POSTOPERATIVE PAIN CONTROL IN MANDIBULAR MOLAR EXTRACTION: A COMPARISON BETWEEN ORAL AND TRANSDERMAL DICLOFENAC SODIUM

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Introduction:

Postoperative pain following mandibular molar extraction is a common clinical problem encountered in routine dental practice. Inadequate pain control can significantly affect a patient's daily activities, sleep, nutrition, and overall quality of life. Although postoperative pain is generally self-limiting, effective analgesic management is essential to reduce morbidity, enhance patient comfort, and facilitate early recovery.

With increasing prevalence of dental caries and improved access to oral healthcare, the frequency of tooth extractions has increased, emphasizing the need for safe and effective postoperative pain control strategies. Diclofenac sodium, a non-steroidal anti-inflammatory drug (NSAID), is widely used due to its potent analgesic and anti-inflammatory properties. However, oral diclofenac is often associated with gastrointestinal irritation and systemic adverse effects [1].

Transdermal diclofenac patches have emerged as an alternative route of administration, offering sustained drug delivery, bypass of first-pass hepatic metabolism, and potentially reduced systemic side effects [2]. Despite growing interest, limited clinical evidence exists comparing oral and transdermal diclofenac specifically in mandibular molar extractions. This study was therefore conducted to compare the efficacy, safety, and wound healing outcomes of oral diclofenac sodium and transdermal diclofenac patches in postoperative pain management.

Aim and Objectives:

Aim

To evaluate and compare the effectiveness of oral diclofenac sodium and transdermal diclofenac sodium in controlling postoperative pain following mandibular molar extraction.

Objectives

1. To assess postoperative pain intensity in patients receiving oral diclofenac sodium (50 mg).
2. To assess postoperative pain intensity in patients receiving a transdermal diclofenac sodium patch (100 mg).
3. To compare the onset, duration, and quality of analgesia between the two routes.
4. To evaluate adverse effects associated with each modality.
5. To assess patient comfort, compliance, and wound healing outcomes

Materials and Methods:

This study was designed as a **prospective, randomised, parallel-group clinical trial** involving **60 patients** undergoing mandibular molar extraction.

Study Groups

- **Group A (n = 30):** Oral diclofenac sodium 50 mg twice daily
- **Group B (n = 30):** Transdermal diclofenac sodium patch 100 mg once daily

Inclusion Criteria

- Patients aged 18–65 years
- Indicated for non-complicated mandibular molar extraction
- ASA physical status I or II

Exclusion Criteria

- Known allergy to NSAIDs
- History of peptic ulcer disease, renal or hepatic impairment
- Pregnancy or lactation
- Recent analgesic use

Randomisation was performed using a simple chit-pull method with allocation concealment. Ethical committee approval was obtained, and informed consent was taken from all participants.

Extractions were performed using a standardised atraumatic technique under local anaesthesia. Postoperative pain was assessed using the **Numeric Rating Scale (NRS)** at 3, 6, 24, 48, and 72 hours post-extraction. Wound healing was evaluated on day 3 and day 7 using the **Landry, Turnbull and Howley wound healing index** [6]. Rescue analgesic consumption and adverse effects were recorded.

Results:

Statistical analysis was performed using SPSS Version 25 with significance set at $p < 0.05$. Age and gender distribution between the two groups were comparable, with no statistically significant differences.

TABLE1: AGE-WISE DISTRIBUTION IN THE GROUPS

		AGE			Total	
		20-30 Y	30-40Y	40-55Y		P value
GROUP	DICLOFENAC (ORAL)	7	5	18	30	
	DICLOFENAC (TRANSDERMAL)	7	6	17	30	
Total		14	11	35	60	0.942

TABLE 2: GENDER-WISE DISTRIBUTION IN THE GROUP

		GENDER		Total	
		MALE	FEMALE		P value
GROUP	ORAL_DICLOFENAC	7	23	30	
	TRANSDERMAL_DICLOFENAC	5	25	30	
Total		12	48	60	0.519

Pain scores at 3, 6, 24, and 48 hours showed no statistically significant difference between the two groups ($p > 0.05$). However, at **72 hours**, patients receiving the transdermal diclofenac patch demonstrated significantly better pain control compared to the oral diclofenac group ($p = 0.004$).

TABLE 3: COMPARISON OF PAIN BETWEEN THE 2 STUDY GROUPS AFTER 3 HOURS

		PS 3			Total	
		MILD 1 - 3	MODERATE 4 - 6	SEVERE 7 - 10		P value
GROUP	DICLOFENAC (ORAL)	2	7	21	30	
	DICLOFENAC (TRANSDERMAL)	1	12	17	30	
	TOTAL	3	19	38	60	0.3

TABLE 4: COMPARISON OF PAIN BETWEEN THE 2 STUDY GROUPS AFTER 6 HOURS

		PS 6			Total	
		MILD 1 - 3	MODERATE 4 - 6	SEVERE 7 - 10		P value
GROUP	DICLOFENAC (ORAL)	3	25	2	30	
	DICLOFENAC (TRANSDERMAL)	1	29	0	30	
	TOTAL	4	54	2	60	0.192

TABLE :5 COMPARISON OF PAIN BETWEEN THE 2 STUDY GROUPS AFTER 24 HOURS

		PS 24			Total	
		MILD 1 - 3	MODERATE 4 - 6	SEVERE 7 - 10		P value
GROUP	DICLOFENAC (ORAL)	12	17	0	30	
	DICLOFENAC (TRANSDERMAL)	13	18	0	30	
	TOTAL	25	35	0	60	0.793

TABLE 6: COMPARISON OF PAIN BETWEEN THE 2 STUDY GROUPS AFTER 48 HOURS

		PS 48			Total	
		NO PAIN 0	MILD 1 - 3	MODERATE 4 - 6		P value
GROUP	DICLOFENAC (ORAL)	2	19	0	30	
	DICLOFENAC (TRANSDERMAL)	0	21	0	30	
	TOTAL	2	40	0	60	0.3

TABLE7: COMPARISON OF PAIN BETWEEN THE 2 STUDY GROUPS AFTER 72HOURS

		PS 72			Total	
		NO PAIN 0	MILD 1 - 3	MODERATE 4 - 6		P value
GROUP	DICLOFENAC (ORAL)	29	1	0	30	
	DICLOFENAC (TRANSDERMAL)	30	0	0	30	
	TOTAL	59	1	0	60	0.04

TABLE8: GROUP-WISE COMPARISON OF WOUND HEALING BETWEEN THE GROUPS AFTER 3 DAYS

		HI 3			Total	
		GOOD - 3	VERY GOOD - 4	EXCELLENT - 5		P value
GROUP	DICLOFENAC (ORAL)	2	19	0	30	
	DICLOFENAC (TRANSDERMAL)	0	21	0	30	
	TOTAL	2	40	0	60	0.003

TABLE 9: GROUP-WISE COMPARISON OF WOUND HEALING BETWEEN THE GROUPS AFTER7 DAYS

		HI 7			Total	
		GOOD - 3	VERY GOOD - 4	EXCELLENT - 5		P value
GROUP	DICLOFENAC (ORAL)	0	13	17	30	
	DICLOFENAC (TRANSDERMAL)	0	6	24	30	
	TOTAL	0	19	41	60	0.001

Discussion:

The present study demonstrates that both oral and transdermal diclofenac sodium are effective in controlling postoperative pain following mandibular molar extraction. Oral diclofenac provides rapid analgesia during the early postoperative period due to faster systemic absorption. In contrast, transdermal diclofenac offers sustained analgesia at later time points, consistent with its controlled drug-release mechanism.

These findings are consistent with previous studies in dental and periodontal procedures [1–5]. The improved wound healing observed in the transdermal group may be attributed to stable plasma drug levels and reduced systemic stress. Additionally, the reduced incidence of gastrointestinal side effects supports the use of transdermal diclofenac in patients with gastric sensitivity or poor compliance.

Limitations of the study include a modest sample size, short follow-up duration, and challenges in blinding due to the visible nature of the patch. Larger multicentre trials with standardised protocols are recommended for further validation.

Conclusion:

Both oral diclofenac sodium and transdermal diclofenac patches are effective in managing postoperative pain following mandibular molar extraction. Oral diclofenac provides faster early analgesia, whereas transdermal diclofenac offers sustained pain relief, superior wound healing, and fewer systemic adverse effects. Transdermal diclofenac can be considered a reliable and patient-friendly alternative, particularly in patients with gastrointestinal intolerance or compliance concerns.

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