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## **A prospective comparative study on analgesia effect between diclofenac sodium and tramadol hydrochloride used in various orthopedic trauma conditions by applying wong-baker faces pain rating scale in a tertiary care teaching hospital**

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### **Abstract**

Acute pain in orthopedic trauma should be anticipated and treatment should be a part of every anesthetic plan. In this study we have aimed to assess the comparison of pain management effects between Diclofenac and Tramadol in orthopedic trauma condition along with Wong-Baker Faces Pain Rating Scale to demonstrate which drug provides better efficacy. This prospective case analysis study was conducted during August and September 2019 in the Department of Orthopedics, Gandhi Hospital, Secunderabad with necessary permission. Selected Cases were collected and documented. Outcome was framed after interpreting the data; according to various category and parameters. 30 cases were identified, included and observed in our study considering 15 each in Diclofenac and Tramadol respectively and analyzed for final outcome. Our study shows that male with age group of 21 – 40 yrs were predominant in developing orthopedic wound. In our study, we also found cases where both Tramadol and Diclofenac were prescription for the management of pain. Out of 15 patients prescribed with Tramadol, Wong-Baker score was found to be; for 4 patients '0' (no hurt), 6 patients '2' (hurts little bit), 4 patients '4' (hurts little more) and only 1 patient '6' (hurts even more) this shows that pain management with Tramadol was satisfactory. On the other hand, out of 15 cases prescribed with Diclofenac, Wong-Baker score was very less, as 6 cases had a score of '4' (hurts little more), 5 cases had a score of '6' (hurts even more), 4 cases had a score of '8' (hurts whole lot). This indicates that Diclofenac may not be sufficient enough to manage orthopedic pain as compared to Tramadol, as orthopedic pain are acute and very complicated in nature; Tramadol may be the best choice to manage the pain.

**Keywords:** Orthopedic trauma, diclofenac, tramadol, Wong-baker faces pain rating scale

### **Introduction**

Acute pain in orthopedic trauma should be anticipated and treatment should be a part of every anesthetic plan. Analgesic approaches have changed in recent years in part due to patient expectations, the shift towards ambulatory surgery and shorter hospital stays. The classes of analgesics used to relieve pain in post-operative cases are non-steroidal anti-inflammatory drugs, local anesthetics, adrenergic agents and novel methods of applying opioid to conventional parenteral analgesics [1]. Diclofenac is a nonsteroidal anti-inflammatory drug (NSAID) of the phenyl acetic acid class with anti-inflammatory, analgesic, and antipyretic properties. Contrary to the action of many traditional NSAIDs, Diclofenac inhibits cyclooxygenase (COX)-2 enzymes with greater potency than it does COX-1. Similar to other NSAIDs, Diclofenac is associated with serious dose-dependent gastrointestinal, cardiovascular, and renal adverse effects. Since its introduction in 1973, a number of different Diclofenac-containing drug products have been developed with the goal of improving efficacy, tolerability, and patient convenience.

Diclofenac is useful for short-term treatment of orthopedic trauma, post-operative pain, and acute muscular-skeletal pain [2]. Tramadol is a centrally acting low risk synthetic opioid analgesic, useful to treat moderate to severe pain. Tramadol has got 100% bioavailability by intra-muscular route and has rapid onset of action. So, there is no ceiling dose for Tramadol. Therefore, pain management can be individually tailored to patient/pain response. Thus, it provides additional advantage to prefer it for orthopedic post-operative analgesia [3]. Assessment of pain relief is complicated aspect, as the doctor has to rely completely on patient's perception and response towards pain or certain pain assessment scale need to be implied to measure the actual condition. Wong-Baker Faces Pain Rating Scale is such a scale which shows a series of faces ranging from happy face at "0" or "no hurt", to a Crying face at "10", which represents "hurts like the worst pain imaginable". There are 6 faces in the Wong baker pain scale Picture-1. Based on the faces and written descriptions, the patient chooses a face that best describes their level of pain [4]. In this study we have aimed to assess the comparison of pain management effects between Diclofenac and Tramadol in orthopedic trauma condition to demonstrate which one provides better efficacy.

**Methodology**

This prospective case analysis study was conducted for a period of 2 months between August 2019 and September 2019 in Department of Orthopedics, Gandhi Hospital, and Secunderabad. Selected Cases were collected and documented in a structured data compilation form from the in-patient department of orthopedics on a daily basis according to inclusion criteria, which includes; patient of all ages and both genders, cases diagnosed with various orthopedic clinical condition in which wound is positive and prescribed with either Diclofenac or Tramadol alone, patients for whom orthopedic implant, prosthetic, amputation or deformity corrections were planned or performed, Cases with complete information till discharge. Study exclusion criteria includes; patient diagnosed with non-wound orthopedic diseases and/or clinical condition like, rheumatoid arthritis, osteoarthritis, anterior cruciate ligament tear etc., cases with any other analgesics or combination analgesics like Diclofenac and Tramadol in a single prescription, cases with incomplete information or without a proper discharge summary, if patient do not want to participate in the study after describing the study process, HIV positive cases and if patient absconded or expired. A total of 30 cases, grouping 15 each with Diclofenac and Tramadol prescription along with other justified inclusion criteria were collected during the study period which was reviewed on a regular basis to update and further follow-up till discharge. Outcome was framed after interpreting the data gathered from case documentation forms; according to various category and parameters. Further results were discussed thoroughly with orthopedic surgeons in a regular manner to accomplish the outcome.

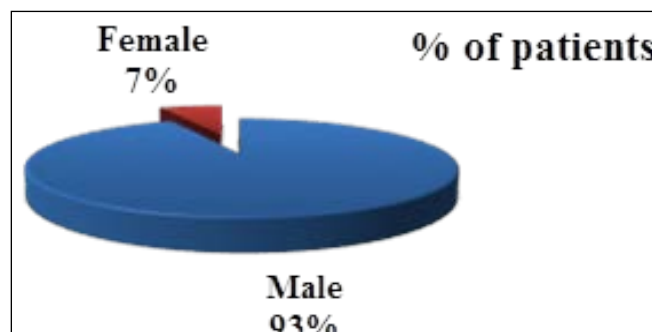
**Results**

Based on inclusion and exclusion criteria, 30 cases were identified, included and observed in our study considering 15 each in Diclofenac and Tramadol respectively and analyzed for final outcome. Following parameters were considered for analysis:

Table 1: Demonstrates the male predominance in the collected cases treated with only Diclofenac Figure 1.

**Table 1:** Distribution of collected cases based on gender (Diclofenac, n=15)

Sl. No	Gender	No. of patients	Percentage %
1.	Male	14	93
2.	Female	01	07

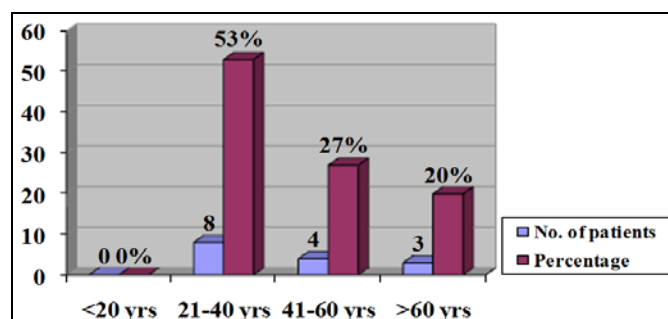


**Fig 1:** Distribution of collected cases based on gender (Diclofenac, n=15)

Table 2: Shows that patients with age group of 21-40 years (53%) were more frequent to develop orthopedic wound in the study Figure 2.

**Table 2:** Age wise distribution of collected cases (Diclofenac, n=15)

Sl. No	Age group	No. of patients	Percentage%
1.	Up to 20 years	0	00
2.	21 – 40 years	08	53
3.	41 – 60 years	04	27
4.	60 years and above	03	20



**Fig 2:** Age wise distribution of collected cases (Diclofenac, n=15)

Table 3: Describes the different diagnosis in collected cases prescribed with Diclofenac. Fracture cases were found to be maximum (53%) Figure 3.

**Table 3:** Diagnosis wise distribution of collected cases (Diclofenac, n=15)

Sl. No	Diagnosis	No. of patients	Percentage%
1.	Fracture (Open, Closed & both Bone)	08	53
2.	Traumatic paraplegia	02	13
3.	Traumatic quadriparesis	01	6.8
4.	Infected implant Right femur	01	6.8
5.	L-2 Burst fracture	01	6.8
6.	Posterior dislocation of hip (left)	01	6.8
7.	Femero acetabular impingement (L > R)	01	6.8

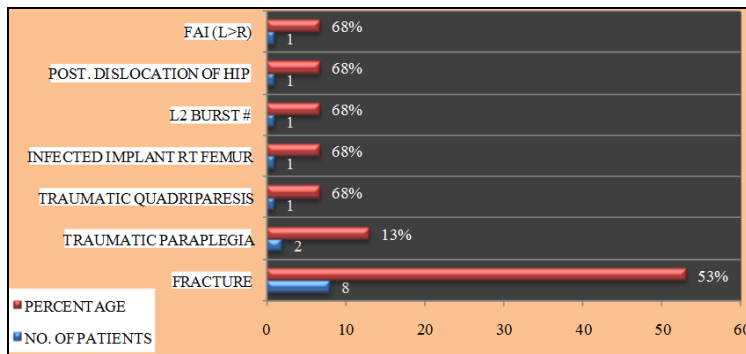


Fig 3: Diagnosis wise distribution of collected cases (Diclofenac, n=15)

Table 4: Elaborates the distribution and outcome measurement of Diclofenac in the orthopedic wounds. This shows almost half of the patient had a response score of '4' (hurts little more) in. It also demonstrates the score '6' and '8' for rest half of the patients which indicates poor pain management outcome.

Table 4: Distribution of Wong-Baker Score on collected cases (Diclofenac, n=15)

Sl. No	Wong-Baker Score	No. of patients	Percentage%
1.	0	-	-
2.	2	-	-
3.	4	6	40
4.	6	5	33
5.	8	4	27
6.	10	-	-

Table 5: Indicates similar gender distribution as Diclofenac group; a male dominance Figure 4.

Table 5: Distribution of collected cases based on gender (Tramadol, n=15)

Sl. No	Gender	No. of patients	Percentage%
1.	Male	13	87
2.	Female	2	13

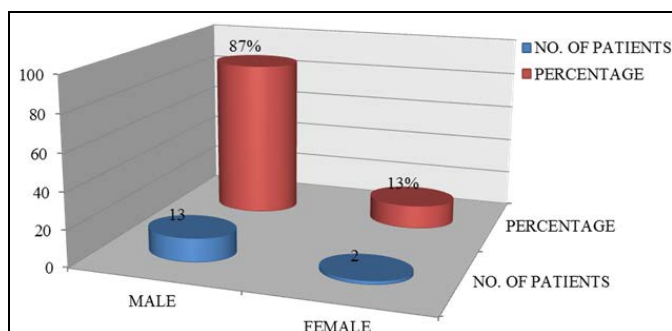


Fig 4: Distribution of collected cases based on gender (Tramadol, n=15)

Table 6: Shows that similar age distribution as Diclofenac group; patients of age group between 21-40 years (73%) are more frequent to develop orthopedic wound in the study Figure 5.

Table 6: Age wise distribution of collected cases (Tramadol, n=15)

Sl. No	Age group	No. of patients	Percentage%
1.	Up to 20 years	03	20
2.	21-40 years	11	73
3.	41-60 years	01	07
4.	60 years and above	00	00

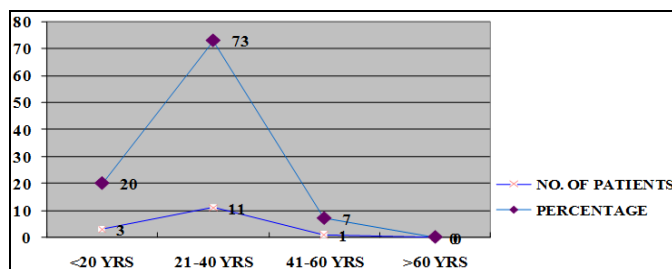


Fig 5: Age wise distribution of collected cases (Tramadol, n=15)

Table 7: Shows that Fracture (93%) was present in almost all collected cases Figure 6.

Table 7: Diagnosis wise distribution of collected cases (Diclofenac, n=15)

Sl. No	Diagnosis	No. of patients	Percentage%
1.	Fracture (Open, Closed & both Bone)	14	93
2.	Cerebrotendinous xanthomatosis of bilateral Achilles tendon	01	07

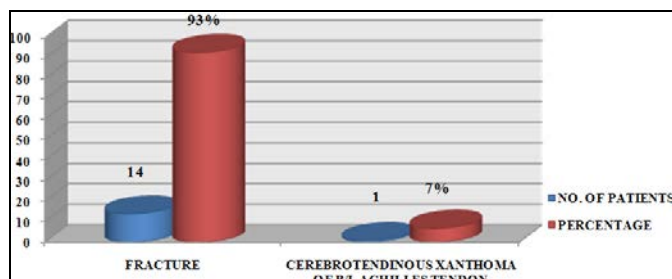


Fig 6: Diagnosis wise distribution of collected cases (Diclofenac, n=15)

Table 8: Highlights the Wong-Baker pain assessment score in Tramadol cases. In this group score of '0' and '2' were 67% together which no-hurt or hurts little bit.

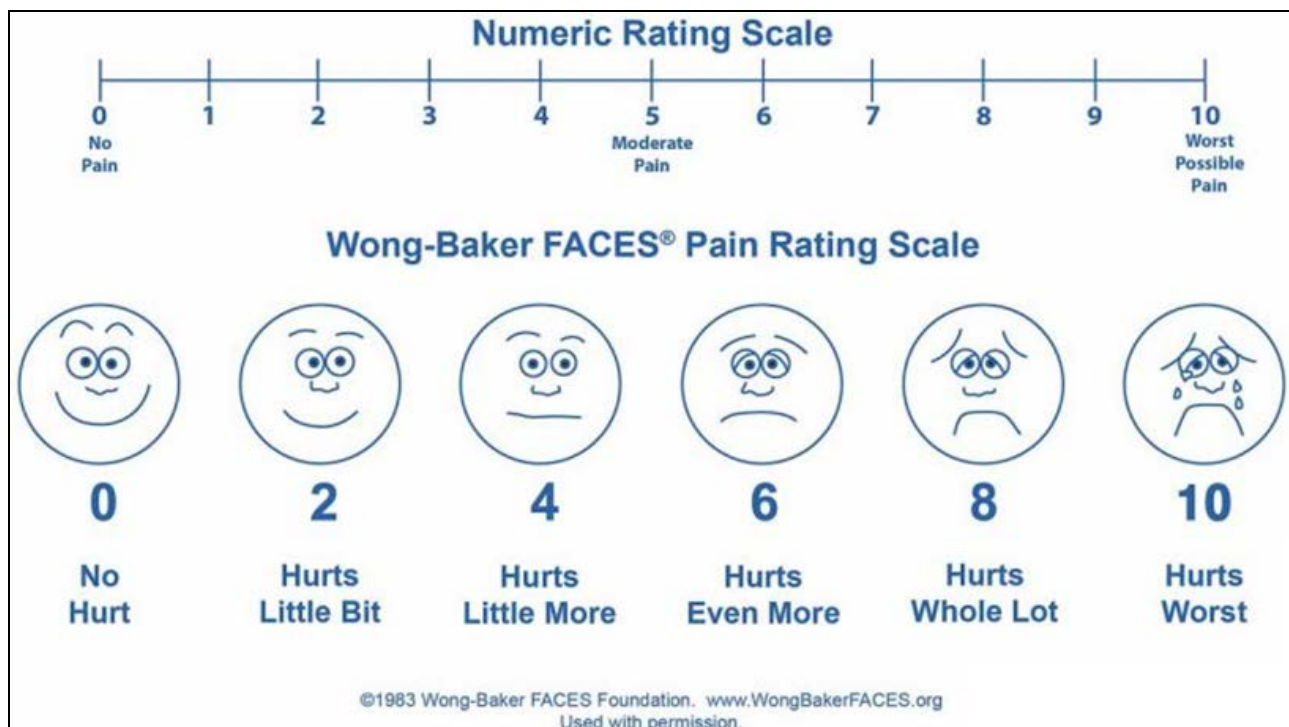
Table 8: Distribution of Wong-Baker Score on collected cases (Tramadol, n=15)

Sl. No	Wong-Baker Score	No. of patients	Percentage%
1.	0	4	27
2.	2	6	40
3.	4	4	27
4.	6	1	6
5.	8	-	-
6.	10	-	-

Table 9: Represents the average difference between Diclofenac and Tramadol pain management assessment score. It clearly shows Tramadol has better score compared to Diclofenac.

**Table 9:** Comparison of average Wong-Baker score for Diclofenac and Tramadol

Sl. No	Prescribed Drug	Average Wong-Baker Score
1.	Diclofenac	6
2.	Tramadol	2

**Picture 1:** Wong baker pain scale

## Discussion

Based on inclusion and exclusion criteria a total of 30 post-operative orthopedic patients were identified, included and analyzed for the study from the inpatient department of orthopedics. Out of which 15 patients each were prescribed with Diclofenac and Tramadol respectively as analgesic to treat the post-operative pain. Our study shows it was found that male with age group of 21-40 yrs were predominant in developing orthopedic wounds. This is mainly due to this particular age group of male who are frequently moved with personal vehicle mainly two-wheeler, which is similar with previous data by Sravya K (2018) [5] in the same department. Wong-Baker scale was used as a tool for pain assessment which has a score range from 0 to 10. The assessment of pain management for various analgesics is very important because the patient with improved acute pain management with appropriate analgesic yields decrease risk of chronic pain and decreased overall morbidity as stated by Tetzlaff JE (2012) [6] and Johnson Q (2013) [6, 7]. In our study we have applied the same tool in the patients after receiving analgesic to assess the pain management outcome.

Tramadol and Diclofenac are the most commonly used analgesics to treat post-operative pain. According to a study conducted by Shukla AK (2015) [8], comparison of analgesic efficacy in pain management is useful to choose appropriate drug and thereby decrease the length of hospital stay and morbidity. In our study, we also found cases with both Tramadol and Diclofenac prescription for the management of pain.

Out of 15 patients prescribed with Tramadol, Wong-Baker score was found to be; for 4 patients '0' (no hurt), 6 patients '2' (hurts little bit), 4 patients '4' (hurts little more) and only 1 patient '6' (hurts even more) this shows that pain management with Tramadol was satisfactory. Even though

there are few acute drugs related issues with Tramadol like Vomiting and Constipation but those can be managed and pain management remain the main focus. Similar report was also published previously by Paudel R (2017) [9].

Out of 15 cases prescribed with Diclofenac, Wong-Baker score was very less, as 6 cases had a score of '4' (hurts little more), 5 cases had a score of '6' (hurts even more), 4 cases had a score of '8' (hurts whole lot). This indicates that Diclofenac may not be sufficient enough to manage orthopedic pain as compared to Tramadol, as orthopedic pain are acute and very complicated in nature, Tramadol may be the best choice to manage the pain, similar reports were also published by Chandanwale AS (2014) [10].

The average Wong-Baker score in case of Diclofenac was '6' and Tramadol was '2'. This score clearly indicated the superiority of Tramadol over Diclofenac. Administration of Tramadol is effective in treating post-operative pain in accordance with the study conducted by Sekar C (2004) [11].

Inclusion of Wong-Baker Faces Pain Rating Scale to assess the pain management was in a pilot manner in this study to identify the various aspects related to this before considering for a final application with a large patient population to achieve a greater outcome. Instead of various clinical conditions a specific diagnosis and drug effect combination would have been more accurate to provide a concrete conclusive statement.

**Ethical Permission:** Obtained

**Conflict of Interest:** None

**Source of funding:** Nil

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### Conclusion

Based on the average Wong-Baker score; Tramadol was found to be a better analgesic compared to Diclofenac in managing various orthopedic pain.

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