple inflammatory mediators. It selectively inhibits Cyclooxygenase-2 (COX-2) and is rapidly absorbed following oral administration. Maximum plasma levels are reached within 1-3 hours. It is indicated in the treatment of pain, inflammation, degenerative arthropathies, and postsurgical or post-traumatic inflammation. This compound serves as a prodrug of

diclofenac, undergoing decomposition under various conditions, including hydrolysis (neutral, acidic, and alkaline) and exposure to light in solution. Approximately, 2-5% of patients experience nausea, abdominal pain, or vomiting, while rare neurological side-effects, including dizziness and vertigo, have been reported [10,11]. Clinical trials have demonstrated Aceclofenac's effectiveness in managing dental pain. The superior tolerability of Aceclofenac translates to reduced withdrawal rates and enhanced treatment fidelity [12-15].

Ibuprofen, a propionic acid derivative, belongs to the NSAID class and exhibits potent anti-inflammatory properties. By acting peripherally, ibuprofen blocks the production of prostaglandins at the site of tissue injury, thereby reducing inflammation. Following oral administration, absorption occurs promptly, and the peak plasma concentration is reached within 15-30 minutes [14]. A Cochrane review indicates ibuprofen's advantage over acetaminophen in alleviating pain and minimising the need for additional medication within 6 hours of third molar extraction. The non selective blockade of COX enzymes by NSAIDs contributes to adverse effects ranging from mild gastrointestinal disturbances, such as dyspepsia, to severe and potentially life-threatening conditions, including gastric ulcers and haemorrhage [16].

As proposed by Insel PA, the suppression of prostaglandin synthesis is thought to be the primary mechanism underlying the attenuation of inflammatory responses at surgical sites, suggesting that preoperative administration of the drug may optimise its therapeutic effects [17]. This hypothesis is substantiated by studies conducted by Cooper SA [9]. Ibuprofen and Aceclofenac exhibit distinct anti-inflammatory mechanisms: Ibuprofen inhibits leukocyte migration and function, while Aceclofenac lowers intracellular arachidonic acid

concentrations [15]. To reduce postoperative pain and discomfort in patients, there is a need to determine the effectiveness of NSAIDs. There is a paucity of research on the efficacy of NSAIDs in reducing swelling. Thus, the present study aimed to compare the effectiveness of aceclofenac and ibuprofen in the management of pain and swelling after periodontal surgery.

MATERIALS AND METHODS

A prospective interventional study was conducted in the Outpatient Department of Periodontology of VYWS Dental College, Amravati, Maharashtra, India, from January 2024 to July 2024. Ethical approval was obtained (DCA/IEC/235/2024) from the Institute's ethical committee.

Inclusion and Exclusion criteria: Participants aged 20-50 years who experienced moderate to severe pain (moderate 4-6 and severe 7-10 on the VAS) after periodontal surgery (mucogingival surgeries to flap surgery) and who provided voluntary consent were included. The study excluded pregnant and lactating women, patients already taking other analgesics, non compliant patients for oral hygiene maintenance, dento-alveolar abscess, pulpo-periodontal lesions, patients with systemic diseases, and those with known hypersensitivity to ibuprofen or aceclofenac.

Sample size calculation: The sample size calculation was performed using OpenEpi, version 3.01. The required sample consisted of 76 patients undergoing major periodontal surgery (mucogingival surgeries to flap surgery).

After a thorough explanation of the study's purpose, procedures, and potential outcomes, all participants willingly provided informed consent, acknowledging their understanding of the research and their right to withdraw at any time without facing adverse consequences. Patients were randomly assigned to treatment groups A and B by coin toss. Group-A received 400 mg ibuprofen [15], while Group-B received 100 mg aceclofenac [15].

Study Procedure

Postoperative assessment: Postsurgery, a recovery period was observed to ensure clearance of anaesthetic effects and enable baseline evaluation of pain and swelling. Postoperative pain intensity was assessed on days 3 and 8 using the VAS, with patients rating their pain from 0 to 10, categorised as: 0=no pain, 1-3=mild, 4-6=moderate and 7-10=severe [18].

Swelling assessment: The TEI, a validated descriptive scale, was used to assess postoperative swelling on days 3 and 8, with scores ranging from 1 to 4: 1=no swelling, 2=slight intraoral swelling, 3=moderate intraoral swelling, and 4=intense extraoral swelling [18].

Follow-up and adverse effects: Seven days post-operatively, the dressing and sutures were removed, and any adverse effects or bleeding complications were documented. The obtained values were recorded and subjected to statistical analysis.

STATISTICAL ANALYSIS

Data were analysed using IBM Statistical Package for Social Sciences (SPSS) Statistics for Windows, version 20.0. The Wilcoxon signed-rank test was used for intragroup comparisons, and the Mann-Whitney U test for intergroup comparisons. A p-value <0.05 was considered statistically significant.

RESULTS

Of the 76 subjects, Group-A consisted of 8 males and 30 females, while Group-B consisted of 22 males and 16 females [Table/Fig-1]. Randomisation confirmed 38 patients in each treatment group and an equal distribution of surgery types in each group (18 mucogingival surgeries and 20 flap surgeries per group).

Variables	Category	Ibuprofen	Aceclofenac
Age (in years)	--	36.40±18.05	37.40±15.86
Gender	Male	8 (21.05%)	22 (57.89%)
	Female	30 (78.94%)	16 (42.10%)

[Table/Fig-1]: Demographic details.

The comparison of VAS scores on day 3 and day 8 within each group is presented in [Table/Fig-2]. VAS scores decreased significantly from day 3 to day 8 in both groups: Group-A, 5.00±1.73 on day 3 and 0.80±1.79 on day 8; Group-B, 4.60±0.55 on day 3 and 0.40±0.89 on day 8. The Wilcoxon signed-rank test yielded p≤0.05, indicating statistical significance.

Groups	3 rd day	8 th day	Difference	p-value
Ibuprofen	5.00±1.73	0.80±1.79	4.20	0.034*
Aceclofenac	4.60±0.55	0.40±0.89	4.20	0.041*

[Table/Fig-2]: Comparison of VAS scores on 3rd day and 8th day within each group. The Wilcoxon signed-rank test

The comparison of swelling on days 3 and 8 within each group is presented in [Table/Fig-3]. The Wilcoxon signed-rank test yielded p>0.05, indicating no statistically significant difference between day 3 and day 8.

Groups	Interval	Score 1	Score 2	Score 3	Median (IQR)	p-value
Ibuprofen	3 rd day	15 (39.47%)	8 (21.05%)	15 (39.47%)	1.00 (0.00-2.00)	0.102
	8 th day	38 (100%)	0	0	0	
Aceclofenac	3 rd day	15 (39.47%)	23 (60.53%)	0	1.00 (0.00-1.00)	0.083
	8 th day	38 (100%)	0	0	0	

[Table/Fig-3]: Comparison of swelling on 3rd day and 8th day within each group. The Wilcoxon signed-rank test

The intergroup comparisons of VAS scores and swelling on the 3rd and 8th days is presented in [Table/Fig-4,5]. On both days, the VAS scores and swelling of the two groups did not show any significant difference (p>0.05).

Interval	Ibuprofen	Aceclofenac	Difference	p-value
3 rd day	5.00±1.73	4.60±0.55	0.40	0.817
8 th day	0.80±1.79	0.40±0.89	0.40	0.881

[Table/Fig-4]: Intergroup comparison of VAS score between two groups. Mann Whitney test

Interval	Ibuprofen			Aceclofenac			p-value
	Score 1	Score 2	Score 3	Score 1	Score 2	Score 3	
3 rd day	15 (39.47%)	8 (21.05%)	15 (39.47%)	15 (39.47%)	23 (60.53%)	0	0.502
8 th day	38 (100%)	0% (0)	0% (0)	38 (100%)	0% (0)	0	1.000

[Table/Fig-5]: Intergroup comparison of swelling between two groups. Mann Whitney test

DISCUSSION

Ibuprofen and aceclofenac were both significantly effective in reducing pain and swelling after periodontal surgeries; however, there was no significant difference between the two groups.

Periodontal surgery provides a suitable clinical model for assessing the efficacy of pain-relief medications, which are often accompanied by swelling. The prolonged duration of postoperative pain following these procedures makes them ideal for evaluating the efficacy of multiple-dose analgesic regimens. As noted by Vogel RI and Gross JI, the use of NSAIDs in controlling periodontal postsurgical

pain offers a dual advantage: not only do these medications provide effective pain relief, but they also exhibit a favourable safety profile, with minimal risk of addiction, Central Nervous System (CNS) toxicity, and gastrointestinal disturbances [5]. Pain intensity was assessed using the VAS, a widely accepted measure according to Berge TI [19] and Seymour RA et al., [14]. Dionne RA et al., (1983) concluded that ibuprofen suppresses postoperative pain when compared with standard therapy without an increase in side-effects. They also showed that a single 400 mg dose of ibuprofen, compared with placebo, significantly prolonged the onset latency of postoperative pain after third molar surgery, by about 100 minutes [20].

A plethora of studies by researchers including Jatin K et al., [21], Habib S et al., [22], Vogel RI and Gross JL [5], and McQuay HJ et al., [23] have consistently demonstrated ibuprofen's efficacy as a reliable analgesic for managing postoperative dental pain, and the findings of the present study corroborate this well-established conclusion. Similar results were reported by Seymour RA et al., (1996), who found that patients receiving ibuprofen 400 mg experienced significantly less pain and greater pain relief than those receiving placebo [11]. However, in a study by Seymour RA et al., (1998), a single dose of aceclofenac 150 mg was less effective than ibuprofen 400 mg for third molar surgery [14]. Both soluble and tablet ibuprofen provided effective pain control after impacted third molar removal, but additional medication may be required after about three hours to manage potential pain increases. Ibuprofen 400 mg appears sufficient for postoperative pain management after third molar surgery. By contrast, Pavithra P et al., (2015) demonstrated that aceclofenac 100 mg provided superior analgesia compared with ibuprofen 400 mg in patients with irreversible pulpitis [15]. A 2011 study by Jain N and Maria A showed that ibuprofen offered superior postoperative pain management compared with aceclofenac after third molar surgery, particularly in terms of its rapid onset and longer duration of action, although statistical analysis revealed only minimal differences between the two medications regarding trismus and anti-inflammatory effects [13].

Aznar-Arasa L et al., (2012) concluded that preoperative ibuprofen intake did not provide additional benefits in reducing pain, swelling, and trismus compared with postoperative administration after impacted lower third molar surgery [4].

A study by Mlachkova A and Dosseva-Panova V (2023) concluded that both ibuprofen and Aulin (nimesulide) are sufficiently effective in controlling postoperative pain in surgical periodontal procedures [24]. Research published by Pearlman B et al., (1997) demonstrated that initiating ibuprofen administration before periodontal surgery substantially improves its effectiveness in limiting postoperative pain, highlighting the benefits of preoperative analgesic prophylaxis [25].

To establish a comparative benchmark, an ibuprofen treatment group was included as a positive control, given the lack of existing research on aceclofenac's efficacy in managing postoperative pain following periodontal surgery. In the present study, the results demonstrated that both ibuprofen and aceclofenac were significantly effective in pain control and swelling after periodontal surgery.

Limitation(s)

Pain is a subjective experience with considerable inter-individual variability, which can introduce bias.

CONCLUSION(S)

The results of the present study indicate that both 400 mg ibuprofen and 100 mg aceclofenac are effective for controlling pain and swelling after periodontal surgeries. Additional comparative studies

are necessary to achieve better pain and swelling control in the surgical treatment of periodontal diseases.

REFERENCES

- [1] Anand KJS, Craig KJ. New perspectives on the definition of pain. *Pain*. 1996;67(1):03-06.
- [2] Kumaravelu P, Kaliappan V, Viswanathan G, David DC, Venkatesan H. A comparative study of oral analgesics: Etoricoxib with tramadol in acute postoperative pain: A randomised double-blind study. *J Clin Diagn Res*. 2010;4:2398-405.
- [3] Popova C, Mlachkova A, Emilov D. Effectiveness of NSAIDs Aulin and ibuprofen on postoperative pain at gingival graft procedures—a preliminary study. *J IMAB*. 2008;14(2):30-34. Doi: 10.5272/jimab.
- [4] Aznar-Arasa L, Harutunian K, Figueiredo R, Valmaseda-Castellón E, Gay-Escoda C. Effect of preoperative ibuprofen on pain and swelling after lower third molar removal: A randomized controlled trial. *Int J Oral Maxillofac Surg*. 2012;41(8):1005-09.
- [5] Vogel RI, Gross JL. The effects of nonsteroidal anti-inflammatory analgesics on pain after periodontal surgery. *J Am Dent Assoc*. 1984;109(5):731-34.
- [6] Betancourt JW, Kupp LI, Jasper SJ, Farooqi OW. Efficacy of ibuprofen-hydrocodone for the treatment of postoperative pain after periodontal surgery. *J Periodontol*. 2004;75:872-76.
- [7] Ferreira SH. The role of interleukins and nitric oxide in the mediation of inflammatory pain and its control by peripheral analgesics. *Drugs*. 1993;46(Suppl 1):01-09.
- [8] Pais JM, Rosteiro FM. Nimesulide in the short-term treatment of inflammatory process of dental tissues: A double-blind controlled trial against oxyphenbutazone. *J Int Med Res*. 1983;11(3):149-54.
- [9] Cooper SA. Five studies on ibuprofen for postsurgical dental pain. *Am J Med*. 1984;77(1A):70-77.
- [10] Seymour RA. Efficacy of paracetamol in reducing postoperative pain after periodontal surgery. *J Clin Periodontol*. 1983;10(3):311-16.
- [11] Seymour RA, Ward-Booth P, Kelly PJ. Evaluation of different doses of soluble ibuprofen and ibuprofen tablets in postoperative dental pain. *Br J Oral Maxillofac Surg*. 1996;34(1):110-14.
- [12] Presser Lima PV, Fontanella V. Analgesic efficacy of aceclofenac after surgical extraction of impacted lower third molars. *Int J Oral Maxillofac Surg*. 2006;35(6):518-21.
- [13] Jain N, Maria A. Randomized double-blind comparative study on the efficacy of ibuprofen and aceclofenac in controlling postoperative sequelae after third molar surgery. *J Maxillofac Oral Surg*. 2011;10(2):118-22.
- [14] Seymour RA, Frame J, Negus TW, Hawkesford JE, Marsden J, Matthew IR. The comparative efficacy of aceclofenac and ibuprofen in postoperative pain after third molar surgery. *Br J Oral Maxillofac Surg*. 1998;36(5):375-79.
- [15] Pavithra P, Dhanraj M, Sekhar P. Analgesic effectiveness of ibuprofen and aceclofenac in the management of acute pulpitis: A randomized double-blind trial. *Int J Pharm Sci Rev Res*. 2015;35:70-74.
- [16] Bailey E, Worthington HV, van Wijk A, Yates JM, Coulthard P, Afzal Z. Ibuprofen and/or paracetamol (acetaminophen) for pain relief after surgical removal of lower wisdom teeth. *Cochrane Database Syst Rev*. 2013;2013(12):CD004624.
- [17] Insel PA. Analgesic-antipyretic and anti-inflammatory agents and drugs employed in the treatment of gout. In: JG Hardman, Limbird LE, Molinoff PB, Ruddon RW and Goodman Gilman A, Eds., Goodman and Gilman's the Pharmacological Basis of Therapeutics, 9th Edition, McGraw-Hill, New York, 1996, pp. 617657.
- [18] Magdy M, Abdelkader MA, Alloush S, Fawzy El-Sayed KM, Nawwar AA, Shoeib M, et al. Ultra-short versus standard-length dental implants in conjunction with osteotomy-mediated sinus floor elevation: A randomized controlled clinical trial. *Clin Implant Dent Relat Res*. 2021;23(4):520-29.
- [19] Berge TI. The use of a visual analogue scale in observer assessment of postoperative swelling subsequent to third molar surgery. *Acta Odontol Scand*. 1989;47:167-74.
- [20] Dionne RA, Campbell RA, Cooper SA, Hall DL, Buckingham B. Suppression of postoperative pain by preoperative administration of ibuprofen in comparison to placebo, acetaminophen, and acetaminophen plus codeine. *J Clin Pharmacol*. 1983;23(1):37-43.
- [21] Jatin K, Lata J, Singh TPA. Comparative study on the efficacy of rofecoxib and ibuprofen in controlling post-operative sequelae following third molar surgeries. *J Maxillofac Oral Surg*. 2007;6(1):17-21.
- [22] Habib S, Mathews RW, Scully SM. A study of the comparative efficacy of four common analgesics in the control of postsurgical pain. *Oral Surg Oral Med Oral Pathol*. 1990;70:559-63. Doi: 10.1016/0030-4220(90)90396-A. Strahan.
- [23] McQuay HJ, Carroll D, Guest PG, Robson S, Wiffen PJ, Juniper RP. A multiple dose comparison of ibuprofen and dihydrocodeine after third molar surgery. *Br J Oral Maxillofac Surg*. 1993;31(2):95-100. Doi: 10.1016/0266-4356(93)90169-W.
- [24] Mlachkova A, Dosseva-Panova V. Effectiveness of NSAIDs for pain management in periodontal surgery. *J IMAB*. 2023;29(1):4757-62.
- [25] Pearlman B, Boyatzis S, Daly C, Evans R, Gouvoussis J, Highfield J, et al. The analgesic efficacy of ibuprofen in periodontal surgery: A multicentre study. *Aust Dent J*. 1997;42(5):328-34.

PARTICULARS OF CONTRIBUTORS:

1. Postgraduate Student, Department of Periodontics, Vidarbha Youth Welfare Society Dental College and Hospital, Amravati, Maharashtra, India.
2. Professor, Department of Periodontics, Vidarbha Youth Welfare Society Dental College and Hospital, Amravati, Maharashtra, India.
3. Professor, Department of Periodontics, Sharad Pawar Dental College and Hospital, Wardha, Maharashtra, India.
4. Senior Lecturer, Department of Periodontics, Vidarbha Youth Welfare Society Dental College and Hospital, Amravati, Maharashtra, India.
5. Postgraduate Student, Department of Periodontics, Vidarbha Youth Welfare Society Dental College and Hospital, Amravati, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Shital V Pophale,
Postgraduate Student, Department of Periodontics, VYWS Dental College,
Amravati-444602, Maharashtra, India.
E-mail: pophaleshital06@gmail.com

PLAGIARISM CHECKING METHODS: [\[Jain H et al.\]](#)

- Plagiarism X-checker: Nov 13, 2024
- Manual Googling: Dec 26, 2025
- iThenticate Software: Dec 29, 2025 (1%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Nov 09, 2024**

Date of Peer Review: **Feb 27, 2025**

Date of Acceptance: **Jan 02, 2026**

Date of Publishing: **May 01, 2026**