

## Assessment of Pain Management Post Mandibular Third Molar Extraction with Piroxicam: A Retrospective Analysis Over 10 Months

Research Article

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### Abstract

Surgical removal of impacted mandibular third molar is one of the most commonly performed procedures in oral and maxillofacial surgical practice. The role of postoperative medications for management of postoperative pain is important for comfortable and uneventful healing. To assess and compare the therapeutic effect of piroxicam and other NSAIDs on patients undergoing surgical removal of impacted mandibular third molar, the study was conducted among patients who reported to a dental college for surgical removal of mandibular third molar. The data was collected and tabulated in MS-Excel and was analysed using SPSS software. Patients experience less post-operative pain on administration of piroxicam in comparison to other analgesics which will help to improve the post-operative pain. Piroxicam was found to have a better analgesic action in comparison to other analgesics given and also help to increase the postoperative comfort and quality of life.

**Keywords:** Analgesics; Third Molar; Pain; Piroxicam; Impaction.

### Introduction

The surgical removal of impacted third molars is one of the most common minor oral surgery procedures widely carried out in general practice and also occupies an appreciable amount of clinical time in many hospitals in oral and maxillofacial departments [23]. The decision to remove the third molar is often difficult because of the consequences of the surgical extraction. Patients complain of pain, swelling, and limitation of mouth opening [50]. Frequently, this pain is moderate and temporary. Pain from lower third molar extraction reaches its maximum intensity 2–4 h after the end of surgery, and, in most cases, patients require analgesic treatment. Besides pain, swelling and the limited articulation of the temporomandibular joint associated with inflammation, there are further who undergo surgical interventions in the oral cavity and treatment for pain, trismus and swelling after lower third molar surgery includes non-steroidal anti-inflammatory require anal-

gesic treatment [23, 7, 4]. The role of preoperative and postoperative medications in reducing postoperative complications has been extensively evaluated. Nonsteroidal anti-inflammatory drugs (NSAIDs) inhibit the synthesis of prostaglandins and reduce the inflammatory reaction and nociceptive stimuli causing reduction in pain. Piroxicam, a NSAID with a long half-life and potent analgesic activity similar to that of indomethacin, [55] has been developed in a new sublingual formulation. It is easily administered and does not have any harmful effects in the oral cavity. Although the analgesic effect of piroxicam in several types of pain (e.g., postoperative pain, acute renal colic, [49] dysmenorrhea, osteoarthritis, [36] low back pain, headache, and migraine [27] has been investigated. Surgical trauma activates a biochemical cascade, with the synthesis or release of prostaglandins, bradykinin, substance-P, histamine, and other substances. They interact to produce plasma extravasation, leading to edema. They also excite and sensitize peripheral nerve endings, resulting in the clinical manifestation of hyperalgesia. These substances have several other effects on

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peripheral nerve endings. They stimulate the release of neuropeptides such as calcitonin gene-related peptide (CGRP) from peripheral nerve endings, contributing to the synergistic effects of other biochemical cascades. These substances form a positive feedback loop that is thought to continually refuel the inflammatory process, maintaining the clinical signs of inflammation for days after the initial stimulus [8]. NSAIDs including piroxicam are not completely free of adverse effects. Some individuals exhibit allergic reactions to NSAIDs. Patients with an increased risk for hepatic failure, peptic ulcers, and gastrointestinal inflammation should avoid using NSAIDs, including piroxicam [24, 12]. Complications of extraction such as dry socket can be treated with ZOE paste [16]. In another study, Irrespective of the year of study, majority of the students showed a negative attitude toward HIV/AIDS patients and only a few among the interns showed a positive approach toward treating HIV patients [37]. This present study compares the efficacy of piroxicam versus other analgesics in surgical extraction of mandibular third molars and assessing the post-operative pain experience by the patients.

Previously our team has a rich experience in working on various research projects across multiple disciplines. (Jain, 2017 [14]); (Varghese, Ramesh and Veeraiyan, 2019 [51]); (Ashok and Ganapathy, 2019 [3]); (Padavala and Sukumaran, 2018 [29]); (Ke et al., 2019 [17]); (Ezhilarasan, 2018 [9]); (Krishnan et al., 2018 [18]); (Ezhilarasan, Sokal and Najimi, 2018 [9]); (Pandian, Krishnan and Kumar, 2018 [31]); (Ramamurthy and Mg, 2018 [39]); (Gupta, Ariga and Deogade, 2018 [13]); (Vikram et al., 2017 [54]); (Paramasivam, Vijayashree Priyadharsini and Raghunandhakumar, 2020 [32]); (Palati et al., 2020 [30]); (Samuel, Acharya and Rao, 2020 [44]) Now the growing trend in this area motivated us to pursue this project.

### Materials and Methods

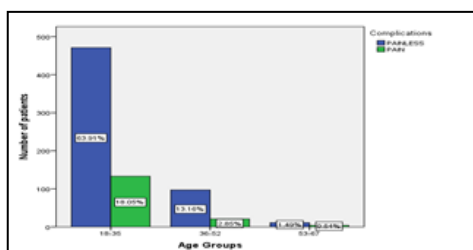
This retrospective study was conducted in the university setting. Data chosen for evaluations were patients who reported to a den-

tal college for the removal of mandibular third molars. The details of the patients were obtained from analysis of 86,000 patients from June 2019 to March 2020 from patient dental records for the purpose of preservation and efficient analysis of the patient's details including intraoral and extra oral pictures and treatments being done, which is maintained in a confidential manner. These serve as records for the retrospective studies. The study was conducted after getting ethical approval from the Institutional Ethical Committee (Ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). Cross verification was done with the help of patient dental records data. To minimize sampling bias all data were included. The inclusion criteria included patients who required removal of impacted mandibular third molars, prophylactic removal of mandibular third molars and patients with acute pericoronitis. The exclusion criteria included patients with drug allergies, medically compromised patients and patients who are pregnant or current lactation. Data was downloaded from the patient dental records and imported to Excel. Data which was not required were excluded. Excel tabulation was done and imported to SPSS and results were obtained in the form of graphs and tables. The advantages of the study included easy accessibility and availability of the required data and drawback was the available data was not location specific and belonged to different ethnicity. Independent variables that were included in the study – age, gender, tooth number (mandibular third molars), analgesic. The dependent variable included post-operative pain. The correlation and association between the variables were analysed and assessed using this test.

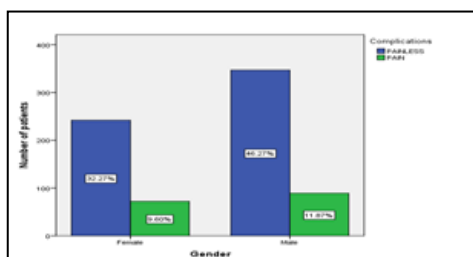
### Results & Discussion

A total number of 694 patients had undergone surgical extraction of mandibular third molars. Of these 153 patients were administered aceclofenac, 17 diclofenac, 141 paracetamol and 342 Piroxicam. Figure 1 shows better efficacy of analgesics in the younger age group. Figure 2 shows males to have a better analgesic effect compared to females. From Figure 3 we can conclude

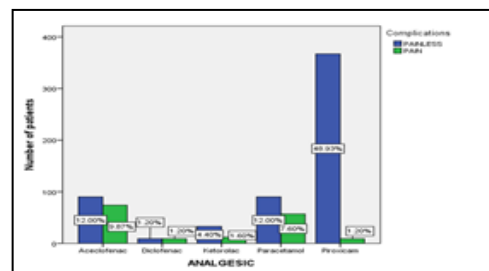
**Figure 1:** This bar graph represents the association between age groups and the analgesic effect of drugs post mandibular third molar extraction-axis represents the age distribution and Y-axis represents the total number of patients who underwent mandibular third molar extraction(Blue: Painless , Green: Pain ). Chi-square test was done and association was found to be statistically Not significant. Pearson's Chi square value: p value: 0.524(>0.05) Hence not statistically significant , proving age does not influence the analgesic effect of drugs post mandibular third molar extraction.



**Figure 2:** This bar graph represents the association between gender and the analgesic effect of drugs post mandibular third molar extraction. X-axis represents the age distribution and Y-axis represents the total number of patients who underwent mandibular third molar extraction (Blue: Painless, Green: Pain). Chi-square test was done and association was found to be statistically significant. Pearson's Chi square value: p value: 0.418(>0.05) Hence not statistically significant , proving gender does not influences the analgesic effect of drugs post mandibular third molar extraction.



**Figure 3:** This bar graph represents the association between different analgesic drugs and the analgesic effect of the drugs post mandibular third molar extraction. X-axis represents the analgesic drugs and Y-axis represents the total number of patients who underwent mandibular third molar extraction (Blue: Painless, Green: Pain). Chi-square test was done and association was found to be statistically significant. Pearson's Chi square value: p value: 0.000(<0.05) Hence, it is statistically significant, proving piroxicam has a better analgesic effect when compared to other drugs post mandibular third molar extraction.



that piroxicam has a better efficiency to control pain post extraction, diclofenac and paracetamol have the least efficacy in pain control. Ketorolac and aceclofenac were found to have an intermediate efficiency in controlling pain. Piroxicam was found to be a better analgesic for surgical extraction comparatively. From Figure 1, Painless extractions were highest in the age group 18-35 years (63.91%) followed by 36-52 years (13.16%) and 53-67 years (1.49%). The extractions reported with pain were also highest in 18-35 years (18.05%) followed by 36-52 years (2.85%) and 53-67 years (0.54%). Chi-square test was done and association was found to be statistically insignificant. Pearson's Chi square value: p value: 0.524(>0.05). Hence not statistically significant. So age is not a factor for confirming the effectiveness of piroxicam. From Figure 2, Painless post-extraction periods were highest in the males (46.27%) and females (32.27%). The extractions reported with pain were also highest in males (11.87%) and females (9.60%). Chi-square test was done and association was found to be statistically significant. Pearson's Chi square value: p value: 0.418(>0.05) Hence not statistically significant. So gender is not a factor for confirming the effectiveness of piroxicam. From Figure 3, Painless post-extraction periods were highest in the Piroxicam (48.93%), Paracetamol (12%) and Aceclofenac (12%), Ketorolac(4.40%) and Diclofenac(1.20%). The extractions reported with pain were also highest in Aceclofenac (9.87%), Paracetamol (7.60%), Ketorolac(1.60%) Piroxicam (1.20%), and Diclofenac (1.20%). Chi-square test was done and association was found to be statistically significant. Pearson's Chi square value: p value: 0.000(<0.05). So, proving piroxicam has a better analgesic effect when compared to other drugs post mandibular third molar extraction.

The presence of pain during the postoperative period after third molar extraction is the chief indicator. In this study we can compare the efficacy of pain with the control group of drugs; Diclofenac, Aceclofenac, Paracetamol and Ketorolac among different age groups. Other studies deal with the swelling, trismus, pain post third molar extraction(Shruthi, no date). A Sunshine et al study on Piroxicam provided evidence for longer duration of analgesic action compared to codeine or aspirin [48]. In another study, ketorolac 10 mg is more effective than Paracetamol 500mg as an analgesic after dental extractions [26]. Oropharyngeal airway volume has shown the highest post-surgical reduction though statistically insignificant [6, 2, 14]. The importance of training regarding biomedical waste management must be emphasized as the lack of proper and complete knowledge about it. [34] management impacts practices of appropriate waste disposal. [20]. A standard protocol regarding the training as well as preventive

measures for surgical extractions should be formulated for the dental students and the knowledge acquired must be transferred into practice [45]. The etiology and pattern of maxillofacial injuries reflect the trauma patterns within the community and can thus provide a guide to help design programs toward prevention and treatment [28]. In another study, buccal fat pad graft proved to give better results as the interposition material as it has good patient acceptance, rapid epithelization, minimal donor site morbidity and minimal intra and postoperative complications [33, 21]. The ability to use Botox as an adjuvant and primary mode of the treatment for various maxillofacial disorders offers exciting treatment options for dentists and patients in the future [19, 15]. Surgical trauma activates a biochemical cascade, with the synthesis or release of prostaglandins, bradykinin, substance-P, histamine, and other substances. They interact to produce plasma extravasation, leading to edema. They also excite and sensitize peripheral nerve endings, resulting in the clinical manifestation of hyperalgesia. These substances have several other effects on peripheral nerve endings. They stimulate the release of neuropeptides such as calcitonin gene-related peptide (CGRP) from peripheral nerve endings, contributing to the synergistic effects of other biochemical cascades. These substances form a positive feedback loop that is thought to continually refuel the inflammatory process, maintaining the clinical signs of inflammation for days after the initial stimulus [8]. Acute pain serves an immediate sensory function, and the inflammatory process is important for normal tissue healing. However, pain and other inflammatory reactions may often overshoot their goal and cause unnecessary sequelae. The magnitude of postoperative pain depends on the degree of tissue damage and on the extent of operative trauma. Reducing pain and excessive inflammatory reactions is necessary not just for immediate reduction of postoperative morbidity, but also to provide prolonged benefits by preventing further worsening of pathologic states. In another study, there was a statistically significant reduction in pain on the postoperative days in the piroxicam group. No rescue treatment was required by any of the subjects in both the groups during the trial and sublingual piroxicam was effective in the management of postoperative pain following surgical removal of mandibular impacted third molar [25].

Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc, Marimuthu and Devadoss, 2018 [35]; Ramesh et al., 2018 [40]; Vijayashree Priyadharsini, Smiline Girija and Paramasivam, 2018 [53]; Ezhilarasan, Apoorva and Ashok Vardhan, 2019 [10]; Ramadurai et al., 2019 [38]; Sridharan et al., 2019 [47]; Vijayashree Priyadharsini, 2019 [52]; Chandrasekar et al., 2020 [5]; Mathew et al., 2020 [22]; R et

al., 2020 [42]; Samuel, 2021 [43]). We hope this study adds to this rich legacy.

## Conclusion

Within the limitations of the study, the efficacies of piroxicam among other NSAIDs was found to be significantly high and in different age groups and gender were found to be not very significant for comparison as a better analgesic when compared to other NSAIDs. In the future studies, larger sample size with multicentered and multiple ethnic groups should be involved to get better results.

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