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Effect of ibuprofen in combination with omega 3 in the management of temporomandibular disorder: A clinical trial

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Abstract---Introduction: Disorders of the temporomandibular joint (TMD) are dentofacial illnesses that can be caused by extra- or intra-articular disease. TMD is treated with a variety of pharmaceutical preparations, including non-steroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, and steroids. Many of these drugs are used together to reduce the symptoms and retard the progression of the disease to chronic illness. Aims & Objectives: The aim of the current study is to compare the effectiveness of ibuprofen in combination with omega 3 in the management of TMJ disorder. Methodology: A randomized control trial was conducted among the patients of temporomandibular disorder presenting to OPD and oral

medicine departments at Peshawar Dental College and Khyber College of Dentistry. A total of 58 patients were randomly selected. The data was collected through a self-structured questionnaire including the Numerical Rating Scale (NRS) for pain. The pain was recorded on day 0 before the commencement of the treatment. Ibuprofen 400mg BD along with omega 3 1000mg OD was given. The participants were given the drugs for a period of 30 days. The patients were recalled for assessment of response to drugs after 7 days, 15 days, and 30 days periods. Mann Whitney U test was applied for statistical analysis. Results: Complete relief from different types of severe pain was observed earlier in Ibuprofen + Omega 3. Conclusion: Our study concludes that ibuprofen combined with omega 3 is better result in relieving pain associated with the temporomandibular joint disorder.

Keywords---ibuprofen, omega 3, analgesic, dentofacial illnesses, temporomandibular joint disorder.

Introduction

The temporomandibular joint (TMJ) works like a sliding hinge connecting each side of the jaw bone to the temporal bones of the skull. The bones and joint are separated by cartilage and shock-absorbing disks to help the jaw open and close smoothly (Segù, 2022). Known complications of long standing TMJ dysfunction include alterations in dentition, chronic facial pain and malocclusion. The establishment of a multidisciplinary pain team can assist the practitioners in reducing such complications (Wu et al., 2021).

For more than four decades, the contributing variables and real underlying etiology of temporomandibular and myofascial pain (MFP) have been debated. Temporomandibular disorders (TMDs) have a multifaceted aetiology. The condition may be caused by biomechanical, neuromuscular, biopsychosocial, and neurological factors (Jahromi, Pirvulescu, Candido, & Knezevic, 2021).

To emphasise predisposing factor role in the progression of TMD, including structural, metabolic or psychologic aspects; trauma or repetitive adverse loading of the masticatory system; and aggravating factors such as parafunction, hormonal, or psychosocial factors (Razavi, Ghasemzadeh Rahbardar, & Hosseinzadeh, 2021). Occlusal variables and their relationship as well as contribution to TMD have been and continue to be the subject of debate in the world of dentistry. For example, reverse articulation, may result in asymmetric muscle function (Verma, 2020).

Some types of TMD appear to be associated with a substantial slip between centric relation and maximum intercuspation. Some researchers believe that mediotrusion interferences presence is a risk factor, whereas others believe that interferences like that may function as protective mechanism (Verma, 2020). Development of temporomandibular pain dysfunction syndrome due to the role of stress has received a lot of attention. According to psychological studies, Patients with temporomandibular functional problems have similar psychological profiles

and dysfunctions as patients with other chronic musculoskeletal pain disorders, such as tension headache, backache, or arthritic pain (Porporatti et al., 2019).

The prevalence of temporomandibular disorders (TMD) is higher in females (Barbar-Smiley et al., 2021). Pathological alterations may be visible in all of the tissues that comprises joint. The microscopic disintegration of articular cartilage in the early stages of osteoarthritis begins with chondrocyte clustering (Singgih et al., 2020).

For the purpose of standardising diagnosis based on epidemiologic studies from various institutions, the Diagnostic pattern was developed (Cetira Filho et al., 2022). The DC/TMD establishes a diagnostic benchmark and assesses both physical symptoms and indicators (Axis I) and psychosocial aspects (Barbar-Smiley et al., 2021). NSAIDs (such as naproxen) have often continued to be the first line treatment for people with substantial inflammatory pain despite the lack of evidence. Muscle relaxants have been advised in addition to NSAIDs for patients whose pain has a muscular component (Barbar-Smiley et al., 2021).

Numerous studies have demonstrated the beneficial effects of omega-3 fatty acids on inflammatory disorders. They have mostly been utilised to treat rheumatoid arthritis in clinical trials. Omega-3 fatty acids were used in additional in-vitro studies on fibroblasts to cause an increase in collagen production. The level of the inflammation mediator prostaglandin E2 dropped along with this synthesis. Omega-3 fatty acids may thereby alter the degradation and inflammation processes that are typical of osteoarthritis (OA). In 2020 Andrea Bahamondes and his co-workers carried out a systemic review and meta analysis on effects of omega 3 on painful symptoms of patients with osteoarthritis (OA) of the synovial joints (Bjørklund et al., 2019; Maqbool et al., 2021; Wu et al., 2021).

Literature review shows that temporomandibular disorders have either been treated with a single drug or combination of drugs. No study with a NSAID in combination with omega-3 fatty acid could be found in literature which prompted us to go for ibuprofen, omega-3 use in this study. In our community the prevalence of TMD is about 62%. Though ibuprofen and other treatments (muscle relaxants, anxiolytics, corticosteroids, opioid analgesics) are available but the advertent adverse effects of current treatments and the recurrence raises a need for other treatment options. Omega 3 has not only anti inflammatory but also anxiolytic and bone forming effects with very less adverse effects (Siriarchavatana, Kruger, Miller, Tian, & Wolber, 2019). So this study has been designed to evaluate the synergistic effects of ibuprofen and omega 3 in patients with TMD.

Research objectives

To evaluate the effectiveness of ibuprofen with omega 3 in the management of TMJ disorder.

Materials and Method

A study design was Randomized control trial. Patients were selected from out-patient and oral medicine departments of Peshawar Dental College and Khyber College of Dentistry, Peshawar.

The Inclusion Criteria were all patients diagnosed with temporomandibular disorder (TMD) having pain, clicking and limited mouth opening, both male and female patients, Patients between the ages 15-35 years, Patients with complete permanent dentition and Exclusion Criteria: Patients with bone diseases (Osteoporosis, osteopetrosis, osteomalacia), Patients with neuropathic pain. Pregnant patients, Patients with systemic diseases like peptic ulcer disease, hypertension, congestive heart. Total sample size was 58. Diagnosed patients of temporomandibular disorder from OPD and oral medicine departments of Peshawar Dental College and Khyber College of Dentistry, Peshawar.

Self-structured questionnaire and numerical rating scale (Breivik, Björnsson, & Skovlund, 2000). After taking ethical approval from ethical review boards of Peshawar Medical College and Khyber College of Dentistry, the patients fulfilling the inclusion criteria were enrolled in this study. The data was collected from the study subjects from October 2021 to July 2022.

Methodology

The data was collected through structured questionnaire. It consisted of demographic variables and variables related to temporomandibular disorder like pain, frequency, etc. The pain was recorded on the day 0 of the treatment using the numerical rating scale. A horizontal line (0-10) in length with description stating no pain on the left hand end and very severe pain on the right hand end of the line was used. The patients marked the point on the line that how they felt, represented their current state of pain. The score was determined by ordinal numerical rating scale. All the patients were ensured about their medicine intake through a proper chart.

The patients were recalled for assessment of response to drugs after 7 days, 15 days, and 30 days period. The review of response to the drugs was done by numerical rating scale in the subsequent visits by another physician who was blind about the patients as well as the drugs used.

Statistical analysis

The data was analyzed by using Statistical Package for Social Sciences (SPSS version 21). Descriptive data was expressed as frequencies and percentages. Mann Whitney U test was applied. A p-value of 0.05 or less was considered statistically significant.

Results

The total number of patients was 58, 45.7% were male and 54.3% were female. They were divided in two groups, each comprising 58 patients. The patients were given Ibuprofen plus Omega 3. The age range of study subjects was 15-35 years and the mean age was 26.49 ± 8.35 .

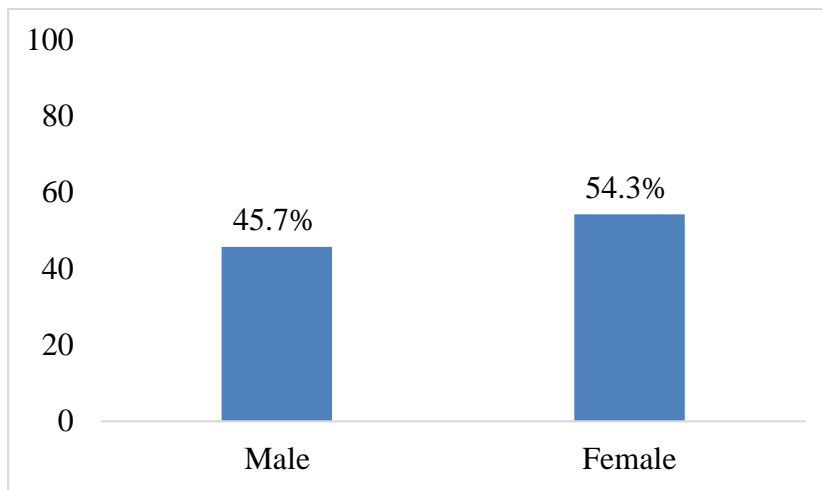


Figure 1: Gender distribution

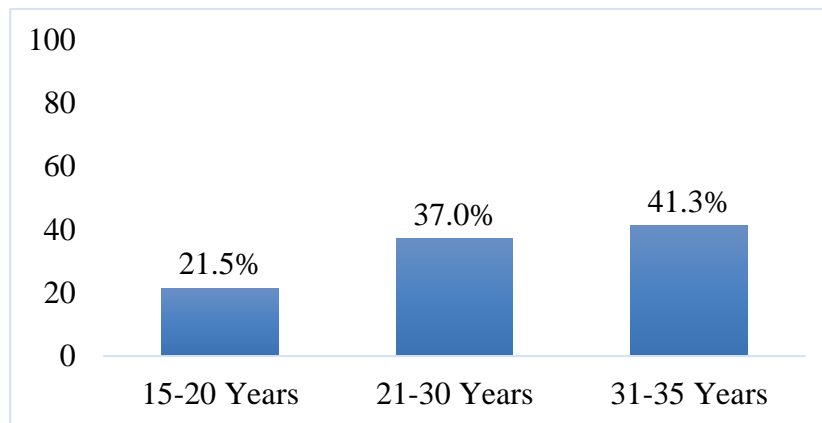


Figure 2: Age distribution

Distribution of mouth opening among the experimental groups

At baseline patients with limited mouth opening were 87.9%. At first follow-up 79.3% had limited mouth opening while at 2nd follow-up the results 31.0%, whereas at 3rd follow-up were 10.3%, had limited opening of the mouth.

Comparison of mouth opening among experimental groups at the end of trial

There is no statistically significant difference between mouth opening among at the end of trial.

Distribution of lateral excursion among the experimental groups

At baseline patients with limited lateral excursion were 93.1%. At first follow-up 74.1% had limited lateral excursion while at 2nd follow-up the results were 55.2% whereas at 3rd follow-up 8.6% had limited lateral excursion (table 1).

Table 1: Distribution of lateral excursion among the experimental groups

Parameters (n=116)		N=58	100%
DAY 0 (initial visit)	Normal	4	6.8
	Limited	54	93.1
Day 7 (1 st follow-up)	Normal	15	25.8
	Limited	43	74.1
Day 15 (2 nd follow-up)	Normal	26	44.8
	Limited	32	55.2
Day 30 th (3 rd follow-up)	Normal	53	91.4
	Limited	5	8.6

Comparison of lateral excursion among experimental groups at the end of trial

The similar effects as far as lateral excursion in patients with TMJ disorder is concerned. There is no statistically significant difference between of lateral excursion at the end of trial.

Distribution of headache among experimental groups

At baseline patients with severe were 48.2%. At first follow-up 36.2% had severe headache while at 2nd follow-up the results 15.5%, whereas at 3rd follow-up there was no severe pain.

Distribution of neck ache among experimental groups

At baseline patients with severe neck ache were 44.8%. At first follow-up 32.7% had severe neck ache while at 2nd follow-up the results were 6.8%, whereas at 3rd follow-up in both groups there was no severe pain.

Distribution of earache among experimental groups

At baseline patients with severe earache were 50.0%. At first follow-up were 34.4% among severe earache while at 2nd follow-up the results were 10.3% whereas at 3rd follow-up s there was no severe pain.

Distribution of severity of pain at temporomandibular joint (TMJ) among the experimental groups

When we observed the severity of pain by numerical rating scale (NRS) at baseline was 68.9% had severe pain. At first follow-up 36.2% had severely pain while at 2nd follow-up the results 6.8% among, whereas at 3rd follow-up in there was no severe pain.

Table 2: Comparison among experimental groups at day 30th for different types of pain relief

Outcome variables	Number of patients with total pain relief at day 30 th	Percentage of patients with total pain relief at day 30 th	p-value
Headache	40	69.0%	0.002
Neck ache	45	77.5%	
Ear ache	43	74.1%	
Pain at TMJ	39	67.2%	

Discussion

There are many different pharmacological approaches for the treatment of TMDs but if medical therapy alone is not working, it is frequently combined with other treatment modalities including oral appliances and physical therapy. It is important for patient to understand that while medical care improves symptoms, a cure cannot be achieved. Unfortunately, despite the fact that these pharmacotherapies have been used for a long time, there is still insufficient evidence to favour one therapy over another.

In our study the total number of patients were 58. Among them 45.7% were males and 54.3% were females. The patients were given Ibuprofen plus Omega 3. The age range of study subjects was 15-35 years and the mean age was 26.49 ± 8.35 . At baseline patients with limited mouth opening in were 87.9%. At first follow-up 86.2% 79.3% had limited mouth opening while at 2nd follow-up the results were 31.0%, whereas at 3rd follow-up 10.3%, had limited opening of the mouth. effects as far as mouth opening in patients with TMJ disorder is concerned. There is no significant difference.

Patients with limited lateral excursion among were 93.1%. At first follow-up 74.1% among Group B had limited lateral excursion while at 2nd follow-up the results were 55.2%, whereas at 3rd follow-up 8.6% had limited lateral excursion effects as far as lateral excursion in patients with TMJ disorder is concerned. There is no significant difference.

In contrast to our findings Thie Nm et al., 2001 have reported that patients taking omega 3 with Glucosamine Sulphate had a significantly greater TMJ function stability (mouth opening & lateral excursion) than glucosamine sulphate alone group, however we have used ibuprofen. Ko G et al., in 2008 revealed omega 3 was helpful in functional improvement in neuropathic pain, which is similar to our results (Guo et al., 2015; Wilkinson, 1980). A study by T. Barbin et al., 2020 on animals also showed positive responses to omega 3 (poly unsaturated fatty acids PUFAs) which concluded that omega-3 was proved to be a success in reducing the damage of TMJs due to arthritis among rats (Barbar-Smiley et al., 2021).

When we observed the severity of pain by numerical rating scale (NRS) it was observed that at baseline 68.9% had severe pain. At first follow-up 36.2%, had severe pain while at 2nd follow-up the results were 6.8% whereas at 3rd follow-up in both groups there was no severe pain. Pain at TMJ has been relieved in at day 30th.

Singer and Dionne in 1997 observed significant decrease in chronic cases of orofacial muscle pain seen among patients who received diazepam alone and combination of diazepam with ibuprofen (Singer & Dionne, 1997). When we compared the number of patients with different types of pain relief in both groups at the end of the trial, it was observed that the results of treatment ibuprofern with omega 3 significantly results of treatment.

Conclusion

Our study concludes that majority of Ibuprofen + Omega 3 showed pain relief and significantly better results. It is recommended that further controlled studies may be done with large sample size and long term follow-up to get validated results

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