



RESEARCH ARTICLE

EFFECTIVENESS OF NSAIDS AND TCA IN THE MANAGEMENT OF TEMPOROMANDIBULAR DISORDERS-RETROSPECTIVE STUDY

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ABSTRACT

Purpose: Temporomandibular Disorders (TMD) encompasses a group of disorders involving joint - disc disorders, masticatory muscles and degenerative joint disorders. It is important to use a management strategy that is safe, economical, and effective for patients. While surgical approaches are hindered by certain complications, non-invasive therapies offer these benefits and are therefore considered the first line of treatment for TMDs. Existing literature suggests a lacuna of studies analyzing the effect of Tricyclic Antidepressants (TCA) on TMDs in comparison to Non-Steroidal Anti-inflammatory Drugs (NSAIDs). The aim of this study was to assess the effectiveness of NSAIDs and TCA in managing Temporomandibular Disorders.

Materials and Methods: Data of diagnosed TMD patients who were treated during the time span between January 2022 and January 2024, was retrieved retrospectively from the institutional electronic database. 50 patients were included, and they were divided up into two groups based on the treatment protocol followed. Patients in Group A were managed with NSAIDs, while patients in Group B were managed with TCAs. Outcome measures including pain relief (VAS score), maximal mouth opening were assessed.

Results: 28% patients treated with TCA showed complete pain reduction and 44% patients showed improved mouth opening compared to NSAID s group which showed 12% reduction in pain and 32% improvement in mouth opening.

Conclusion: TCA was found to be more effective in relieving pain and improved mouth opening compared to NSAIDs when supplemented with physical therapy. TCAs can be a viable therapeutic option for TMDs.

Keywords: TMJ Disorders, Anti-inflammatory agents, Non-steroidal, Antidepressants

1. INTRODUCTION

Temporomandibular joint is formed by the insertion of mandibular condyle into the mandibular fossa of

the temporal bone. It is regarded as a ginglymoarthroidal joint, meaning it may move in both

hinge and gliding modes¹. The two most prevalent types of TMD are pain, including headaches, arthralgia, and myalgia, and conditions related to the TMJ, primarily disc displacements and degenerative diseases². The most common symptoms of temporomandibular disorders include pain, discomfort, TMJ noises and limited or asymmetric mandibular motion³. It is usual for pain or discomfort to be restricted to the masticatory muscles, jaw, and TMJ. Common accompanying symptoms are headache, neck pain, tinnitus, dizziness, and ear pain^{4,5}. Chronic facial pain is one of its defining characteristics which lowers people's quality of life and debilitates them physically and psychologically⁶. It has been extensively established that TMD has a multifaceted etiology^{7,8}.

Globally, 34% of people have TMDs (South America 47%, Asia 33%, Europe 29%, North America 26%). The significance of TMDs as a disease entity is shown by the vast quantity of cases in the population⁹. Globally, research has shown that between 10 and 15 % of persons have pain from TMD, and 5 % appear to require treatment. Remarkably, the literature has reported a higher female to male prevalence of roughly 10:1.6¹⁰.

In the majority of TMD cases, conservative therapy is the initial course of treatment. This frequently involves the usage of systemic anti-inflammatory drugs, analgesics, dietary modifications, the creation of occlusal splints, physical therapy¹¹ and TENS therapy¹². The effects of NSAIDs, corticosteroids, muscle relaxants, anxiolytics, opioids, and TCA have all been investigated in relation to pharmaceutical therapy, but no definitive findings have been reached. Extended use of NSAIDs has been associated with major side effects such as gastrointestinal, hepatic, renal, and cardiovascular issues¹³, therefore the need to explore and validate effective alternatives to NSAIDs for managing TMDs remains a crucial area of research. Recent studies have focused on the effect of TCA in alleviating TMD pain¹⁴. However, studies comparing the effectiveness of NSAIDs and TCA are lacking.

This present study aimed to assess the effectiveness of Non-Steroidal Anti-inflammatory Drugs and Tricyclic Antidepressants in management of TMDs.

2. MATERIAL AND METHODS

This retrospective cross - sectional study was conducted in the Department of Oral Medicine and Radiology, Saveetha Dental College and Hospitals, Chennai, India using the data of patients clinically and radiographically diagnosed with Temporomandibular

Disorders obtained from Institutional Electronic Database from January 2022 – January 2024.

Data of diagnosed TMD patients who were treated with NSAIDs and TCA were retrieved. Inclusion criteria were Patients with Myalgia, Myositis, Internal Derangement, Anterior Disc Displacement with reduction / without reduction. Exclusion criteria were individuals who are allergic to NSAIDs/ TCA, individuals below 18 years of age. A convenient sampling technique was used in the present study. Group A consisted of 25 TMD patients who were managed with Non – Steroidal Anti-inflammatory Drugs (Tab zerodol p – Aceclofenac 100mg & Paracetamol 325mg) and Group B consisted of 25 TMD patients who were treated with Tricyclic Antidepressants (Tab.Tryptomer – Amitriptyline Hydrochloride 10mg). Both the groups were subjected to Physical therapy. These patients were treated for 1 month. The outcome parameters assessed were pain (VAS score) and mouth opening. The collected data were entered in the Microsoft Excel 2016 and analysed with IBM SPSS Statistics for Windows, Version 29.0. (Armonk, NY: IBM Corp). To describe about the data descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean & S.D were used for continuous variables. To find the significance in qualitative categorical data Chi-Square test was used. In the above statistical tool, the probability value .05 is considered a significant level.

3. RESULTS

A total of 50 patients were included in this study (n = 25 patients who were treated with NSAIDs and n=25 patients who were treated with TCA). Pain (VAS score) recorded at the first visit showed that both NSAIDs group and TCA group had approximately similar proportions of severe pain cases (32% and 28% respectively). Moderate intensity pain cases were also equally distributed among both the groups (48% and 48% respectively). The proportion of mild pain cases were double in TCA group (24%) compared to NSAIDs group (12%). Two patients in NSAIDs group reported with absence of pain, whereas there were no pain-free cases in TCA group. In the first visit, measurement of mouth opening reveals 56.0% and 52.0% of patients had restricted mouth opening in NSAIDs group and TCA group respectively.

The association of pain intensity and mouth opening with grouping at baseline was statistically insignificant (p = 0.381 and p = 0.094) implying a random distribution between the groups

Pain (VAS score) recorded at the follow-up showed that complete reduction of pain was seen in

n=3 (12%) and n=7 (28%) in NSAIDs and TCA groups, respectively. No reduction of pain was noted in n=9 (36%) in NSAIDs group and n=2 (8%) in TCA group (figure 1). Similarly , in the follow up improvement in restricted mouth opening was recorded in n=8 (32%) and n=11 (44%), respectively in NSAIDs group and TCA

group whereas, n=6(24%) in NSAIDs group and n=2 (8%) in TCA group showed no improvement in mouth opening (figure 2).

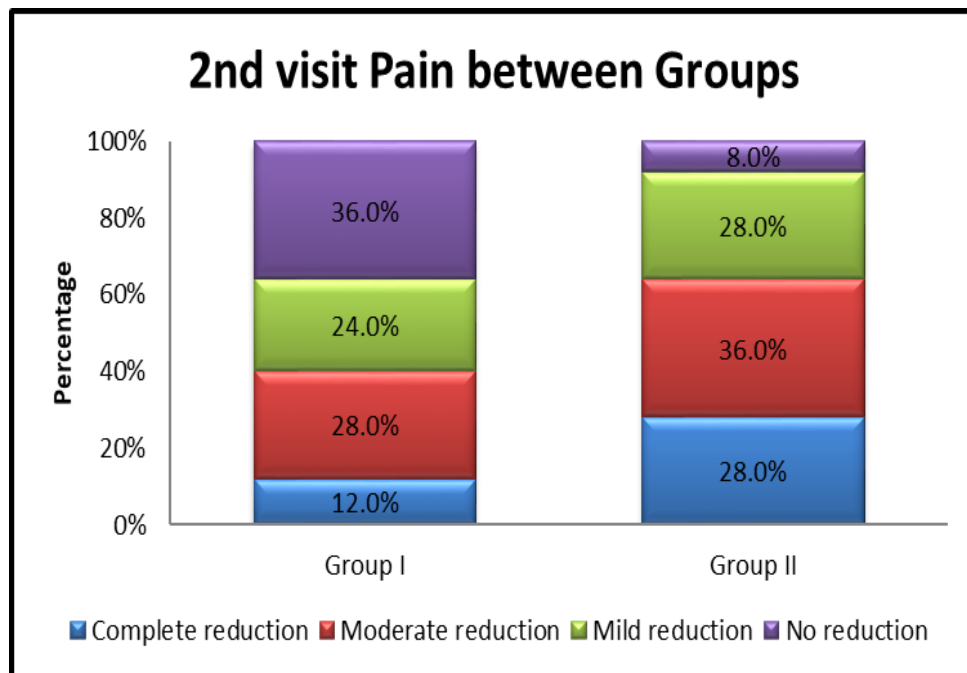


Figure 1. Pain intensity in Group NSAIDs and Group TCA in follow up

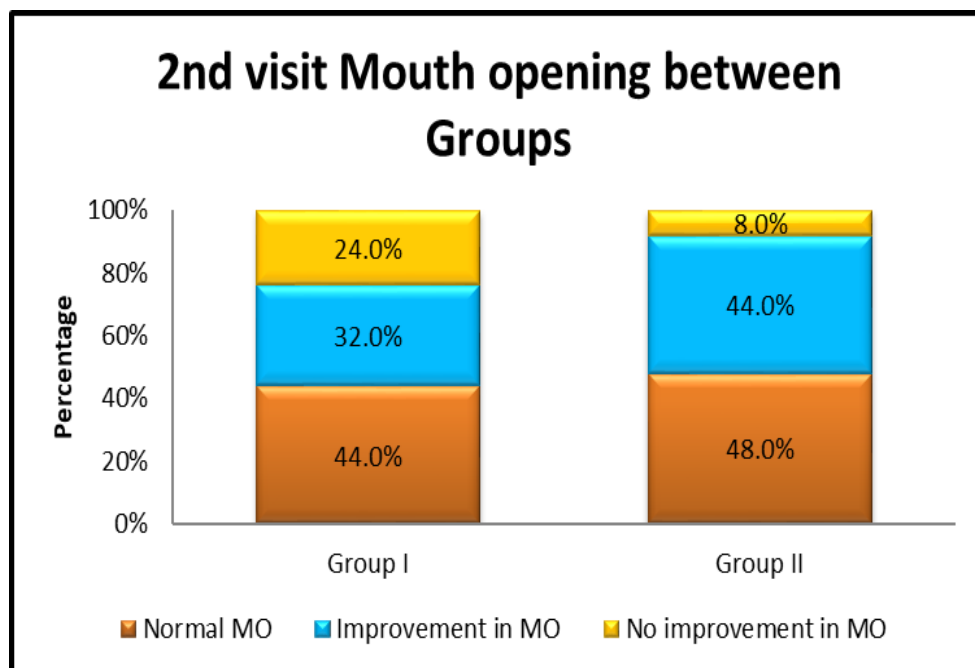


Figure 2. Mouth opening in Group NSAIDs and Group TCA in follow up

At follow-up, it was shown that there was no statistically significant correlation between the two groups' mouth opening and pain intensity ($p = 0.094$ and $p = 0.284$) (Table 1, 2).

TABLE 1. Reduction of pain

			Groups		Total
			Group I	Group II	
2 nd visit pain	Complete reduction	Count	3	7	10
		%	12.0%	28.0%	20.0%
	Moderate reduction	Count	7	9	16
		%	28.0%	36.0%	32.0%
	Mild reduction	Count	6	7	13
		%	24.0%	28.0%	26.0%
	No reduction	Count	9	2	11
		%	36.0%	8.0%	22.0%
Total		Count	25	25	501
		%	100.0%	100.0%	100.0%

Pearson Chi-Square, $p=0.094$

TABLE 2. Improvement in Mouth Opening

			Groups		Total
			Group I	Group II	
2 nd Visit Mouth Opening	Normal MO	Count	11	12	23
		%	44.0%	48.0%	46.0%
	Improvement in MO	Count	8	11	19
		%	32.0%	44.0%	38.0%
	No improvement in MO	Count	6	2	8
		%	24.0%	8.0%	16.0%
Total		Count	25	25	50
		%	100.0%	100.0%	100.0%

Pearson Chi-Square, $p=0.284$

4. DISCUSSION

The term "temporomandibular disorders" (TMDs) refers to pain and dysfunction in the temporomandibular joint (TMJ) and chewing muscles. The most prevalent type of orofacial pain is TMD. TMJ sounds and a restricted range of motion are further indications of TMD. However, the primary motivation for patients with TMDs to seek treatment is persistent discomfort. Patients with TMDs are more likely to have issues with their sleep and tinnitus, and there are reciprocal relationships between TMDs and anxiety and depression.

Pharmacological treatments for TMDs focus on the fundamental pathological processes, with the goal of reducing pain, enhancing joint function, and promoting overall patient wellness.

This study is a retrospective analysis of 50 patients who were managed with NSAIDs ($n=25$) and TCA

($n=25$) supplemented with physical therapy. A considerable percentage of the population is impacted by the epidemiology and pathophysiology of temporomandibular disorders, with estimates indicating that 10-15% of individual's experience pain from TMD, and 5% require treatment¹⁵. There are psychological, structural, and functional components to the complex aetiology of TMDs, which makes therapy more challenging⁶. The high prevalence, particularly among females at a ratio of approximately 10:1.6, highlights the need for effective treatment modalities².

This study found complete pain relief was obtained in 3 out of 25 patients (12%) which is in accordance with the study by Yuasa Kurita et al.,¹⁶ which showed 60% improvement in intervention group (NSAIDs and physical therapy) than the control group (untreated) which showed 33% over a course of 4 weeks.

Another study by Di Rienzo Businco et al.,¹⁷ which compared topical and oral NSAIDs showed reduction in pain scores achieving a decrease of 61% in topical group and 59% in oral group highlighting the effectiveness both topical and systemic NSAIDs, but this is in contrast with the study by Marini et al.,¹⁸ in which palmitoylethanolamide (PEA) and NSAIDs are compared and showed statistically significant amount of pain reduction ($p=0.0001$) and improvement in mouth opening ($p=0.22$) is seen in PEA group than NSAIDs group and in our study the mouth opening is NSAIDs group is 32%.

The study found that TCAs were associated with a higher percentage of patients reporting complete pain relief (28%) compared to the NSAID group (12%). This is consistent with study by Céla M. Rizzatti et al.,¹⁹ in which there is a significant difference in pain and discomfort in patients who were treated with Amitriptyline 25mg than who were treated with placebo for 14 days. In another study by Plesh et al.,²⁰ which used Amitriptyline (10-30mg) over a course of 6 weeks for myofascial pain and mixed (myofascial and TMDs) showed improvement in pain reduction at end of 6 weeks and 1-year post treatment.

To the best of the authors' knowledge, no studies have been conducted till date to compare the effectiveness of TCAs with NSAIDs in TMD patients. Calderon et al.,²¹ assessed effectiveness of Amitriptyline (TCA) and Cognitive Behaviour Therapy (CBT) in chronic TMD patients which showed combination of CBT and TCA resulted in reduced pain, depression level as well improvement in Quality of Life, sleep. This validates study by Dione et al.,²² that suggests TCAs address psychological issues like depression and anxiety that accompany TMDs in addition to relieving pain. The ability of TCAs to reduce stress levels may play a crucial role in managing TMD symptoms, as stress is often implicated in the exacerbation of pain²³. Conversely, NSAIDs, while commonly used due to their anti-inflammatory properties, have been associated with significant adverse effects, particularly when used over an

extended period of time¹³. The study's findings underscore the limitations of NSAIDs, particularly while managing chronic pain where alternative therapies like TCAs may be more beneficial. Both treatment groups in this study received physical therapy, which is a critical component in the management of TMDs.

Limitations

The effectiveness of TCAs over NSAIDs, although clinically obvious, was found to be statistically insignificant. This could be attributed to the smaller sample size. However, considering the fact that TCAs are not commonly prescribed for management of TMDs the present study findings can pave way for further research with higher sample size.

Other limitations of the study include the short follow-up duration, retrospective design, individual differences in pain tolerance, psychological factors and adherence to physical therapy, all of which might have influenced the treatment outcomes.

Future Prospects

Larger, prospective, randomised controlled trials with extended follow ups across multicenter to validate the findings, future studies could also assess the risk – benefit ratio by monitoring adverse side effects associated with both drugs. Studies should also explore how individual patient factors such as stress, comorbid conditions and genetic predispositions influence the choice and effectiveness of treatment

5. CONCLUSION

The outcomes of this study show that TCAs(Amitriptyline) particularly in low dose is effective than NSAIDs in pain reduction and improvement in mouth opening when combined with physical therapy. Presently, NSAIDs remain a commonly approached pharmacological intervention due to their anti-inflammatory properties. Nonetheless, their long term usage is associated with systemic side effects, making TCAs a promising alternative. In addition, TCAs are known to address the underlying psychological factors such as stress, anxiety which can exacerbate the symptoms of TMD.

DECLARATIONS

Ethical approval and consent to participate

Not Applicable

Availability of data and material

All data generated or analyzed during this study are included in the published article.

Competing interests

The authors declare that there are no competing interest. **Acknowledgements**

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