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RESEARCH ARTICLE

A COMPARATIVE STUDY ON MCKENZIE EXERCISES AND ROCABADO'S TECHNIQUE ON PAIN AND RANGE OF MOTION IN PATIENTS WITH TEMPOROMANDIBULAR JOINT DISORDERS

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Abstract

A Comparative study on McKenzie Exercises and Rocabado's Technique on Pain and Range of motion in patients with Temporomandibular Joint Disorders.

Objective: To compare the effect of McKenzie exercises and Rocabado's technique on pain and range of motion in patients with Temporomandibular Joint Disorders.

Methodology: 30 participants of age group 20-40 years were selected according to the selection criteria. They were randomly assigned into two groups: Group A was given McKenzie Exercises; Group B was given Rocabado's Technique. The amount of pain was assessed using Numerical Pain Rating Scale and range of motion were assessed using plastic ruler, respectively. The entire procedure was explained to the participants and informed consent was taken. McKenzie exercises were given for 10-12 times and 3 sets in a session and Rocabado's technique were given for 10-15 repetitions for 5-6 times in a session. Numerical Pain Rating Scale scores and range of motion were checked before and after the intervention and results were analyzed.

Outcome Measure: Numerical Pain Rating Scale and Inter-incisor mouth opening was used for the purpose of assessment of pain and range of motion.

Result: The comparison of post intervention scores of Numerical Pain Rating Scale of group A and group B was significant ($p = 0.0001$) and also the comparison of post intervention scores of Range of motion of group A and group B was moderately significant ($p = 0.0001$)

Conclusion: This study concludes that both McKenzie exercises and Rocabado's technique is effective in reducing pain and increasing range of motion but McKenzie exercises is comparatively more effective than Rocabado's Technique.

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Introduction: -

Temporomandibular Joint Disorders is a broad term which is used for any conditions that connected with the jaw joint. Any injury to the temporomandibular joint or muscles presents in the jaw can be the absolute cause for temporomandibular joint disorders.⁽²⁾ Following are the signs and symptoms of temporomandibular joint disorders such as pain in the jaw region, clicking sound in jaw joint, restriction in the jaw movements, muscle tenderness and joint tenderness. There are some other symptoms also present such as headache, ear related symptoms and cervical

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spine disorders are generally associated with temporomandibular joint disorders.⁽⁵⁾ Treatment of temporomandibular joint disorders mainly involves integrative approach and conservative treatment which generally includes use of variety of splints, physical therapy, medications and orthodontic treatment.⁽⁵⁾ Temporomandibular Joint Disorders is considered as a musculoskeletal disorder that affects more than 25% of general population. It indicates that there are 80-90% patients has one or more symptoms of temporomandibular joint disorders in their daily life and 5-6% patients have clinically significant temporomandibular joint disorders related symptoms.⁽³⁾

McKenzie's method of mechanical diagnosis and therapy is a commonly used classification-based approach for the management of joint pain. These exercises are determined by positive system response such as centralization or abolition of the pain and restore your function. Centralization is the abolition of distal pain in response to sustained and range posture and repetitive movements.⁽²⁾ Evidence for reliability and treatment validity of the centralization showed by the number of studies. Importance of specific exercises linked to the directional preferences also been demonstrated. McKenzie method depends on the symptomatic and mechanical response to repeated movements and sustained end range holds using therapist applied overpressure. According to subjects condition, subjects were classified into derangement syndrome and demonstrated rapid improvement in pain as well as improvement in the range of motion of temporomandibular joint.⁽²⁾

Rocabado's technique consist of non thrust temporomandibular joint manipulation. Temporomandibular joint manipulation is used to normalize the range of motion and relief soft tissue tension in the entire region of the jaw, neck and head. The non thrust manipulation for temporomandibular joint open lock improved neuromuscular control during activities involving mouth opening. Rocabado's technique improve neuromuscular control of patient's self limited activities which includes mouth opening and prevent subsequent episodes of open lock.⁽¹⁾

Procedure:

A total of 30 subjects were selected according to selection criteria. Written informed consent was taken and they were given McKenzie exercises and Rocabado's technique.

30 subjects (screened according to Fonseca's questionnaire and Numerical Pain Rating Scale) between 20 to 40 years of age group participated in this study. They were randomly assigned for McKenzie exercises and Rocabado's technique. 15 subjects participated in the McKenzie exercises program and 15 subjects participated in Rocabado's technique program.

Fonseca's Questionnaire (screened before interventions)- It indicates the severity of temporomandibular joint disorders. This study included mild to moderate (Score between 20-65) severity of temporomandibular joint disorders. It is the set of 10 questions and each question answered with "yes" or "no" or "sometimes" and each with scoring 0-15. The final value will be compared to the clinical index and the subjects will be classified as per Temporomandibular Joint Disorders degree.

Numerical Pain Rating Scale (NPRS)-The amount of pain was measured using Numerical Pain Rating Scale, before and after intervention immediately. Subjects with score between 3-6 on Numerical Pain Rating Scale were included in this study.⁽⁴⁾

Inter-incisor mouth opening measured using a plastic ruler, before and after intervention immediately. It is the distance between the upper central incisors and the lower central incisors.

McKenzie exercises (Group A) - The subjects were in supine lying position, head is in relaxed position and rested on pillow. The therapist then asks the patient to open and close the mouth in unilateral directional several times followed with therapist apply pressure at the end range. This is repeated for 10-12 times and 3 sets was given to the subjects. It is based on the principle of centralization which include repeated movements and sustained postural holds at the end range.⁽²⁾

Rocabado's Technique (Group B) – It consist of non thrust temporomandibular joint manipulation which includes three glides anterior glide, medial glide and lateral glide. Each glide was given for 10 to 15 repetitions for 5 to 6 times in a session. The grade of mobilization begins with grade 1 and grade 2 and progressed to grade 4 depending on patient's condition. Total duration of full session lasted for 30 minutes.

1. Anterior Glide - The patient was in supine lying with mouth slightly open and the mandible relaxed. The therapist places the thumb on patient's lower teeth inside the mouth with index finger on the mandible outside the mouth. The mandible was then distracted downward with the thumb and forward with the index finger while the other fingers pushed against the chin, acting as a pivot joint. The examiner could feel the tissue stretch on the joint and each joint was done individually. The other hand of and arm of the therapist was used to steady the head.
2. Medial Glide - The patient was in side lying position with the mandible relaxed. The examiner placed the thumb (or over lapping thumbs) over the lateral aspect of the mandibular condyle outside the mouth and applied a medial pressure to the condyle while gliding the condyle medially.
3. Lateral Glide- The patient was in supine lying positioned with mouth opened and mandible relaxed. The examiner placed the thumb inside the mouth of the subject along the medial side of the mandible and teeth, then pushes the thumb laterally leading to the mandible to glide laterally. Each joint was mobilized individually.⁽¹⁾

Data Analysis and Result:-

Demographics:

A total of 30 participants were selected according to selection criteria. They were divided onto two groups according to randomization: Group A (McKenzie exercises on pain and range of motion) and Group B (Rocabado's Technique on pain and range of motion).

Age:

The average of group A is 26.8 ± 4.996 years and the average of group B is 25.6 ± 5.46 years. The total mean of 30 participants was 26.2 ± 5.269 years. The age in both the groups was not significant by unpaired t test which showed that both the groups were comparable with t value 0.5337 and p value 0.5885

	Group a	Group b
Age	26.8 ± 4.996	26.2 ± 5.269

Gender:

There were 6 females i.e(40 %) and 9 males i.e(60%) in group A and 6 females i.e(40%) and 9 males i.e (60%) in group B.

	Males	Females	Ratio
Group a	9	6	3:2
Group b	9	6	3:2

Fonseca's Score:

The average of Fonseca's score of group A is 43.67 ± 9.39 and the average of Fonseca's score of group B is 42 ± 12.49 . The total mean of 30 participants was 42.83 ± 11.08 . The fonseca's score in both the groups was not significant by unpaired t test which shows both the groups were comparable with t value 0.3980 and p value 0.6967

	Group a	Group b
Fonseca's score	43.67 ± 9.39	42 ± 12.49

Comparison of pre-intervention and post-intervention NPRS value in group A:

Numerical Pain Rating Scale was used as an outcome measure for assessment of pain in patients with temporomandibular joint disorders. The mean of pre-intervention NPRS value in group A is 5.66 ± 0.79 and the mean of post NPRS value in group A is 2.2 ± 0.86 . The comparison of mean pre and post intervention of group A shows that the study is significant which was calculated using paired t test with t value $t=13.43$ and $p=0.0001$

Outcome Measure	Pre-intervention mean+ Standard Deviation	Post-intervention mean+Standard Deviation	Paired t test	P value and significance
NPRS value	5.06 ± 0.79	2.2 ± 0.86	13.43	0.0001

Comparison of pre-intervention and post-intervention NPRS value in group B:

Numerical Pain Rating Scale was used as an outcome measure for assessment of pain in patients with temporomandibular joint disorders. The mean of pre-intervention NPRS value in group B is 5.06 ± 0.96 and the mean of post NPRS value in group A is 3.26 ± 1.16 . The comparison of mean pre and post intervention of group B shows that the study is significant which was calculated using paired t test with t value $t=8.86$ and $p=0.0001$

Outcome Measure	Pre-intervention mean+ Standard Deviation	Post-intervention mean+Standard Deviation	Paired t test	P value and significance
NPRS value	5.06 ± 0.96	3.26 ± 1.16	8.86	0.0001

Comparison of pre-intervention and post-intervention Range Of Motion in group A:

Inter incisor mouth opening was used as an outcome measure for assessment of range of motion in patients with temporomandibular joint disorders. The mean of pre-intervention range of motion value in group A is 3.54 ± 0.36 and the mean of post-intervention range of motion value in group A is 4.54 ± 0.44 . The comparison of mean pre and post intervention of group A shows that the study is significant which was calculated using paired t test with t value $t=2.7$ and $p=0.0001$

Outcome Measure	Pre-intervention mean+ Standard Deviation	Post-intervention mean + Standard Deviation	Paired t test	P value and significance
Range of Motion	3.54 ± 0.36	4.54 ± 0.44	2.79	0.0001

Comparison of pre-intervention and post-intervention Range of Motion in group B:

Inter incisor mouth opening was used as an outcome measure for assessment of range of motion in patients with temporomandibular joint disorders. The mean of pre-intervention range of motion value in group B is 3.49 ± 0.32 and the mean of post-intervention range of motion value in group B is 4.11 ± 0.35 . The comparison of mean pre and post intervention of group B shows that the study is moderately significant which was calculated using paired t test with t value $t=1.93$ and $p=0.062$.

Outcome Measure	Pre-intervention mean+ Standard Deviation	Post-intervention mean+Standard Deviation	Paired t test	P value and significance
Range Of Motion	3.49 ± 0.32	4.11 ± 0.35	1.93	0.062

Comparison of post-intervention NPRS value in group A and group B:

Numerical Pain Rating Scale was used as an outcome measure for assessment of pain in patients with temporomandibular joint disorders. The mean of post-intervention NPRS value in group A is 2.2 ± 0.86 and the mean of post NPRS value in group B is 3.26 ± 1.16 . The comparison of mean pre and post intervention of group A and B shows that the study is significant which was calculated using un-paired t test with t value $t=4.49$ and $p=0.0001$

Outcome Measure	Post-intervention mean+ Standard Deviation	Post-intervention mean+Standard Deviation	Un-paired t test	P value and significance
NPRS value	2.2 ± 0.86	3.26 ± 1.16	4.49	0.0001

Comparison of post-intervention Range Of Motion in group A and group B:

Inter incisor mouth opening was used as an outcome measure for assessment of range of motion in patients with temporomandibular joint disorders. The mean of post-intervention range of motion value in group A is 4.54 ± 0.44 and the mean of post-intervention range of motion value in group B is 4.11 ± 0.35 . The comparison of mean pre and post intervention of group A and B shows that the study is moderately significant which was calculated using un-paired t test with t value $t=1.99$ and $p=0.0001$

Outcome Measure	Post-intervention mean+ Standard Deviation	Post-intervention mean+ Standard Deviation	Un-paired t test	P value and significance
Range Of Motion	4.54 ± 0.44	4.11 ± 0.35	1.99	0.0001

Discussion:-

Physical Therapy has shown reduce symptoms of Temporomandibular Joint Disorders. The primary findings from the present study was that both McKenzie exercises and Rocabado's Technique showed significant results in pre to post intervention of NPRS scores according to Numerical Pain Rating Scale and Range of Motion. There was a difference between the results of McKenzie exercises and Rocabado's Technique but it was not statistically significant.

It is found from the study that both the groups of subjects, the group who received McKenzie exercises and the group who received Rocabado's Technique have shown statistically and clinically significant effect on reducing pain and improving range of motion. It was observed that McKenzie exercises was more effective than Rocabado's Technique in reducing pain but not more effective in increasing Range of Motion so the adherence was better in the McKenzie exercises.

On measuring the range of motion before and after the respective interventions, there is scarcely any difference between the effectiveness of Mckenzie exercises and Rocabado's technique. However, according to the scores on the Numerical Pain Rating Scale, there has been a significant decrease in pain after receiving Mckenzie exercises as intervention.

McKenzie method basically works on the symptomatic and mechanical responses to repeated movements and sustained end range holds using therapist overpressure. Application of active repeated movement and sustained end range postural holds improve pain as well as improve range of motion. It could be concluded that pain is produce because of another things like articular disc of temporomandibular joint and indeed derangement of disc and this is present in classification of Temporomandibular Joint Disorders. Rocabado's technique consist of non thrust Temporomandibular joint manipulation. Temporomandibular joint manipulation is used to normalize the range of motion, relief pain, relief soft tissue tension in the entire region of jaw, neck and head. It found to be effective by biomechanical and neurophysiological mechanism. Joint manipulation activates mechanoreceptors to reduce pain by pain modulation occurs by the pain gate theory and also by descending pathway inhibition. The gliding movements that occur in the joint during manipulation causes synovial fluid movement to improve nutrient exchange, improves mobility of the hypomobile joints by loosening the adhesion, maintains the extensibility strength of articular tissue and causes soft tissue relaxation.

Therefore, from the finding it found that there is statistically and significant effect in reducing pain in the group who received McKenzie exercises in comparison with the group who received Rocabado's technique. But there is statistically and significant effect in improving range of motion in the group who received McKenzie exercises and moderately significant effect in the group who received Rocabado's technique. Hence, the present study shows that McKenzie exercises are more effective than Rocabado's technique in reducing pain and improving range of motion immediately.

Conclusion:-

This study concluded that both McKenzie exercises and Rocabado's technique is effective in reducing pain and increasing range of motion but McKenzie exercises is comparatively more effective than Rocabado's Technique.

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Limitations:

Sample size was limited because of time bounded study.

Clinical Implication:

McKenzie Exercises can be introduced more effective on reducing Pain and increasing range of motion in patients with Temporomandibular Joint Disorders.

Future Scope of the Study:

The study can be conducted on large sample size and also it can be conducted for longer duration. Large follow up periods are recommended and also comparison with other techniques can be done.

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