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EFFECT OF MCKENZIE EXERCISES AND ROCABADO'S TECHNIQUE ON TEMPOROMANDIBULAR JOINT PAIN IN INDIVIDUALS WITH IDIOPATHIC NECK PAIN

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ABSTRACT

An investigation comparing the effects of Mckenzie Exercises and Rocabado's Technique on pain management and range of motion in individuals with Temporomandibular Joint Disorders was conducted. The aim of this study is to assess and compare the impact of Mckenzie exercises and Rocabado's technique on pain levels and range of motion among patients diagnosed with Temporomandibular Joint Disorders. Thirty participants aged between 20 and 40 years were selected based on specific criteria and randomly divided into two groups: Group A received Mckenzie Exercises, while Group B received Rocabado's Technique. Pain levels were evaluated using the Numerical Pain Rating Scale, and range of motion was assessed using a plastic Vernier caliper. Participants were fully briefed on the procedure, and their informed consent was obtained. Pain scores and range of motion measurements were recorded before and after the intervention, and the data were analyzed accordingly. When comparing pre-treatment and post-treatment scores of pain and disability, mean and standard deviation were calculated for both Group A and Group B. The results revealed that Group A exhibited greater improvement in mean and standard deviation across numerical pain rating scale, Fonseca'squestionnaire, and range of motion values compared to Group B. The study demonstrated that Group A exhibited superior progress in both pain reduction and functional disability compared to Group B.

KEYWORDS: Temporomandibular disorders, Mckenzie Exercises, Rocabado's Technique, Numerical pain Rating Scale, Fonseca'sQuestionnaire.

INTRODUCTION

The temporomandibular joint (TMJ) is a hinge joint that connects the jawbone (mandible) to the skull, specifically to the temporal bone. It plays a crucial role in various jaw movements, including chewing, speaking, and yawning.

Temporomandibular joint disorders (Temporomandibular disorder) can occur due to various reasons, such as trauma, arthritis, teeth grinding, stress, or improper alignment of the jaw. Symptoms of Temporomandibular disorder may include jaw pain, clicking or popping sounds when moving the jaw, difficulty in opening or closing the mouth, and headaches. The Second most common cause of the Chronic pain in the Human musculoskeletal system after chronic low back pain is Temporomandibular disorder (TMD). The Temporomandibular disorders fringe a heterogenous group of inflammatory and degenerative disease. The trigger point in the muscles around the temporomandibular joint is the reliable cause of the pain.

Next are the Signs and symptoms of Temporomandibular disorder (TMD) cause in local pain in the Jaw, clinching of teeth, reduction of jaw movements, patient seldom experience pain and dysfunction in the

Temporomandibular disorder (TMD) joint and masticatory muscle when chewing and opening the Mouth, which affect the ADL of the Patient.

Based on the neurophysiological and biomechanical relationship between Temporomandibular joint (TMJ) and the neck it may be theory that patient with idiopathic neck pain may also episode some Temporomandibular joint (TMJ) dysfunction those even asymptomatic.

More than 25% of normal people are get prone to the Temporomandibular joint disorder. Show that there are 70-80% patient with one or more symptoms of Temporomandibular joint disorder in their Existence and 4-6% of patient have clinically matches with Temporomandibular joint disorders related symptoms.

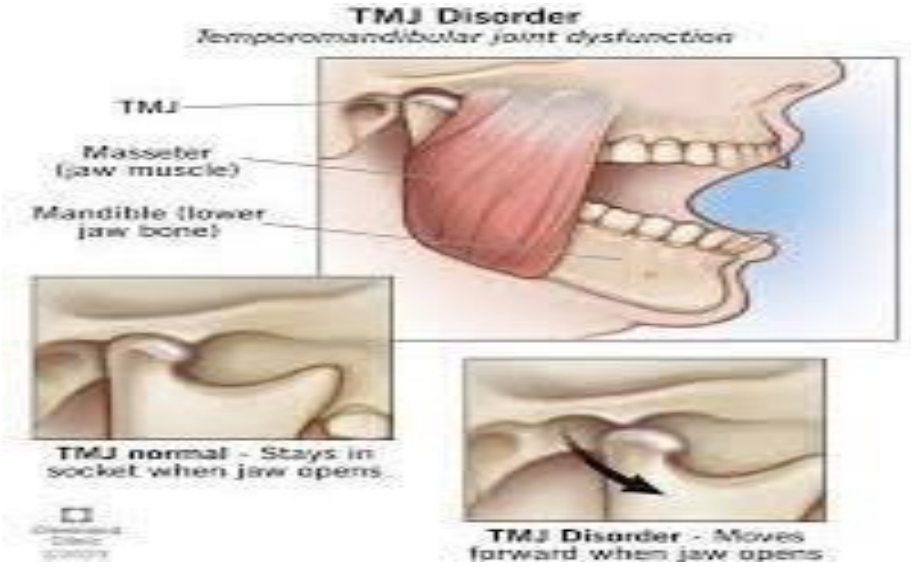
A management that accompanies the medical and dental in wide range of physical manual therapies are been used such as joint mobilization exercise method, electrotherapy, biofeedback, and relaxation technique.

For the treatment of joint pain Mckenzie's method of mechanical diagnosis and therapy are commonly used because it is classification Based approach. It is the biomechanical approach were the general mechanical syndromes that guide the determined directional exercise such as flexion and extension. To restore your Activity of daily living (ADL) function of Temporomandibular Joint these Mckenzie's exercise will help.

According to Victims condition, victims are classified into unbalance syndrome and show rapid improvement in torment as same as in improvement in range of motion of Temporomandibular joint. Documentation for reliability and treatment validity of the centralization showed by the number of studies. Documentation for the importance of determined exercises linked to directional preferences has also been showed.

Rocabado's technique subsists of non-thrust temporomandibular joint manipulation. To release the soft tissue tension and to normalize the range of motion of entire region of jaw, neck and head this technique of Joint Manipulation is used, these non-thrust manipulation for temporomandibular joint open lock and improves in neuro muscular control during activities. These improves the neuromuscular control of subject's limited activities that includes mouth opening and prevent from further locks.

In This study, we focused to examine the effectiveness of a three-week rehabilitation program on pain intensity, range of motion in cervical spine, head posture, and temporomandibular joint functioning in patients with idiopathic neck pain where the Temporomandibular joint (TMJ) pain is absent. The originality of the study is comprehensive analysis of the impact of neck pain and Temporomandibular joint. The intervention is focused to reduce the Temporomandibular joint pain. Where the focused of Mckenzie's method and Rocabado's technique forms a solution of Temporomandibular joint pain.



METHODOLGY

- Study design: comparative study
- Study population: Temporomandibular disorder patient aged between 20 to 60
- Study duration: 4 weeks
- Study setting: Vels school of physiotherapy and Ishari velan mission hospital
- Sample size: 30

INCLUSION CRITERIA

- Subject is selected between the age of 20-65 years
- Both male and females are choosen
- Pain and loss of range of motion in temporomandibular joint.

EXCLUSION CRITERIA

- Subject aged under 20 and above 60
- Recent injuries in the jaw are excluded
- Any history of secondary temporomandibular joint pathologies, malignant tumors of face and jaw, history of temporomandibular joint dislocation and any neurological or cognitive deficts.
- After consultation of inclusion and exclusion criteria victims were build in this study respectively.

PROCEDURE

- Before commencing the experiment, 30 patients were selected according to inclusion and exclusion criteria, and their informed consent was obtained.
- The patients were split into two groups, each group has 15 members each: group A underwent Mckenzie exercise, while group B has been treated with Rocabado's Technique.
- Patients underwent an initial evaluation on the first day of therapy, with a follow-up reassessment four-week post treatment.
- Throughout the four-week period, patients engaged in Mckenzie's exercise and Rocabado's Technique were instructed for them to repeat as needed.
- Pain and range of motion is to be evaluated before and after the treatment. And a Fonseca questionnaire will be issued subjectively to all the patients. After a week of four therapy session, the patient's levels of discomfort and statistical analysis were evaluated to examine the post test results.

MCKENZIE'S EXERCISE (GROUP A)

- The patient's head is in a relaxed position, resting on a pillow. Following the Mckenzie's principle of centralization, the therapist instructs the patient to perform unilateral jaw movements by opening and closing the jaw several times. [FIG:1A]
- This is followed by the therapist applying overpressure at the end range of the movement. The sequence is repeated for 10-12 times, comprising three sets.
- The approach involves a combination of repeated movements and sustained postural holds at the end range, aligning with the principles of Mckenzie's methodology.

[FIG:1A]

[FIG:1B]

[FIG:1C]

[FIG:1D]

ROCABADO'S TECHNIQUE (GROUP B)

- The procedure involves non-thrust temporomandibular joint manipulation, encompassing three distinct glides: anterior [FIG:2E], medial [FIG:2F], and lateral [FIG:2G]. And some of the repeated exercise based on the Rocabado's technique will also help to relive pain. [FIG:2A TO 2D]
- Each glide is administered for 10 to 15 repetitions, repeated 5 to 6 times within a session.
- The mobilization grades commence at grade 1 and grade 2, advancing to grade 4 based on the patient's specific condition. The entire session duration spans 30 minutes, encompassing the comprehensive application of these graded mobilization technique.

[FIG:2A]

[FIG:2B]

[FIG:2C]

[FIG:2D]

ANTERIOR GLIDE

- The patient assumed a supine position with a slightly open mouth and a relaxed mandible. The therapist positioned the thumb inside the patient's mouth on the lower teeth and the index finger on the mandible externally.
- Employing a downward and forward distraction with the thumb and index finger, respectively, and utilizing the other fingers as a pivot joint against the chin, the therapist facilitated individual distraction of each joint.
- Throughout the procedure, the therapist's other hand and arm provided stabilization to the patient's head, allowing for a controlled and focused tissue stretch on the targeted joints.

[FIG:2E]

MEDIAL GLIDE

- The patient assumed a side-lying position with a relaxed mandible. The examiner positioned the thumb (or overlapping thumbs) on the lateral aspect of the mandibular condyle outside the mouth and applied medial pressure to the condyle, facilitating a controlled medial glide of the condyle.

[FIG:2F]

LATERAL GLIDE

- The patient lay supine with an open mouth and a relaxed mandible. The examiner inserted the thumb inside the subject's mouth along the medial side of the mandible and teeth applying lateral pressure to induce a controlled lateral glide of the mandible. This mobilization technique was performed individually for each joint.

[FIG:2G]

DATA ANALYSIS

The collected data were tabulated and analyzed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24.0. Paired t-test was adopted to find the statistical difference within the groups & Independent t-test was adopted to find the statistical difference between the groups.

TABLE - 1

COMPARISON OF NUMERICAL PAIN RATING SCALE SCORE BETWEEN GROUP – A AND GROUP – B IN PRE-TEST AND POST-TEST

NPRS	GROUP A		GROUP B		t-TEST	SIGNIFICANCE
	MEAN	SD	MEAN	SD		
PRE-TEST	4.67	1.11	4.27	1.53	0.818	.421*
POST-TEST	1.67	0.72	3.06	1.53	3.197	.000**

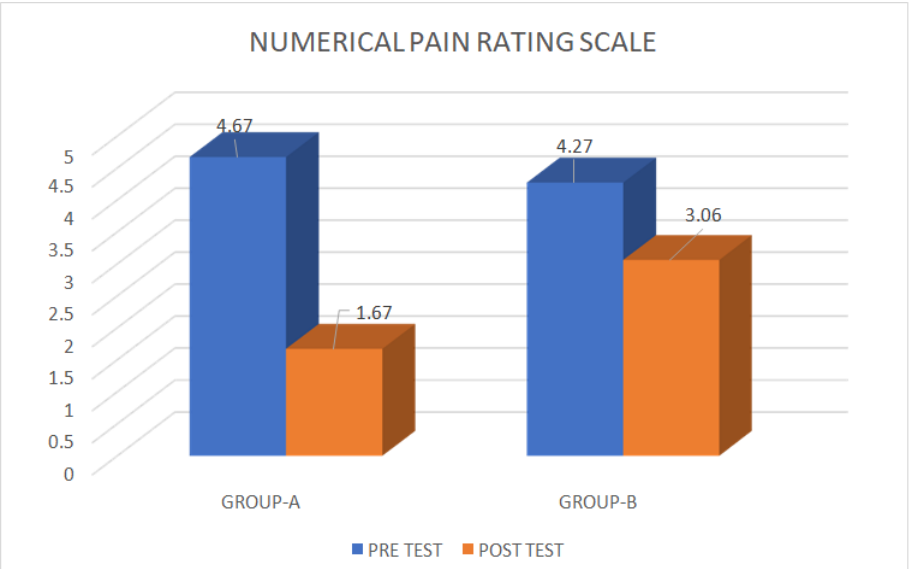
(*- P > 0.05, **- P ≤ 0.001)

The above table reveals the Mean, Standard Deviation (S.D), t-test and p-value of the Numerical Pain Rating Scale score between (Group A) & (Group B) in pre-test and post-test.

This table shows that there is no significant difference in pre-test values of the Numerical Pain Rating Scale score between Group A & Group B (*****P > 0.05).

This table shows that there is a significant difference in post-test values of the Numerical Pain Rating Scale score between Group A & Group B (******P ≤ 0.001).

Both the group shows significant decrease in the post-test means but (GROUP-A) which has the lesser mean value is more effective than (GROUP-B).



GRAPH - 1 COMPARISON OF NUMERICAL PAIN RATING SCALE SCORE BETWEEN GROUP – A AND GROUP – B IN PRE-TEST AND POST-TEST.

TABLE 2: COMPARISON OF FONSECA'SQUESTIONNAIRE SCORE BETWEEN GROUP – A AND GROUP – B IN PRE-TEST AND POST-TEST.

FONSECA'S QUESTIONNAIRE	GROUP A		GROUP B		t- TEST	SIGNIFICANCE
	MEAN	SD	MEAN	SD		
PRE-TEST	43.33	14.84	44.00	11.05	0.140	.890*
POST-TEST	20.00	7.79	31.33	10.93	3.269	.000**

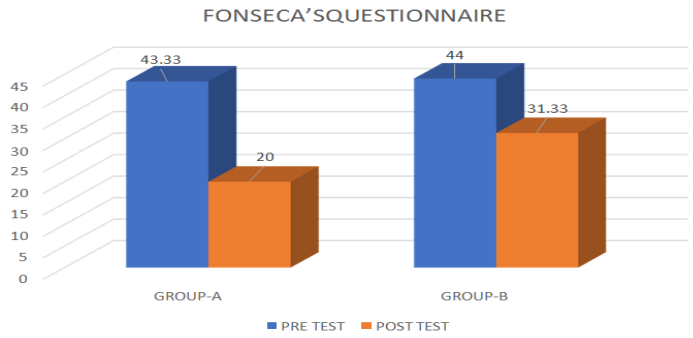
(*- P > 0.05, **- P ≤ 0.001)

The above table reveals the Mean, Standard Deviation (S.D), t-test and p-value of the Fonseca's Questionnaire Score between (Group A) & (Group B) in pre-test and post-test.

This table shows that there is no significant difference in pre-test values of the Fonseca's Questionnaire score between Group A & Group B (*P > 0.05).

This table shows that there is a significant difference in post-test values of the Fonseca's Questionnaire score between Group A & Group B (**P ≤ 0.001).

Both the group shows significant decrease in the post-test means but (GROUP-A) which has the lesser mean value is more effective than (GROUP-B).



GRAPH – 2 COMPARISON OF FONSECA'SQUESTIONNAIRE SCORE BETWEEN GROUP – A AND GROUP – B IN PRE-TEST AND POST-TEST.

TABLE – 3 COMPARISON OF VERNIER CALIPER SCORE BETWEEN GROUP – A AND GROUP – B IN PRE-TEST AND POST-TEST.

VERNIER CALIPER	GROUP A		GROUP B		t-TEST	SIGNIFICANCE
	MEAN	SD	MEAN	SD		
PRE-TEST	3.87	1.76	3.20	1.26	1.188	.245*
POST-TEST	5.73	1.03	4.33	0.97	3.816	.000**

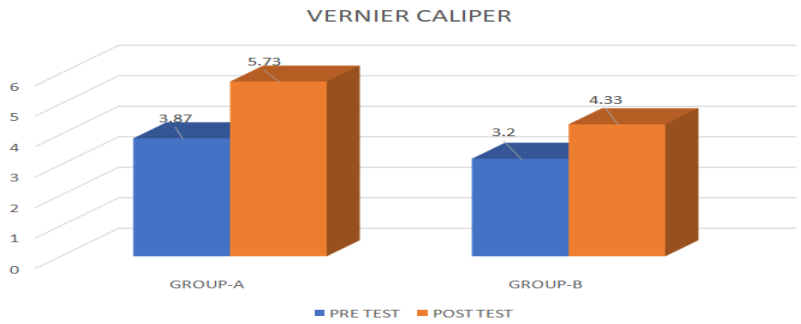
(*- P > 0.05, **- P ≤ 0.001)

The above table reveals the Mean, Standard Deviation (S.D), t-test and p-value of the Vernier Caliper score between (Group A) & (Group B) in pre-test and post-test.

This table shows that there is no significant difference in pre-test values of the Vernier Caliper score between Group A & Group B (*P > 0.05).

This table shows that there is a significant difference in post-test values of the Vernier Caliper score between Group A & Group B (**P ≤ 0.001).

Both the group shows significant increase in the posttest means but (GROUP-A) which has the higher mean value is more effective than (GROUP-B).



GRAPH – 3 COMPARISON OF VERNIER CALIPER SCORE BETWEEN GROUP – A AND GROUP – B IN PRE-TEST AND POST-TEST.

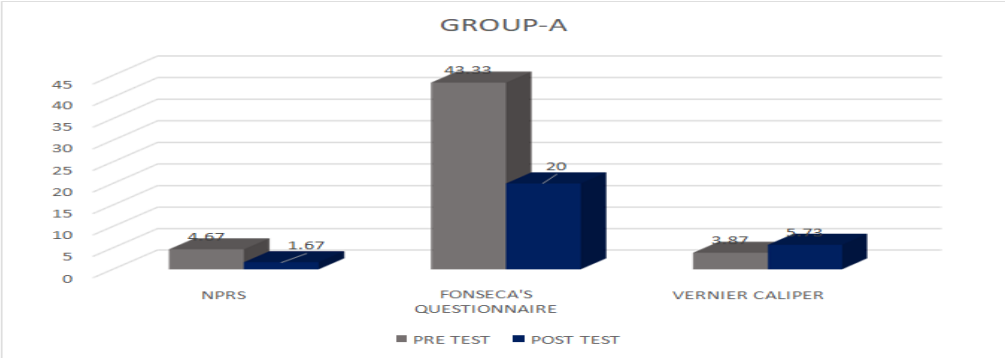
TABLE – 4 COMPARISON OF NUMERICAL PAIN RATING SCALE, FONSECA'S QUESTIONNAIRE AND VERNIER CALIPER SCORES BETWEEN PRE-TEST AND POST-TEST WITHIN GROUP – A.

GROUP – A	PRE-TEST		POST-TEST		t- TEST	SIGNIFICANCE
	MEAN	SD	MEAN	SD		
NUMERICAL PAIN RATING SCALE	4.67	1.11	1.67	0.72	13.748	.000*
FONSECA'SQUESTIONNAIRE	43.33	14.84	20.00	7.79	8.931	.000*
VERNIER CALIPER	3.87	1.76	5.73	1.03	5.802	.000*

(*- P ≤ 0.001)

The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre- test and post-test within Group – A.

There is a statistically highly significant difference between the pre-test and post-test values of Numerical Pain Rating Scale, Fonseca's Questionnaire And Vernier Caliper scores within Group - A (*- P ≤ 0.001).



GRAPH – 4 COMPARISON OF NUMERICAL PAIN RATING SCALE, FONSECA'S QUESTIONNAIRE AND VERNIER CALIPER SCORES BETWEEN PRE-TEST AND POST-TEST WITHIN GROUP – A.

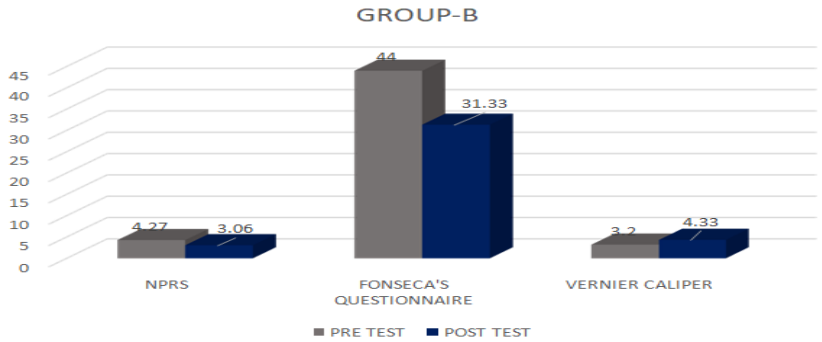
TABLE – 5 COMPARISON OF NUMERICAL PAIN RATING SCALE, FONSECA'S QUESTIONNAIRE AND VERNIER CALIPER SCORES BETWEEN PRE-TEST AND POST-TEST WITHIN GROUP – B.

GROUP – B	PRE-TEST		POST-TEST		t- TEST	SIGNIFICANCE
	MEAN	SD	MEAN	SD		
NUMERICAL PAIN RATING SCALE	4.27	1.53	3.06	1.53	11.225	.000*
FONSECA'SQUESTIONNAIRE	44.00	11.05	31.33	10.93	13.201	.000*
VERNIER CALIPER	3.20	1.26	4.33	0.97	6.859	.000*

(*- P ≤ 0.001)

The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre- test and post-test within Group – B.

There is a statistically highly significant difference between the pre-test and post-test values of Numerical Pain Rating Scale, Fonseca's Questionnaire and Vernier Caliper scores within Group - B (*- P ≤ 0.001).



GRAPH – 5 COMPARISON OF NUMERICAL PAIN RATING SCALE, FONSECA'S QUESTIONNAIRE AND VERNIER CALIPER SCORES BETWEEN PRE-TEST AND POST-TEST WITHIN GROUP – B.

RESULTS

In Table 1, On comparing mean values of GROUP-A and GROUP-B on Numerical Pain Rating Scale, shows highly significant improvement in the post-test mean but GROUP-A shows (1.67) lesser mean value is more effective than GROUP-B (3.06) at P≤0.001, Hence the null hypothesis is rejected**.**

In Table 2, On comparing mean values of GROUP-A and GROUP-B on Fonseca's Questionnaire score shows highly significant improvement in the post-test mean but GROUP- A shows (20.00) lesser mean value is more effective than GROUP-B (31.33) at P≤0.001, Hence the null hypothesis is rejected.

In Table 3, On comparing mean values of GROUP-A and GROUP-B on Vernier Caliper score shows highly significant improvement in the posttest mean but GROUP-A shows (5.73) higher mean value is more effective than GROUP-B (4.33) at P≤0.001, Hence the null hypothesis is rejected.

In Table 4 & 5, On comparing Mean Values of Numerical Pain Rating Scale, Fonseca's Questionnaire and Vernier Caliper scores Between pre-test and post-test within the Group-A and Group-B shows highly significant difference at p≤ 0.001. Hence the null hypothesis is rejected.

DISCUSSION

- The current study revealed notable improvements in symptoms of Temporomandibular Joint Disorders through physical therapy interventions. Both Mckenzie exercises and Rocabado's Technique demonstrated significant enhancements in NPRS scores (Numerical Pain Rating Scale) and Range of Motion from pre-post-intervention. While distinctions between the outcomes of Mckenzie exercises and Rocabado's Technique were observed, they did not reach statistical significance.

- The study findings indicate that both cohorts, one receiving Mckenzie exercises and the other Rocabado's Technique, exhibited statistically and clinically significant reductions in pain and improvements in range of motion. Notably, Mckenzie exercises demonstrated superior efficacy in pain reduction compared to Rocabado's Technique; however, there was no significant difference in their effectiveness in increasing range of motion. Consequently, adherence rates were higher among participants engaged in Mckenzie exercises.

- While the assessment of range of motion before and after the interventions revealed minimal disparity in effectiveness between Mckenzie exercises and Rocabado's technique, a noteworthy reduction in pain was observed following the implementation of Mckenzie exercises, as indicated by scores on the Numerical Pain Rating Scale.

- The Mckenzie method primarily focuses on addressing symptomatic and mechanical responses through repeated movements and sustained end-range holds, often augmented by therapist-applied overpressure. By engaging in active repeated movements and sustained end-range postural holds, this approach aims to alleviate pain and enhance range of motion. Notably, pain may originate from factors such as the articular disc of the temporomandibular joint and disc derangement, which are encompassed within the classification of Temporomandibular Joint Disorders.

- In contrast, Rocabado's technique involves non-thrust temporomandibular joint manipulation. This technique aims to normalize range of motion, alleviate pain, and release soft tissue tension throughout the jaw, neck, and head region. Its effectiveness is attributed to both biomechanical and neurophysiological mechanisms. Joint manipulation activates mechanoreceptors, thereby reducing pain through mechanisms such as pain modulation as per the pain gate theory and descending pathway inhibition. Additionally, the gliding movements during joint manipulation facilitate movement of synovial fluid, enhancing nutrient exchange, mobilizing hypomobile joints by loosening adhesions, maintaining articular tissue extensibility, and promoting soft tissue relaxation.

- Consequently, the study's results demonstrate a statistically significant effect in pain reduction favoring the group undergoing Mckenzie exercises compared to those receiving Rocabado's technique. Additionally, there is a statistically significant effect in improving range of motion observed in the Mckenzie exercises group, whereas the effect in the Rocabado's technique group is moderately significant. Thus, the current study suggests that Mckenzie exercises exhibit superior efficacy over Rocabado's technique in both immediate pain reduction and range of motion improvement.

CONCLUSION

This study found that both the Mckenzie exercise and the Rocabado technique were effective in alleviating pain and enhancing range of motion. However, it revealed that the Mckenzie exercise demonstrated a greater effectiveness compared to the Rocabado technique.

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