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THE EFFECT OF MWM ON TMJ AND SNAGS ON THE CERVICAL SPINE TO IMPROVEMOUTH OPENING, REDUCE PAIN AND FUNCTIONAL OUTCOME OF TMJ FUNCTION

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ABSTRACT

Background: Temporomandibular disorder (TMD) includes a variety of conditions associated with pain and dysfunction of the temporomandibular joint (TMJ) and the masticatory muscles. These disorders also are referred to as temporomandibular dysfunction Craniomandibular Disorders Mandibular Dysfunction. **Objectives:** The main aim of this study is to investigate the effect of MWM on TMJ and SNAGS on the cervical spine to improve mouth opening, reduce pain and function outcome of TMJ dysfunction. **Method:** This study was carried out in the Janaki Medical College, Nepal for the duration of one year.Within this period, 30 patients were selected as per inclusion and exclusion criteria. **Result:** This study conducted on 30 participants with TMJD. The participants were divided into 2 groups, 15 participants in each group. The mean age of Group A was23.467±4.96 and in Group B was 24.133±4.38 years. There was no statistically significant difference was found between the ages of the participant in all group, proving that the groups are homogenous in terms of age. **Conclusion:** The results adding MWM & SNAGS along with other conventionalphysical therapy is helpful in pain reduction, mouth opening and improve Jaw function in TMjoint dysfunction.

KEYWORDS: MWM on TMJ and SNAGS.

INTRODUCTION

The temporomandibular joint is a synovial, condylar, hinge-type joint with fibro cartilaginous surfaces and an articular disc.[1] Each temporomandibular joint is described as a glinglymoarthrodial joint, consisting of the mandibular condyle articulating with the temporomandibular disc and glenoid fossa of the temporal bone.[2]This completely divides each joint into two cavities, upper cavity and lower cavity.1 Gliding, translation, or sliding movement occurs in the upper cavity of the TM joint, whereas rotation or hinge movement occurs in the lower cavity,[3] Movements of the mandible are a result of the action of the cervical and jaw muscles. The three major closing muscles of the mandible are the temporalis, the masseter, and the medial pterygoid. The superior head of the lateral pterygoid is also actively involved in mandibular closure. The inferior head of lateral pterygoid and anterior head of the digastric are primary muscles for mandibular opening.[4] The TMJ is most frequently used and most mobile joint in body and it is used for mastication, swallowing and speaking.[5]

MATERIALS AND METHODOLOGY

4.1. STUDY DESIGN: Experimental study.

4.2. SAMPLE DESIGN: Simple Random Sampling Method in Allocation (Computerized random table method)

4.3. STUDY POPULATION: Participants with Temporomandibular jointdysfunction.

4.4. SAMPLING SIZE: Total 30 Study Participants. [Group A=15, Group B=15]

4.5. STUDY SETTING: Institutional OPD

4.6. STUDY DURATION: 1 year.

4.7. TREATMENT DURATION: 4 days per week for 4 Weeks.

4.8. SELECTION CRITERIA

(4.8.1) INCLUSION CRITERIA[7,9,11,40,41]

1. Axis: I – Diagnostic classifications of physical condition, Modified from the diagnostic criteria/Temporomandibular disorders.
2. Group I: Masticatory muscle disorders.
3. Mouth opening ≤40mm.
4. With Unilateral and Bilateral affection.
5. Age 13 to 35 year.
6. Both male and female.
7. Patients referred from local dentist, specialist (ENT) and physician.
8. Pain in the myofascial area either during

compression or jaw movements.
9. Participants who are willing to participate in this study.

(4.8.2) EXCLUSION CRITERIA[7,11, 33]

1. Group II: Disc displacement. Group III: Arthralgia. Osteoarthritis. Osteoarthrosis.
2. Patients who made use of analgesics and/or muscle relaxant.
3. Hypermobility in the cervical region or mouth opening.
4. Osteoporosis.
5. Congenital abnormality of the TMJ.
6. Any cardio neurological condition.
7. Patients with symptoms of respiratory disorders.
8. Neoplastic conditions.
9. Post traumatic and post-surgical.
10. Cervical radiculopathy.
11. Otitis media.
12. Otitis externa.
13. Trigeminal neuralgia.
14. Herpes zoster.
15. Parotitis.
16. Pregnancy

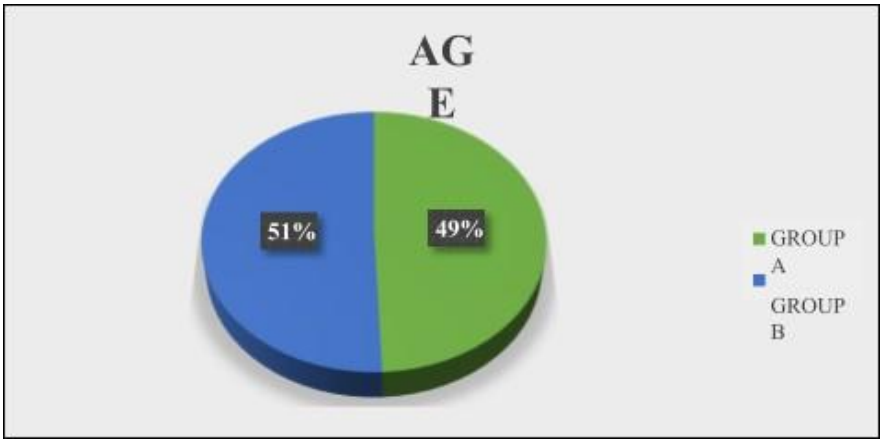
al side of the limited rotation.

RESULTS

All statistical analysis was done using SPSS 16.0 version of statistical software. Confidence interval was 95%. All outcome measures were recorded atbaseline and after 4 weeks. Intra group comparison of pre-& post treatment score of NPRS, MMO and JFLS 20 was done using non parametric Wilcoxon signed rank test and parametric paired t test. Intergroup comparison of post treatment score of NPRS, MMO and JFLS 20 was done using non parametric Mann whitney U test and parametric independent t test.

Table 1: Age distribution.

Groups	N	Mean age	±SD
A	15	23.467	±4.96
B	15	24.133	±4.38
Total	30	23.8	±4.61

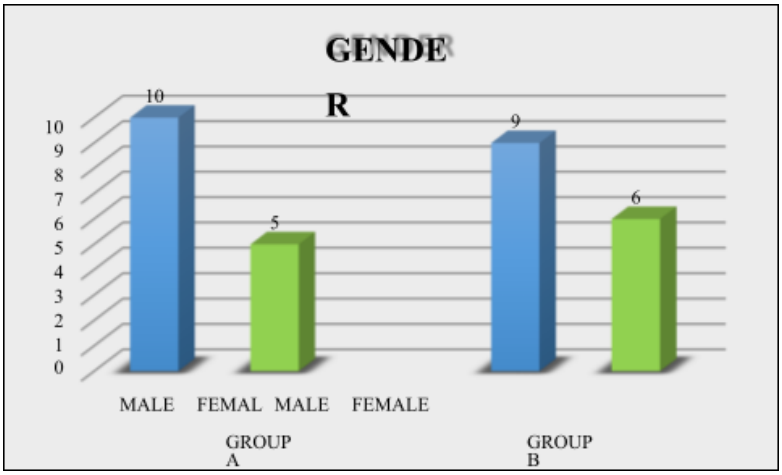


Graph 1: Mean age of participant in Group A & B.

Table 1 and graph 1 shows the mean age of subjects in Group A (23.46), Group B (24.13). No statistically significant difference was found between the ages ofthe participant in all group, proving that the groups are homogenous in terms of age.

Table 2: Gender distribution.

Groups	Male	Female
A	10	5
B	9	6
Total	19	11



Graph 2: Gender distribution in Group A & B.

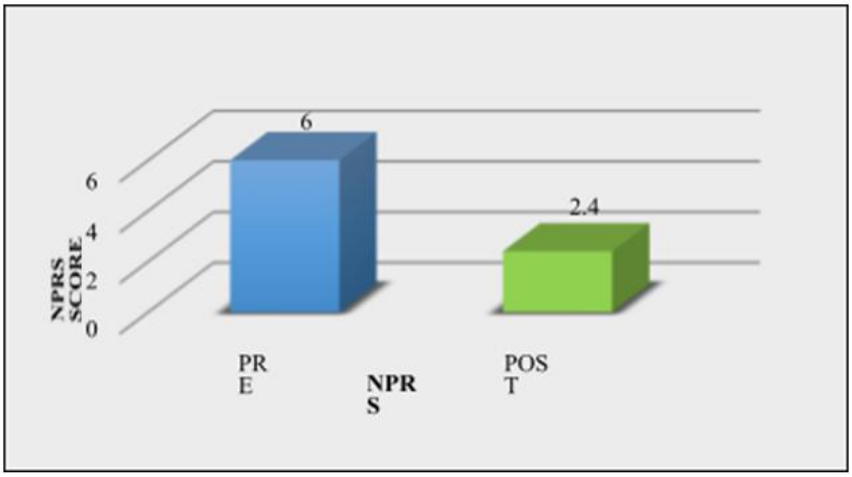
Table 2 and graph 2 shows the gender distribution among Group A and Group.

B. A total of 30 participants, 19 Male and 11 Female have participants in study. Out of 30 participant Group A consist of 9 males and 6 females in Group A and in Group B consist of 10 males and 5 females.

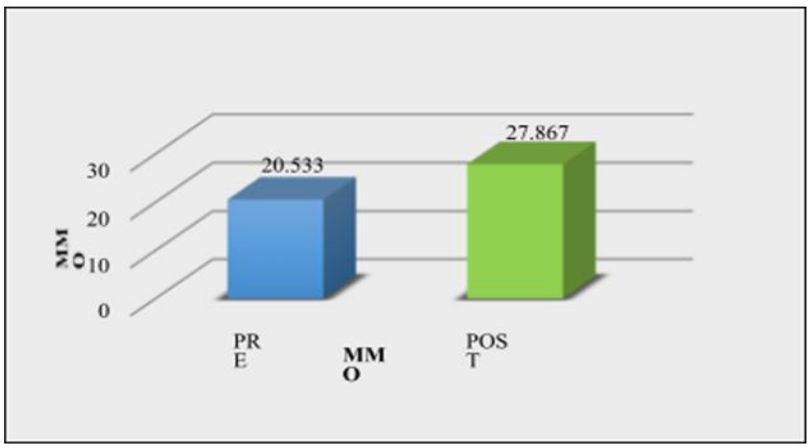
Table 3: Intragroup comparison of pre and post test value of NPRS, MMOand JFLS 20 of Group A.

VARIABLES	PRE VALUE		POST VALUE		p Value
	Mean	±SD	Mean	±SD	
NPRS	6	±1.69	2.66	±1.29	0.001
MMO	19.66	±5.08	29.4	±4.17	0.000
JFLS 20	131.13	±17.53	35.06	±11.70	0.001

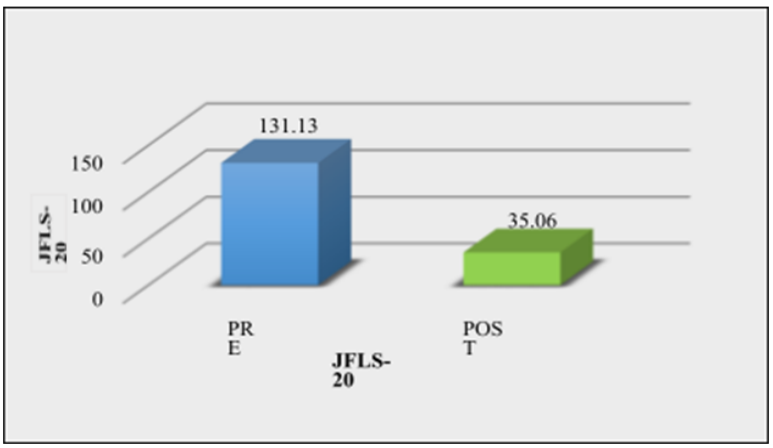
Table 3 and graph 3, 4, & 5 shows intragroup comparison of pre and post test value of Group A. The p value of Group A is < 0.05. A statistically significant difference was found between the pre and post test value of NPRS, MMO and JFLS 20 in Group A.



Graph 3: Group A pre-test & post-test comparison of NPRS.



Graph 4: Group A pre-test & post-test comparison of MMO.

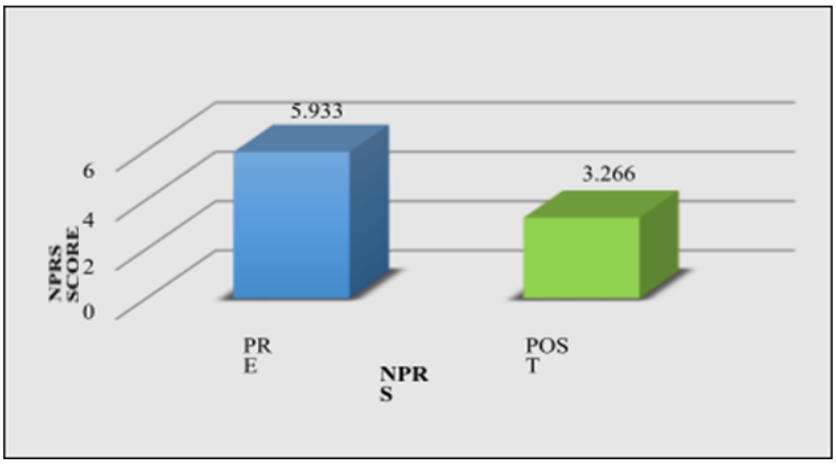


Graph 5: Group A pre-test & post-test comparison of JFLS 20.

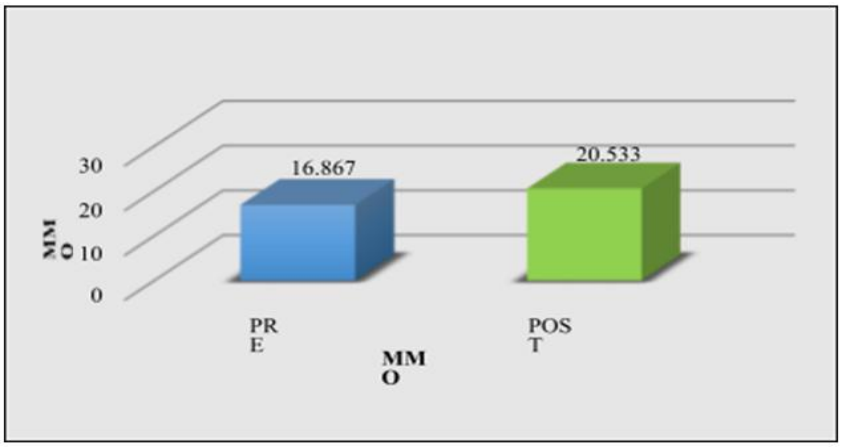
Table 4: Intragroup comparison of pre and post test value of NPRS, MMOand JFLS 20 of Group B.

VARIABLES	PRE VALUE		POST VALUE		p Value
	Mean	±SD	Mean	±SD	
NPRS	5.93	±1.39	3.26	±0.96	0.001
MMO	16.86	±4.64	22.66	±4.63	0.000
JFLS 20	137.27	±19.06	86.13	±11.67	0.001

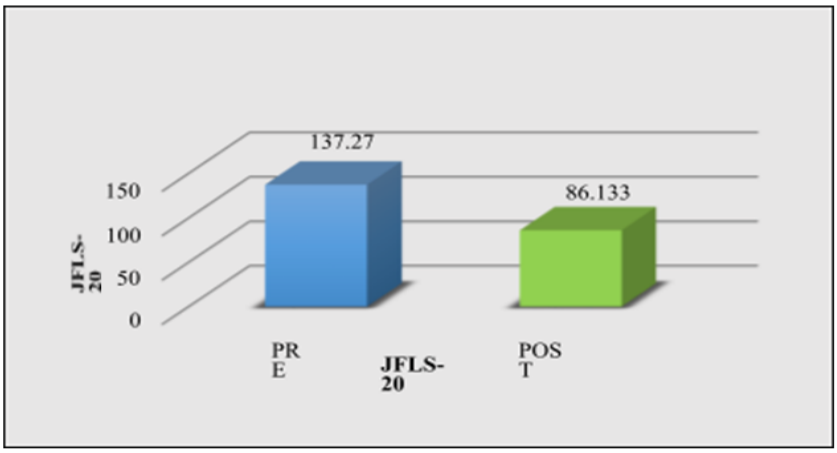
Table 4 and graph 6, 7 & 8 shows intra group comparison of pre and post test value in Group B. the p value of Group B is < 0.05. A statistically significant difference was found between the pre and post test value of NPRS, MMO and JFLS 20 in Group B.



Graph 6: Group B pre-test & post-test comparison of NPRS.



Graph 7: Group B pre-test & post-test comparison of MMO.

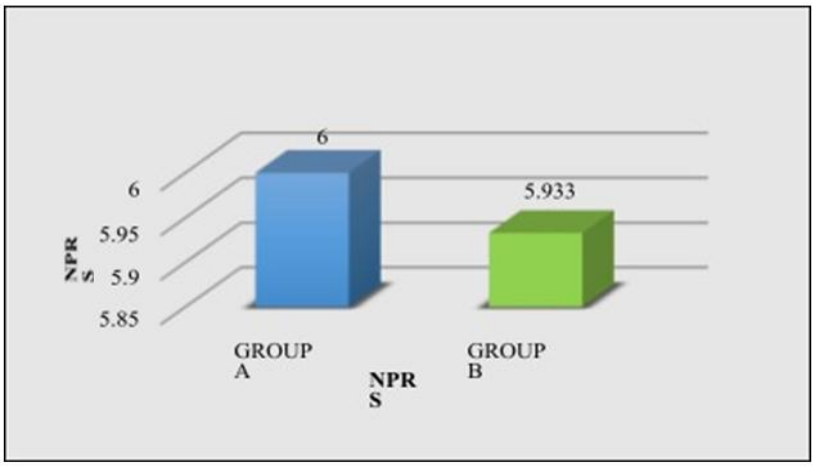


Graph 8: Group B pre-test & post-test comparison of JFLS 20.

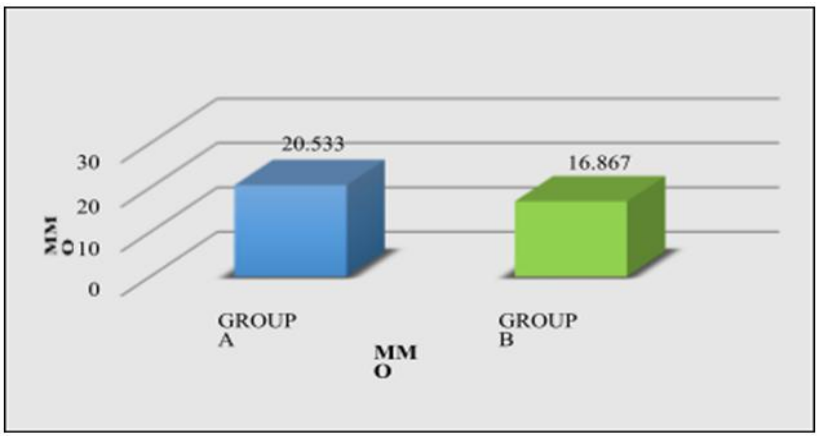
Table 5: Inter Group comparison of pre-test values of Group A & B.

VARIABLES	Group A		Group B		p Value
	Mean	±SD	Mean	±SD	
NPRS	6	±1.69	5.93	±1.39	0.935
MMO	19.66	±5.08	16.86	±4.64	0.085
JFLS 20	113.13	±17.53	137.37	±19.06	0.345

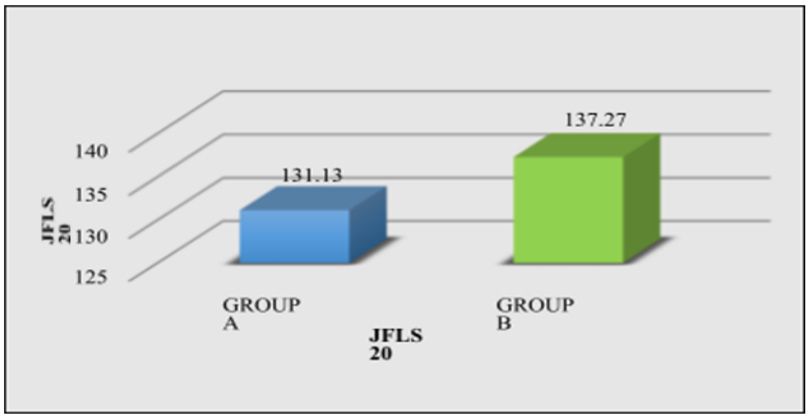
Table 5 and graph 9, 10 & 11 shows the inter group comparison of all variables of Group A and Group B, where the p value of all variables is >0.05. It shows that there is no significant difference between the pre-test value of NPRS, MMO and JFLS 20 between Group A & B. Hence it proves that the group are homogeneous.



Graph 10: Intergroup pre-test comparison of NPRS.



Graph 11: Intergroup pre-test comparison of MMO.



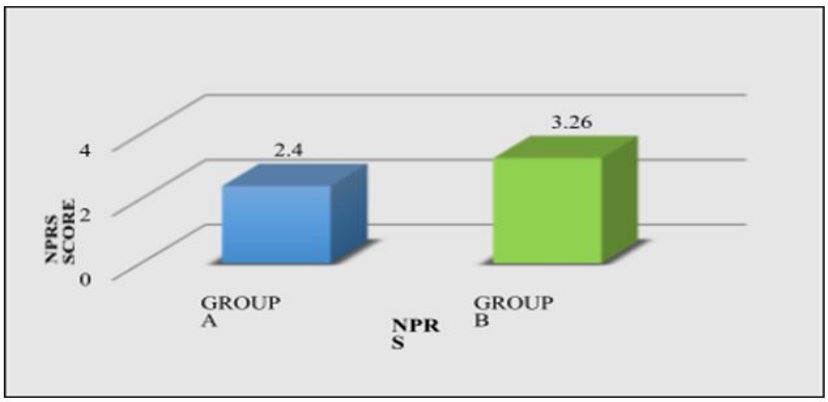
Graph 12: Intergroup pre-test comparison of JFLS 20.

Table 6: Inter Group comparison of post-test values of Group A & B.

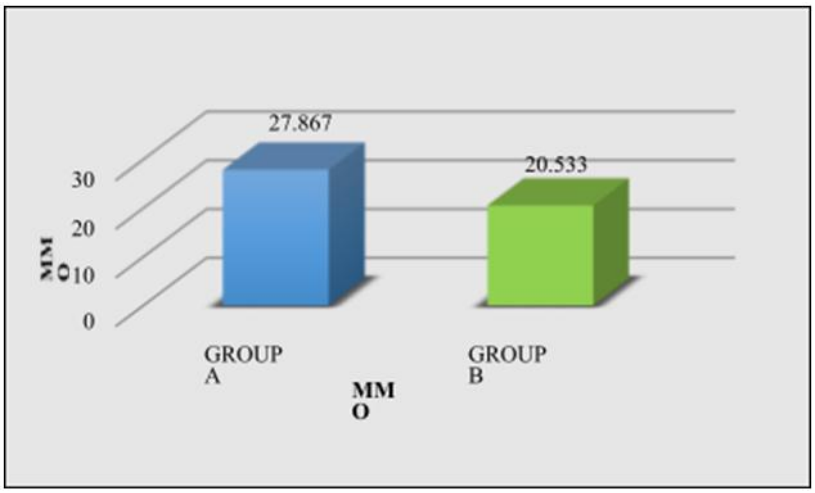
VARIABLES	Group A		Group B		p Value
	Mean	±SD	Mean	±SD	
NPRS	2.66	±1.29	3.26	±0.96	0.033
MMO	29.4	±4.17	22.66	±4.63	0.002
JFLS 20	35.06	±11.70	86.13	±11.67	0.000

Table 6 and graph 13, 14 & 15 shows the inter group comparison of all variables of Group A and Group B, where the p value of all variables is <0.05. It shows that there is significant difference between the post-test value of NPRS, MMO and JFLS 20 between Group A & B at the end of 4 weeks.

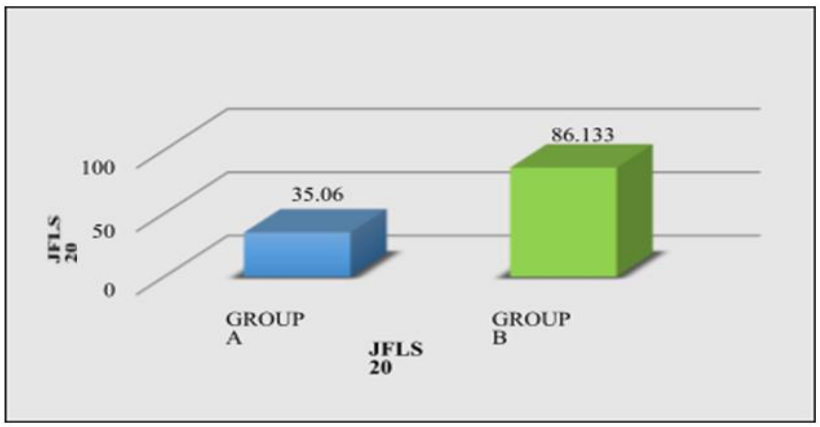
Hence, the experimental hypothesis (H1), *i.e.* effect of MWM, SNAGS and conventional physical therapy on reduction of pain, improvement in mouth opening and functional outcome in temporomandibular joint dysfunction, holds true.



Graph 13: Intergroup post-test comparison of NPRS.



Graph 14: Intergroup post-test comparison of MMO.



Graph 15: Intergroup post-test comparison of JFLS 20.

DISCUSSION

This study conducted on 30 participants with TMJD. The participants were divided into 2 groups, 15 participants in each group. The mean age of Group A was 23.467±4.96 and in Group B was 24.133±4.38 years. There was no statistically significant difference was found between the ages of the participant in all group, proving that the groups are homogenous in terms of age.

In the study 30 participants, there were 10 male and 5 female in Group A & 9 males and 6 females in Group B. Group A received MWM for TMJ, SNAGS for cervical along with conventional physical therapy and Group B received conventional physical therapy alone for 4 weeks.

In this study stretching exercise with stick and isometric exercises for mouth opening, closing, and Right & Left lateral deviation were applied which improves mouth opening and jaw functional activity.

Aysenur Besler Tuncer et al, in 2013 who found that an intervention program consisting of stretching exercises, isometric exercises were effective in increasing pain free maximum mouth opening and improving jaw functional activity.[44]

Alberto da Roch Moraes et al, in 2013 concluded that therapeutic exercises can be an effective in the management of muscular TMJD.[45]

In conventional physical therapy ultrasound were added for each affected side over pterygoid and masseter muscles for 5 min with 1 MHz, continues mode in side lying.

Ucar M. et al, in 2014 conducted study on "Effectiveness of a home exercise program in combination with ultrasound therapy for temporomandibular joint disorders." And supported that ultrasound therapy can be used to reduce inflammation and promote muscular relaxation which leads to improvement in mouth opening and reduction of pain.[18]

Esposito CJ et al, conducted study on "Alleviation of myofascial pain with ultrasonic therapy. The Journal of prosthetic dentistry." Support that healing effect of ultrasound thus the decreases the sensation of pain.[17]

Translatory and rotatory movement between the mandibular and the fossa of maxilla happens with its gliding, sliding and rolling movements, this overall retaining of the function can be regained with combined arthrokinematics and osteokinematics motion.

Mulligan's movement with mobilization has been given with the same core concept to achieve normal physiology of TM Joint dysfunction.

One of the principle mechanisms is believed to be correction of a positional faultat the faulty joint with the MWM glide force.[7] While there is evidence of a positional fault in pathologies affecting the ankle,[46,47] knees,[48] and shoulder,[49] there is no such evidence for the TMJ.

Oliver, 2011 to date, only been one case report to describe the outcomes following MWM in the management of a patient with TMD. One component of the intervention was MWM directed at the TMJ.[50]

Arthrokinematics have to be improved in TMJ, so the twisty combined movements would be possible bilaterally during chewing and other activities. This happens while craniocervical connection are in stable position. The mobility in upper cervical segments provided better basement for the full functionality of TMJ.

The above statement was supported by Alanen and Kirveskari investigation a group of 141 female non-patients and found 51% of them to have some signs or symptoms of TMD.[51] Comparing the group with symptoms and without symptoms with regard to craniocervical problems, they found 71% of CSD in the TMD group and only 40% in the non-TMD group. The high prevalence of functional limitations, even in the control group, was parallel to the present findings.[52]

Paungmali et al., 2003 in their study revealed that it is possible that the SNAGS treatment may normalize input from Type IV nociceptors, as there was a decrease in pain parallel to the decrease in dizziness in participants treated with SNAGs. The rapid pain relieving effect produced by SNAGs is similar to the rapid pain relief reported in the treatment of lateral epicondylalgia using another Mulligan technique, mobilization with movement.[53]

Javier González-Iglesias et al, 2013 in their prospective case series, MWM directed to the TMJ and SNAGS directed cervical spine; thoracic manipulation directed at the thoracic spine; and TrP-DN (trigger point release by dry needing) exhibited significant and clinical important improvements in pain, disability, and MMO.[7]

In this study result by comparing the pretreatment variable in both groups, results showed a significant decline in the pain intensity p value is 0.935, for mouth opening p value is 0.085 and for function p value is 0.345. By the comparing the posttreatment variables in both groups, the results revealed that there was a significant difference between the group A & B. there was a significant decline in intensity of pain ($p = 0.033$), improvement in mouth opening ($p = 0.002$) and function ($p = 0.000$) in group A when compared to group B. This finding supports to our finding that whoever the patients have received MWM and SNAGS have showed significant improvement in pain, mouth opening and functional activity. In this study after analysis of data between group it was noted that the p value <0.05, so the null hypothesis is rejected, and the Alternate hypothesis is accepted.

Hence the results adding MWM & SNAGS along with other conventional physical therapy is helpful in pain reduction, mouth opening and improve Jaw function in TMjoint dysfunction.

CONCLUSION

The study result indicates that the treatment in all groups are effective in temporomandibular joint dysfunction to reduce pain, improving mouth opening and reduction in functional disability, the addition of MWM, SNAGS along with conventional physical therapy produced a significantly greater decline in the intensity of pain, improving mouth opening and reduction in functional disability, when comparison to conventional physical therapy.

Figure: 9 MWM for TMJ

Red Arrow: direction of physiological component of MWM

Black Arrow: Accessory movement component

Figure: 5 TMJ isometric exercise for right Deviators

Figure: 6 TMJ isometric exercise for left Deviators

Figure: 7 TMJ isometric

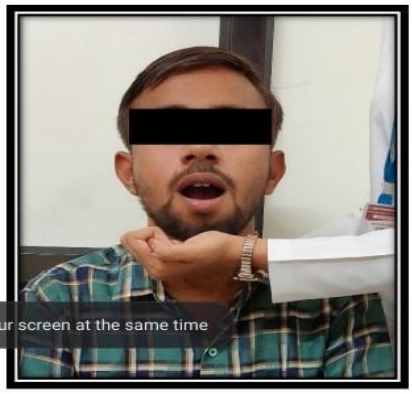


Figure: 8 TMJ isometric

Figure 10: SNAGS for C1-C2

Red Arrow: Direction of Rotation.

A horizontal, anteriorly directed force will applied with the distal phalanx of the thumbs over the C1 transverse process on the contralateral side of the limited rotation.

Figure 3: Application of Ultrasound Therapy

Figure 4: Stretching Exercise

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