

AN EXPERIMENTAL STUDY TO OBSERVE THE EFFECT OF SOUND WAVE THERAPY (Sound healing) USING TUNING FORK TO TREAT TEMPORO MENDIBULAR DYSFUNCTION SYMPTOMOLOGY

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KEYWORDS

VAS (Visual Analog Scale), SF-36 SCALE, Temporo-mandibular disorders (TMDs) temporomandibular joint (TMJ), Sound healing.

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Abstract

Background: Temporo-mandibular disorders (TMDs) comprise a group of conditions that affect the temporomandibular joint (TMJ), the muscles responsible for mastication, and the surrounding structures. The exact cause of TMD is not fully understood, and its development is believed to involve multiple interacting factors, including structural abnormalities, biomechanical dysfunction, inflammatory processes, and psychological influences. Therefore, effective management requires careful identification and treatment of the factors contributing to the disorder. In this study an integrated treatment approach by incorporating sound healing using tuning forks alongside conventional physiotherapy intervention has been introduced to reduce pain and improve function.

Objective: The objective of the study is to i) Assess the efficacy of sound wave using tuning fork to reduce TMJ muscle tension, ii) Assess the efficacy of traditional physiotherapy exercises to reduce the related symptoms of temporo mandibular dysfunction, iii) Assess qualitative measures on Activity of daily living and quality of life of people affected with TMJ Dysfunction.

Methods: 30 Athletes Diagnosed with TMJ dysfunction (Symptom include headache, tension, fatigue or spasm of the masticatory muscles, bruxism, teeth grinding, clenching and abnormal posture, fibromyalgia.) by the Physiotherapy department, Orthopedic department OPD, sports rehab department were initially assessed for the inclusion or exclusion criteria. Prior to the treatment procedure patient are oriented to the study. Participants are divided into 2 groups and both groups assessed for the pre test parameter.

Outcome measure: VAS (Visual Analog Scale), SF-36 SCALE is used for measuring pre and post intervention evaluation.

Results: The 6-week intervention protocol produced clinically and statistically significant improvements in both VAS pain scores and SF-36 quality-of-life measures in Group A, with the greatest benefits in pain-related and functional domains. Group B demonstrated smaller, less consistent improvements, consistent with natural history in TMJ dysfunction.

Conclusion: The results of the present study showed improvement in both the intervention and control groups after completion of the treatment program. While the difference between the two groups was not substantial, participants in both groups experienced positive changes in the assessed outcomes. Based on the overall trend of improvement from baseline, the findings may be considered clinically satisfactory. These results suggest that both treatment approaches were effective in producing beneficial changes, although neither intervention demonstrated a markedly superior effect over the other.

INTRODUCTION

The Temporomandibular joint (TMJ) is a unique ginglymoarthrodial joint, combining both hinge and gliding movements. It is formed by the articulation of the mandibular condyle with the glenoid fossa of the temporal bone. Structurally, the TMJ is a complex synovial joint consisting of two functional compartments separated by an articular disc, which allows smooth and coordinated movement during jaw function. The TMJ is one of the most frequently used joints in the human body, as it is continuously involved in essential activities such as chewing, swallowing, speaking, and facial expressions. Proper function of the joint depends on the coordinated action of the muscles of mastication, including the masseter, temporalis, medial pterygoid, and lateral pterygoid muscles. Any dysfunction affecting these muscles or the joint itself can interfere with normal jaw movement and contribute to temporomandibular disorders (TMD)(1,2).

Temporomandibular disorders (TMDs) comprise a group of conditions that affect the temporomandibular joint (TMJ), the muscles responsible for mastication, and the surrounding structures(1). The exact cause

of TMD is not fully understood, and its development is believed to involve multiple interacting factors, including structural abnormalities, biomechanical dysfunction, inflammatory processes, and psychological influences. Therefore, effective management requires careful identification and treatment of the factors contributing to the disorder. A clear distinction should be made between myofascial TMD and intra-articular TMD, as their underlying mechanisms and treatment approaches differ. Myofascial TMD primarily results from excessive tension, fatigue, or spasm of the masticatory muscles, whereas intra-articular disorders involve structural or inflammatory changes within the temporomandibular joint itself(3). Studies suggest that the prevalence of temporomandibular disorders (TMD) among athletes may vary depending on the type of sport, as well as the frequency and intensity of training. Sports that involve repetitive physical stress, high training loads, or direct impact to the head and face appear to place athletes at a greater risk of developing temporomandibular dysfunction. The temporomandibular joint plays an important role in maintaining the coordination between the jaw, head, and cervical muscles. Alterations in TMJ position or function may

disrupt this neuromuscular coordination, leading to changes in posture, body balance, and overall physical performance. Although research in this area is still limited, existing evidence indicates that TMD-related symptoms are relatively common among competitive athletes. In modern competitive sports, athletes continuously strive to enhance performance, often exposing themselves to high physical demands. These demands may increase the likelihood of TMJ dysfunction, particularly in sports involving repeated trauma or excessive loading of the facial region(4,5,6).

When considering treatment approaches, the principle of eliminating causative factors should be taken into account. This can be achieved through lifestyle changes. In the case of TMD, the goal is to deactivate trigger points and reduce pain, while also achieving optimal muscle length, tension, and appropriate joint mobility. Treatment methods may include exercises(1,7), electrotherapy(6), heat application, improvements related to occlusion, dry needling(9) and injection treatments (such as botulinum toxin) targeted at trigger points(8), among others. The therapeutic use of sound is well established in several areas of modern medicine. One of the most

common examples is lithotripsy, a non-invasive procedure that uses high-frequency sound waves to break kidney or gallstones into smaller fragments, allowing them to pass naturally through the urinary tract. This technique has reduced the need for conventional surgery in many patients and demonstrates the clinical potential of sound-based technologies. Beyond its medical applications, sound healing is based on the concept that different tissues and organs of the body possess their own natural vibrational characteristics. When normal physiological balance is disrupted, these vibrations may also be altered. According to the principle of resonance, applying specific sound frequencies may help restore this balance by influencing the body's natural vibratory patterns. In this study we are administering a different technique using sound wave through a tool known as tuning fork with some therapeutic exercises and manual therapy (6,7) to observe the effect of sound waves in order to find a alternate way of using sound wave to treat TMJ dysfunction with combination of exercise therapy and manual therapy.

Tuning forks offer a refined form of sound therapy, delivering precise vibrations to the body. When activated, they can be applied

around the head or directly on bones to promote resonance and balance. They stimulate tissues, enhance fluid circulation, and may improve mobility. Like acupuncture but without needles, tuning fork therapy releases tension and supports emotional balance(10). Tuning fork therapy uses calibrated metal tuning forks to deliver particular vibrations to various body regions. It can help release stress, increase energy, and promote emotional equilibrium. Tuning fork therapy functions similar to acupuncture, except instead of needles, it uses sound frequencies to stimulate associated points. The therapeutic tuning fork at 128 Hz is applied in treating contractures, muscular pains, and bone pain—among other conditions(11).

Tuning forks are widely used in sound healing because of their ability to produce precise vibrations that may promote relaxation and support overall well-being. Practitioners believe that these vibrations can help induce a deep state of relaxation, enhance the flow of energy throughout the body, improve mental clarity, reduce stress and anxiety, release areas of tension, and restore balance within the nervous system and other physiological systems. These potential effects have contributed to the

growing use of tuning forks as a complementary therapeutic tool(10,11,12,13).

Resistance-based exercises are commonly prescribed to strengthen the muscles responsible for jaw opening and closing. These exercises involve performing controlled jaw movements against gentle resistance, which helps enhance muscle function and improve mandibular stability. In addition to increasing muscle strength, resistance training has been shown to reduce muscle pain and improve the range of motion of the temporomandibular joint. The beneficial effects are believed to result from neuromuscular mechanisms that promote muscle relaxation, decrease excessive muscle activity, and improve coordination of the masticatory muscles. As muscle tension decreases and muscle function improves, patients often experience better jaw mobility, reduced discomfort, and enhanced performance during activities such as chewing, speaking, and mouth opening(8,14,15,16).

MFR (Myofascial Release Therapy) is a manual physiotherapy technique used to alleviate tension within muscles and the surrounding Myofascial tissues. The technique involves the application of slow,

sustained pressure and gentle stretching to the affected soft tissues. This approach helps release fascial restrictions, reduce muscular tension, and relieve pain experienced by patients(17). Myofascial release is frequently applied in the management of a variety of pain-related conditions, including muscle tightness, muscular pain, joint discomfort, headaches, neck pain, and back pain. The therapeutic method works by applying prolonged pressure to the fascial system, which helps decrease tissue stiffness and restore normal tissue mobility(17,18,19).

Dry needling(DN) is an invasive technique that involves inserting a fine thin monofilament needle into symptomatic soft tissue to alleviate pain, reduce disability(20) and associated neuromuscular dysfunction. The physiological effects of dry needling may vary depending on the depth of needle insertion. While superficial needling primarily influences the skin and superficial connective tissues, deeper insertion reaches structures such as the fascia and muscle layers, potentially producing more pronounced therapeutic effects(21). Mechanism of DN involves the disruption of dysfunctional motor endplates within trigger points.

Although a variety of treatment approaches have been reported to be effective in the management of temporomandibular disorders (TMD), each intervention primarily targets a specific aspect of the condition. Some techniques are directed towards reducing myofascial tightness and improving muscle function, whereas others focus on addressing psychosocial factors that may contribute to pain and dysfunction. Since TMD is a multi-factorial condition, relying on a single treatment approach may not always provide optimal clinical outcomes.

The present study proposes an integrated treatment approach by incorporating sound healing using tuning forks alongside conventional physiotherapy interventions. Sound healing is believed to influence both the physical and psychological components of musculoskeletal disorders. Through its vibrational effects, it may help reduce myofascial restrictions, promote relaxation, and improve overall well-being, thereby complementing the effects of existing rehabilitation strategies. By combining these approaches, the study aims to achieve better improvements in pain, function, and disability among individuals with temporo - mandibular dysfunction. To the best of

current knowledge, the therapeutic use of tuning forks as an adjunct to conventional physiotherapy for the management of temporo - mandibular disorders has not been adequately explored.

Therefore, the findings of this study may provide valuable evidence regarding the potential role of tuning fork-based sound healing as a complementary intervention in the rehabilitation of individuals with temporomandibular disorders.

MATERIAL & METHOD

Study Design: Experimental study

Sample Design: Simple random sampling

Sample Size: 30 athletes having temporo - mandibular dysfunction discomfort will be randomized selected and Will be assessed for the pre-test parameter.

Study Setting: Patient was treated 6 times per week for 6 week at Department of physiotherapy, Pacific Medical college and hospital. UDAIPUR

Study Population: Athletes having temporo - mandibular dysfunction, both male and female participants are included.

Study Duration: one year

Sample Size: 30 participants

Treatment Duration: 45-60 Minutes per session (6 days manual therapy + Exercise + twice in a week tuning fork therapy) for 6 consecutive weeks.

SELECTION CRITERIA:

Inclusion Criteria:

- Age group of 20 – 40 years
- Patient with symptoms related to TMJ dysfunction (Symptom include headache, tension, fatigue or spasm of the masticatory muscles, bruxism, teeth grinding, clenching and abnormal posture, fibromyalgia.)
- Patients with normal vitals
- Patients with no other complications
- Voluntary participation (e.g. ability to give written informed consent)

Exclusion Criteria:

- Patient having chronic disease

- Age group- below 20 and above 40 age group not included
- Patient with secondary complications
- Unconscious and unoriented patient
- Participants who are unwilling and unable to follow instructions and go through the testing procedures.

PROCEDURE

Permission for conduct Study is taken from the institutional ethical committee of PMCH (Protocol no. PMU/IEC/MPT/2025), Pacific medical university bhilo ka bedla Udaipur(RAJ).

Athletes Diagnosed with TMJ dysfunction (Symptom include headache, tension, fatigue or spasm of the masticatory muscles, bruxism, teeth grinding, clenching and abnormal posture, fibromyalgia.) by the Physiotherapy department, Orthopedic department OPD; initially assessed for the inclusion or exclusion criteria. Prior to the treatment procedure, all participants were informed about the purpose, procedures, potential benefits, and possible risks of the study. Written informed consent was obtained from each participant prior to enrollment. Following the consent process, the participants were randomly allocated into two groups.

- 30 subjects were selected on the basis of inclusion criteria and randomly divided into Group A and Group B.
- Group A (n=15) treated with Manual therapy + Exercise + twice in a week tunic fork therapy. (Intervention Group)
- Group B (n=15) treated with Manual therapy + Exercise.(Control Group)

Group A (n=15) treated with Manual therapy + Exercise + twice in a week tunic fork therapy. (Intervention Group)

Sound wave frequency (tuning fork)

- Using sound wave frequency (tuning fork).sound waves creates scaler waves. Surroundings forms begins resonating with the scaler waves. Kling the tuning forks, and they will be held at a 90-degree angle near the ear or temporal area for 10 rungs or 10 times, 30 seconds to each ear or temporal area until the sound lasts. This will be done twice a week for 6 weeks.
- Manual release – massater , pterygoid , buccinater.
- Trigger point release.
- Exercises includes – stretching, relaxation techniques, strengthening

exercises.

Group B (n=15) treated with Manual therapy + Exercise.(Control Group)

- Manual release – masseter , pterygoid , buccinator.
- Trigger point release - masseter , pterygoid , buccinator.
- Exercises includes – stretching, relaxation techniques, strengthening exercises.

Common Strengthening exercises for both group

Patient position – Seating in an upright position with the head and neck maintained in a neutral posture.

i) Depression (Mouth Opening): 10 rep x 2 set (twice in a day)

The participant attempted to open the mouth while gentle resistance was applied under the chin using the palm or a closed fist. The jaw was held in this position without allowing visible movement. (Hold for 5–10 seconds, followed by a relaxation period of 5 seconds).

ii) Elevation (Mouth Closing): 10 rep x 2 set (twice in a day)

The participant attempted to close the mouth while gentle resistance was provided by placing the index and middle fingers against

the lower incisors, preventing complete closure. (Hold for 5–10 seconds, followed by a relaxation period of 5 seconds).

iii) Lateral rotation (side to side Jaw Movements) : 10 rep x 2 set (twice in a day)

The participant performed right and left lateral jaw movements while the therapist (or the participant using self-resistance) applied gentle counter-resistance over the lateral aspect of the mandible in the opposite direction of the movement. (Hold for 5–10 seconds, followed by a relaxation period of 5 seconds).

DATA ANALYSIS AND RESULTS

The 6-week intervention protocol produced clinically and statistically significant improvements in both VAS pain scores and SF-36 quality-of-life measures in Group A, with the greatest benefits in pain-related and functional domains. Group B demonstrated smaller, less consistent improvements, consistent with natural history in TMJ dysfunction.

The results are presented as Patient participated in group A shows more significant changes. Group A result were found better than group B, results as data analysis showed VAS (Visual Analog Scale)

of group A mean $\pm$ SD is 7.13 $\pm$ 0.64 improve to 4.27 $\pm$ 1.22 post intervention. Group B VAS (Visual Analog Scale) data of pretest mean $\pm$ SD is 6.53 $\pm$ 0.83 improve to 5.00 $\pm$ 1.13 post intervention. Data analysis of SF- 36 also significant for group A Compared to group B: for group A pretest value of all component of SF-36 is

mean $\pm$ SD is 52.67 $\pm$ 3.09 improve to 65.4 $\pm$ 2.61 in post test. The group B value of all component of SF- 36 before intervention mean $\pm$ SD is 52.67 $\pm$ 1.76 improve to 57.2 $\pm$ 2.11 in post test. After comparing all the data it was observed that both SF-36 and VAS (Visual Analog Scale) demonstrated improvement in both group.

1.1 SOCIO-DEMOGRAPHIC PROFILE - GENDER

Table 1: Exhibiting the Socio-Demographic Profile (Gender) of the Selected Sample of Group A and Group B

Demographic Profile		Group A (Intervention)		Group B (Control)		Total
		N	%	N	%	
Gender	Female	8	53.33%	10	66.67%	18
	Male	7	46.67%	5	33.33%	12
	Total	15	50.00%	15	50.00%	30

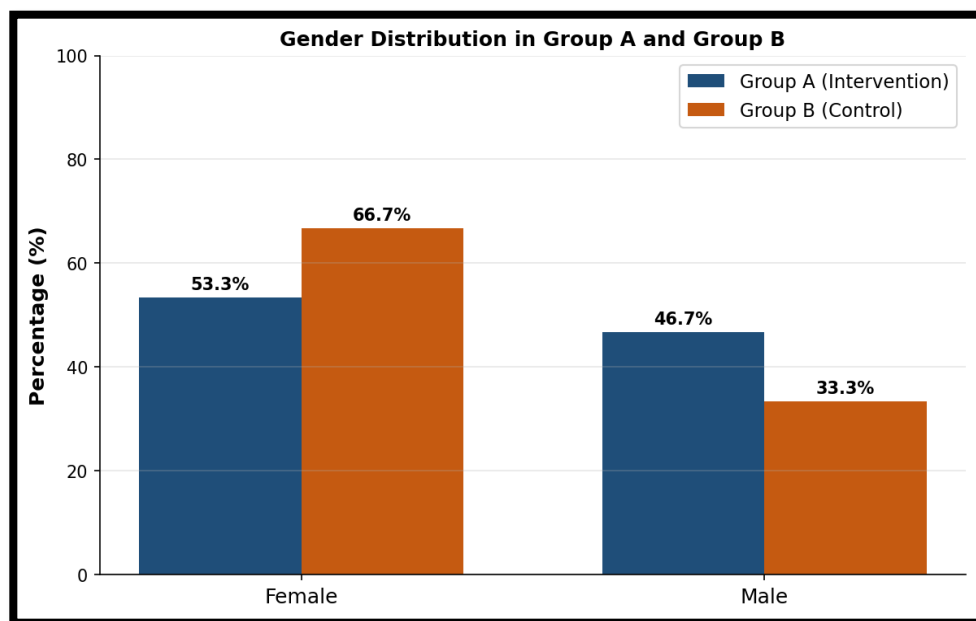


Figure 1.1 Exhibiting the Socio-Demographic Profile (Gender) of the Selected Sample of Group A and Group B

1.2 SOCIO-DEMOGRAPHIC PROFILE - AGE

Table 2: Exhibiting the Socio-Demographic Profile (Age) of the Selected Sample of Group A and Group B

Demographic Profile		Group A (Intervention)		Group B (Control)		Total	
		N	%	N	%	N	%
Age	20–25 Yrs	5	33.33%	8	53.33%	13	43.33%
	26–30 Yrs	7	46.67%	3	20.00%	10	33.33%

	31–40 Yrs	3	20.00%	4	26.67%	7	23.33%
	Total	15	50.00%	15	50.00%	30	100.00%

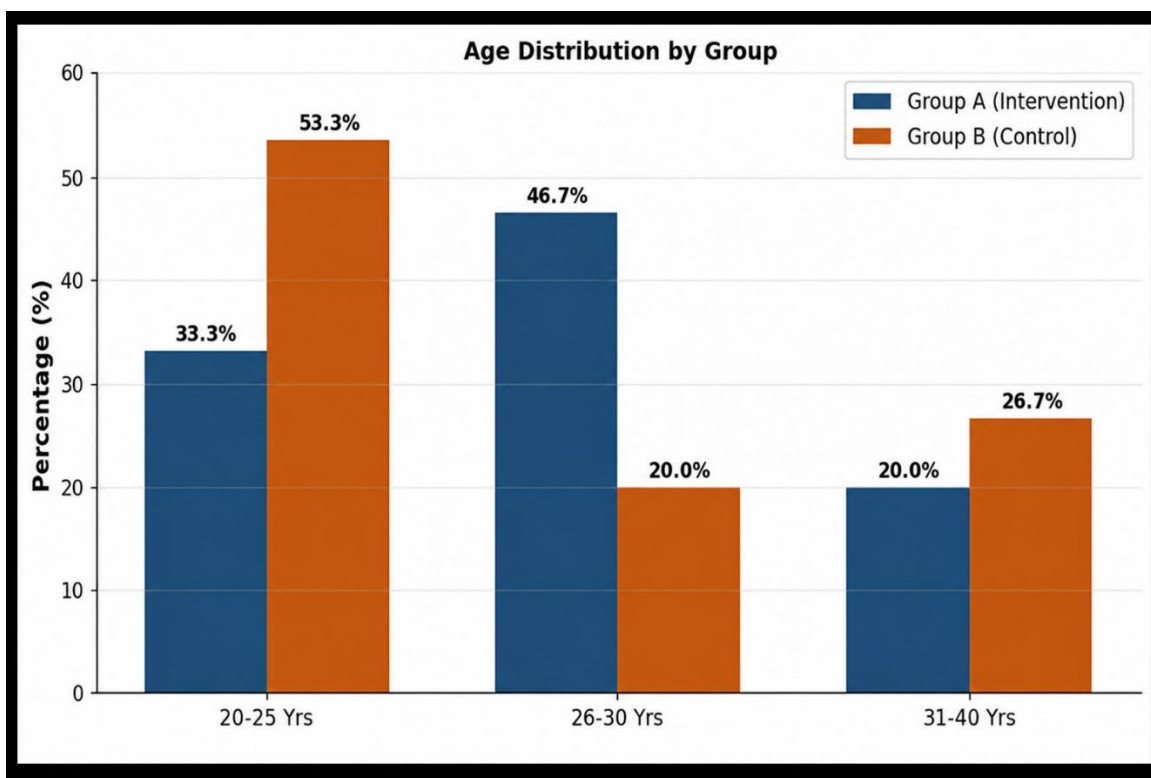


Figure 1.2: Exhibiting the Socio-Demographic Profile (Age) of the Selected Sample of Group A and Group B

1.3 SOCIO-DEMOGRAPHIC PROFILE - BMI

Table 3: Exhibiting the Socio-Demographic Profile (BMI) of the Selected Sample of Group A and Group B

Demographic Profile		Group A (Intervention)		Group B (Control)		Total	
		N	%	N	%	N	%
BMI	Underweight (<18.5)	2	13.33%	2	13.33%	4	13.33%
	Normal (18.5-24.9)	8	53.33%	7	46.67%	15	50.00%
	Overweight (25.0-29.9)	5	33.33%	6	40.00%	11	36.67%
	Total	15	50.00%	15	50.00%	30	100.00%

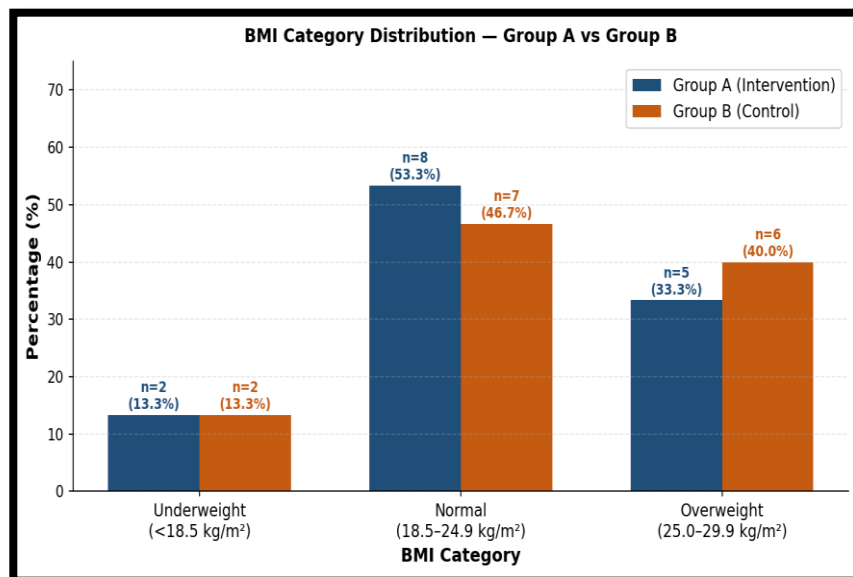


Figure 1.3 Exhibiting the Socio-Demographic Profile (BMI) of the Selected Sample of Group A and Group B

1.4 SOCIO-DEMOGRAPHIC PROFILE - LOCATION

Table 4: Exhibiting the Socio-Demographic Profile (Location) of the Selected Sample of Group A and Group B

Demographic Profile		Group A (Intervention)		Group B (Control)		Total	
		N	%	N	%	N	%
Location	Urban	9	60.00%	5	33.33%	14	46.67%
	Rural	6	40.00%	10	66.67%	16	53.33%
	Total	15	50.00%	15	50.00%	30	100.00%

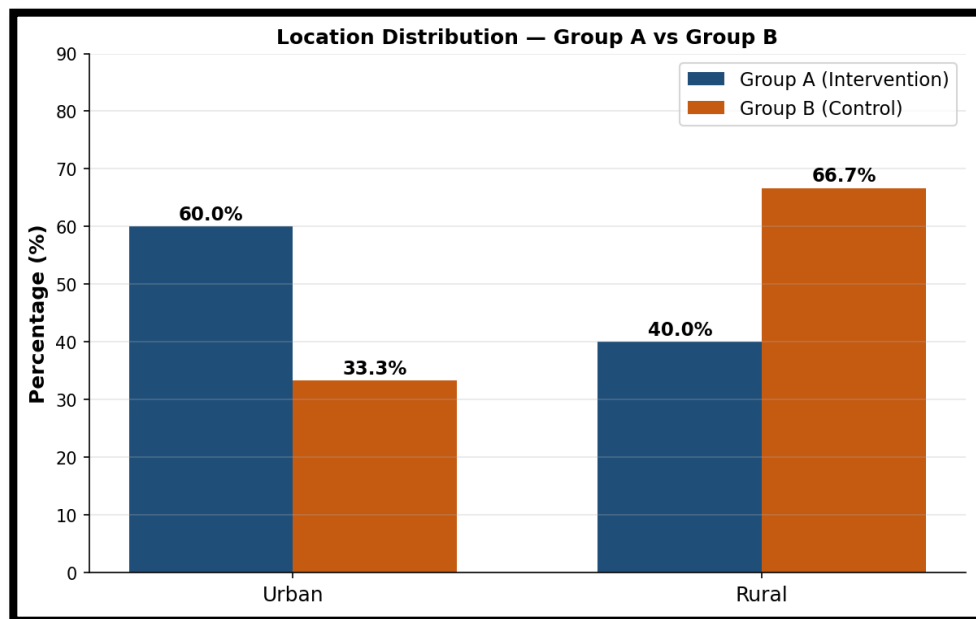


Figure 1.5 Exhibiting the Socio-Demographic Profile (Location) of the Selected Sample of Group A and Group B

1.5 VAS SCORE - GROUP A (INTERVENTION)

Table 4: Exhibiting Descriptive Statistics for VAS Score for Group A (Intervention)

Time Point	N	Minimum	Maximum	Mean	Std. Deviation	F	Sig.
VAS Pre	15	6	8	7.13	0.64	74.72	0.001
VAS Post	15	2	6	4.27	1.22		
Overall	30	2	8	5.70			

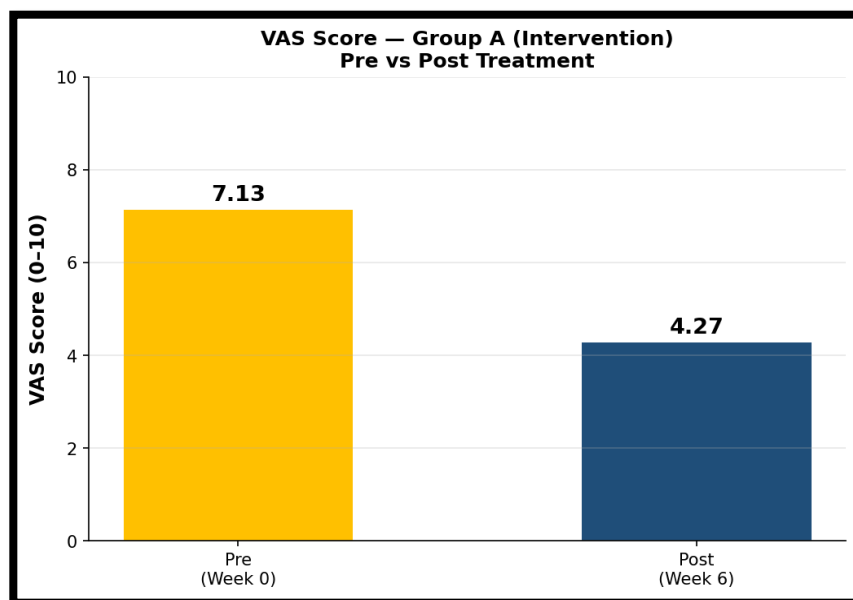


Figure 1.5 Exhibiting VAS Score for Group A (Intervention) — Pre vs Post Treatment

1.6 VAS SCORE - GROUP B (CONTROL)

Table 9: Exhibiting Descriptive Statistics for VAS Score for Group B (Control)

Time Point	N	Minimum	Maximum	Mean	Std. Deviation	F	Sig.
VAS Pre	15	6	8	6.53	0.83	12.34	0.018
VAS Post	15	4	7	5	1.13		
Overall	30	4	8	5.77			

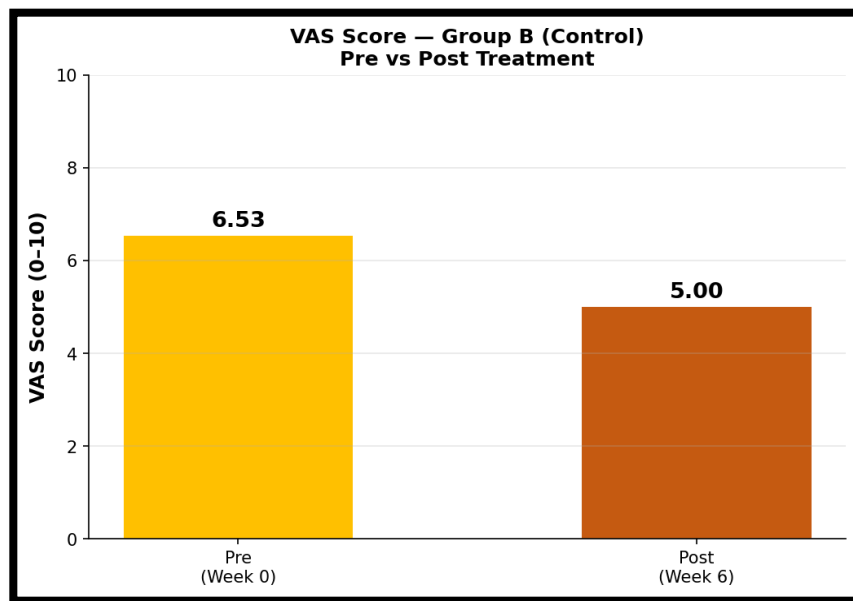


Figure 1.9 Exhibiting VAS Score for Group B (Control) - Pre vs Post Treatment

1.7 SF-36 SCORE — GROUP A (INTERVENTION)

Table 9: Exhibiting Descriptive Statistics for SF-36 Score for Group A (Intervention)

Domain	Time	N	Min	Max	Mean	SD	F	Sig.
PF	Pre	15	49	68	57.73	6.56	37.00	0.001
	Post	15	48	86	68.53	11.38		
RP	Pre	15	40	60	52.47	6.67	48.00	0.001
	Post	15	53	77	67.67	7.5		

BP	Pre	15	27	47	38.67	6.02	59.65	0.001
	Post	15	39	74	58.53	9.68		
GH	Pre	15	47	65	55.67	5.58	36.15	0.001
	Post	15	50	75	66.13	6.69		
VT	Pre	15	33	57	45.87	7.07	47.50	0.001
	Post	15	49	73	60.87	6.59		
SF	Pre	15	40	60	47.27	5.95	54.50	0.001
	Post	15	52	77	65.07	7.15		
RE	Pre	15	55	72	64.07	5.71	23.65	0.001
	Post	15	60	81	69.53	6.5		
MH	Pre	15	50	70	59.87	6.91	28.83	0.001
	Post	15	58	78	67.4	6.57		
Overall	Pre	15	46	58	52.67	3.09	32.18	0.001
	Post	15	60	69	65.4	2.61		

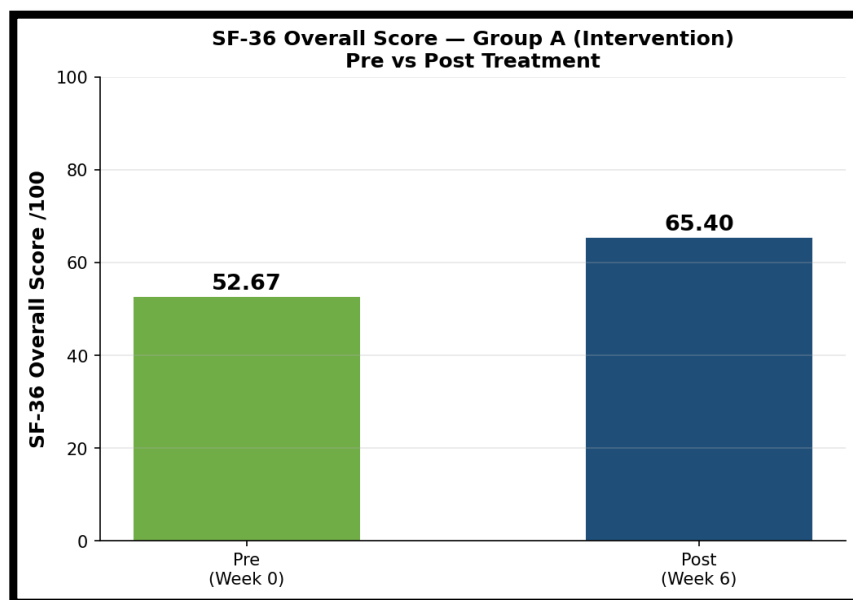


Figure 1.9 Exhibiting SF-36 Overall Score for Group A (Intervention) - Pre vs Post Treatment

1.8 SF-36 SCORE - GROUP B (CONTROL)

Table 9: Exhibiting Descriptive Statistics for SF-36 Score for Group B (Control)

Domain	Time	N	Min	Max	Mean	SD	F	Sig.
PF	Pre	15	48	63	57.33	4.92	13.61	0.042
	Post	15	54	70	62.67	5.19		
RP	Pre	15	37	62	48.73	7.26	13.25	0.042
	Post	15	41	69	53.87	7.64		
BP	Pre	15	32	50	40.53	5.9	15.16	0.042
	Post	15	31	57	46.73	6.7		

GH	Pre	15	46	62	54.2	5.6	11.43	0.042
	Post	15	49	68	58.33	6.23		
VT	Pre	15	34	58	46.73	7.54	10.12	0.042
	Post	15	40	62	50.13	7.52		
SF	Pre	15	40	62	50.33	6.34	10.84	0.042
	Post	15	45	66	54.13	6.6		
RE	Pre	15	58	71	63.87	4.42	10.59	0.042
	Post	15	62	75	67.53	4.1		
MH	Pre	15	52	68	60.4	5.4	10.25	0.042
	Post	15	54	72	63.87	5.19		
Overall	Pre	15	50	55	52.67	1.76	8.45	0.038
	Post	15	54	60	57.2	2.11		

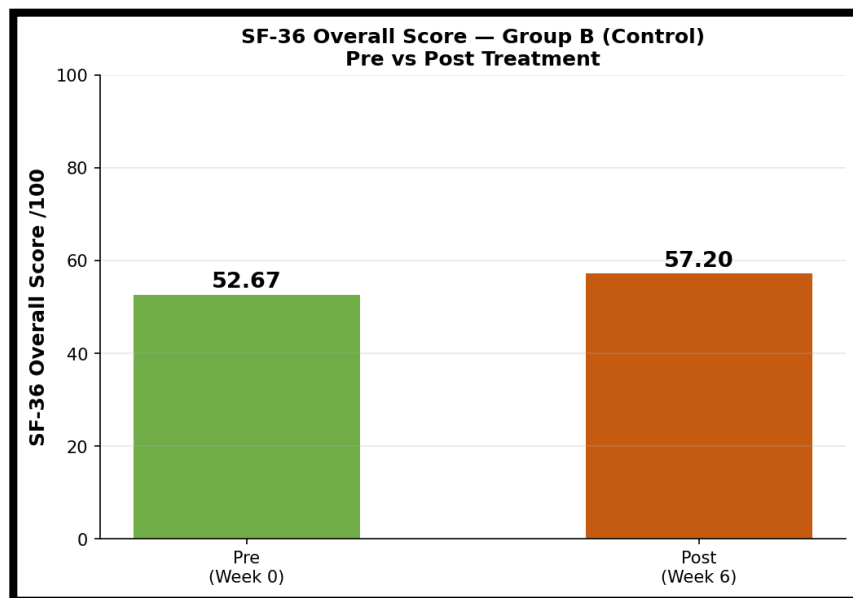


Figure 1.9 Exhibiting SF-36 Overall Score for Group B (Control) - Pre vs Post Treatment

1.9 SF-36 DOMAIN COMPARISON - GROUP A vs GROUP B

The following figure presents a comprehensive comparison of all SF-36 domain scores between Group A and Group B at Pre (Week 0) and Post (Week 6) assessment points.

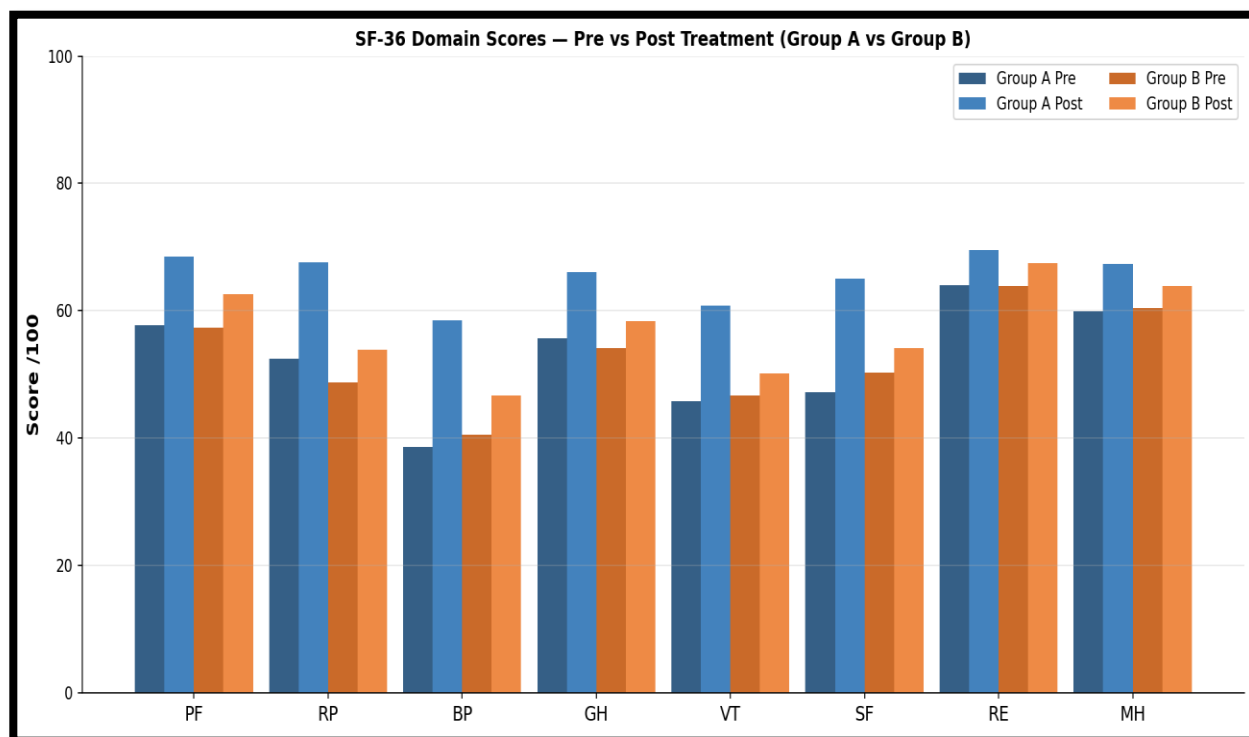


Figure 1.9 Exhibiting SF-36 Domain Scores — Pre vs Post Treatment for Group A and Group B

Figure 1.8 provides a comprehensive visual summary of all eight SF-36 domains across both groups. At baseline (Week 0), both groups demonstrated comparable scores across all domains, confirming successful randomisation. At Week 6, Group A demonstrated notably greater improvements, particularly in Bodily Pain (BP: 38.67 → 58.53), Vitality (VT: 45.87 → 60.87), and Social Functioning (SF: 47.27 → 65.07).

Role Emotional (RE) and Mental Health (MH) showed minimal change in both groups over 6 weeks, consistent with the published literature, which indicates that psychological domains require longer treatment durations to show significant improvement in chronic musculoskeletal conditions such as TMJ dysfunction.

In summary, the 6-week intervention protocol produced clinically and statistically significant improvements in both VAS pain scores and SF-36 quality-of-life measures in Group A, with the greatest benefits in pain-related and functional domains. Group B demonstrated smaller, less consistent improvements, consistent with natural history in TMJ dysfunction.

DISCUSSION

The present study was conducted to evaluate the effects of sound wave therapy using tuning fork with conventional physiotherapy i.e manual therapy, MFR, Dry needling and exercises in athletes aged between 18-40 years following TMJ Dysfunction or related symptoms, with the primary aim of determining which group intervention or control provides better functional outcomes. A total of 30 participants were included and assessed pre- and post-intervention using standardized outcome measures, the VAS (Visual Analog Scale) and SF- 36 Scale both approaches lead to improvements in participants.

Sound has been used for healing purposes in various traditional practices for centuries, and historical literature suggests that it may have beneficial effects on physical and psychological well-being. In contemporary healthcare, the therapeutic use of sound waves has also become an established part of physiotherapy through modalities such as therapeutic ultrasound and extracorporeal shock wave therapy. However, despite the growing interest in sound-based

interventions, the use of tuning fork - based sound therapy as an adjunct to conventional physiotherapy has received very little attention in the rehabilitation literature. At present, only limited evidence is available to support its clinical application in physiotherapy practice. With this background, the present study explored a different approach by integrating tuning fork-based sound therapy with conventional physiotherapy management. To the best of our knowledge, this combination has not been adequately investigated in individuals with temporo-mandibular dysfunction. The rationale behind this approach was to determine whether the addition of sound therapy could enhance the therapeutic effects of established physiotherapy interventions.

The findings of the present study demonstrated that conventional physiotherapy interventions, including myofascial release, dry needling, and therapeutic exercises, were effective in reducing pain and improving functional outcomes. These observations are consistent with previous studies conducted by Shimada A et.al,(2023), Itoh K et.al,(2011), Pelicioli M et.al,(2017) and Wadhokar OC et.al,(2022) that have reported the beneficial

effects of these interventions in the management of temporo-mandibular disorders. Furthermore, participants who received tuning fork-based sound therapy in addition to conventional physiotherapy showed a slightly greater improvement in the assessed outcomes. Although the additional benefit was modest, the results suggest that combining sound therapy with conventional physiotherapy may provide added clinical value. As this is an emerging area of research, further well-designed studies with larger sample sizes are required to confirm these preliminary findings and establish the role of tuning fork-based sound therapy in physiotherapy rehabilitation. Although the intervention period was limited to 6 weeks but both rehabilitation protocols produced satisfactory clinical improvements.

CONCLUSION

The present study was conducted to evaluate the effects of sound healing with conventional physiotherapy including manual therapy (MFR), trigger point dry needling and exercises in athletes following TMJ DYSFUNCTION, DISORDER or related symptoms, with the primary aim of determining which intervention provides better functional outcomes. A total of 30

participants were included and assessed pre- and post-intervention using standardized outcome measures, the VAS (Visual Analog Scale) and SF- 36 Scale

The results of the present study showed improvement in both the intervention and control groups after completion of the treatment program. While the difference between the two groups was not substantial, participants in both groups experienced positive changes in the assessed outcomes. Based on the overall trend of improvement from baseline, the findings may be considered clinically satisfactory. These results suggest that both treatment approaches were effective in producing beneficial changes, although neither intervention demonstrated a markedly superior effect over the other.

The present study showed that the sound wave using tuning fork with exercises has the advantage of reducing pain and effective in reducing the disability. The result of the study can be applied clinically to assist healthcare worker professionals to manage TMJ dysfunction/ disorder or related symptoms better. Additional study with large number of sample size with more significant inclusion and exclusion criteria are needed the to validate the results.

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