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The effectiveness of myofascial release and Maitland mobilization in cervical spondylosis patients

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Abstract
Cervical spondylosis is a chronic degenerative process that affects the vertebral bodies and intervertebral disc of the neck. The objective was to find out the effectiveness of Myofascial release technique and Maitland's mobilization in cervical spondylosis patients and to compare it in terms of pain, functional ability and range of motion. Total 30 participant were involved. Group A were given MFR, and group B were given Maitland mobilization for three weeks and pain, functional ability and range of motion were assessed pre and post intervention. Data analysis was done using paired and unpaired 't' test. Result showed statistically significant improvement in the Group A as compared to Group B. Conclusion was that Myofascial release is more effective than Maitland mobilization in cervical spondylosis patients in improving pain threshold, functional ability and range of motion.

Keywords: myofascial release technique, Maitland mobilization, cervical spondylosis

Introduction
Cervical spondylosis is a chronic degenerative process that affects the vertebral bodies and intervertebral disc of the neck, and may progress into disc herniation, bone spur formation, compression of the spinal cord, or cervical spondylotic myelopathy [1].

Cervical Spodylosis can lead to different conditions ranging from axial neck pain to cervical myelopathy [2] The incidence of neck pain is in adults is approximately 20-50% per year, much of which is caused by spondylosis. The prevalence of cervical spondylosis is similar for both sexes, although the degree of severity is greater for males [3] Spondylotic changes in the cervical spine occur at singular disc space levels in 15-40% of patients and at multiple levels in 60-85%. The discs between the 3rd and 7th cervical Vertebrae are most commonly affected [4].

An alteration in proteoglycan content beginning in the 3rd decade diminishes the ability of the disc to maintain its hydration. The amount of keratin sulfate increases, and the amount of chondroitin sulfate decreases. With these changes in viscoelasticity, the periphery of the disc begins to bear an increasingly greater proportion of the load borne by the disc, with resultant loss of disc height and bulging of the annulus into the spinal canal.

As the height of the disc decreases, the vertebral bodies approach each other thus causing in folding of the ligamentum flavum and facet joint capsule and reducing the dimensions of the canal and the foramen. The anterior height of the disc is greater than the posterior height of the disc in a normally configured disc; with degeneration, the ventral portion of the disc loses height to a greater degree than the dorsal portion, and loss of cervical lordosis can occur. A positive feedback cycle ensues with greater force placed on the ventral aspect of the vertebral bodies leading to kyphosis. The facet joints bear greater loads, fasten the formation of osteophytes at these joints and at the peripheral vertebral endplate margins. Osteophytes, the posteriorly protruded disc material, and the infolded soft tissue within the canal and neuroforamina all diminish the space available for the spinal cord or nerve root. Radiographically, the C5-6 interspace is the most frequently affected level, followed closely by C6-7 [5]. The bones and protective cartilage in your neck are prone to wear and tear that can lead to cervical spondylosis. The causes of the condition include, Bone spurs, and these overgrowths of bone are the result of the body trying to grow extra bone to make the spine stronger. However, the extra bone can press on delicate areas of the spine, such as the spinal cord and nerves, resulting in pain. Spinal bones have discs between them, which are thick, pad-like cushions that absorb the shock during lifting, twisting, and other activities. The gel-like material inside these disc can dry out over time. This causes your bones (spinal vertebrae) to rub together more, which can be painful. The spinal disc can develop cracks, which allows leakage of the internal cushioning material. This material can press on the spinal cord and nerves, resulting in symptoms such as arm numbness and sciatica. An injury to your neck, such as during a fall or car accident, this can hasten the aging process. Ligament the tough cords that connect your spinal bones to each other can become even stiffer over time, which affects your neck movement and makes the neck feel tight. Some occupations includes repetitive movements or lifting heavy weights, such as construction work. This can put extra pressure on the spine, resulting in early wear and tear [6] Symptoms can depend on the stage of the pathological process and the site of neural compression. Diagnostic imaging may show spondylosis, but the patient may be asymptomatic [7]

Pain, paresthesias or muscle weakness, or a combination of these are the most commonly reported symptoms. Due to Cervical_ Radiculopathy, the pain most often occurs in the cervical region, the upper limb, shoulder, and or interscapular region [8]. The International Federation Of Orthopaedic Manipulative Physical Therapists (IFOMPT) Has Offered The Following Definitions For Maitland Mobilization, A manual therapy technique comprising a continuum of skilled passive movements to the joint complex that are applied at varying speeds and amplitudes, that may include a small amplitude/high velocity therapeutic movement [manipulation] with the intent to restore optimal motion, function and to reduce pain Manual therapy technique is used to modulate pain, to increase ROM and treat joint dysfunctions that limit ROM by specifically addressing altered joint mechanics. Maitland has described various grades of oscillation for joint mobilization.

Maitland has described various grades of oscillation for joint mobilization. The type of mobilisation used depends on the severity, irritability and nature of the spinal pain. The mobilisations create movement within the joints of the spine which reduces stiffness and makes movement easier. The increased ease of movement also reduces pain.

Myofascial release (MFR) is a collection of approaches and techniques that focuses on freeing restrictions of movement that originate in the soft tissues of the body. The benefits of this work are diverse. Direct bodily effects range from alleviation of pain, improvement of athletic performance, and greater flexibility and ease of movement to more subjective concerns such as better posture. More indirect goals include emotional release, deep relaxation, or general feelings of connection and well-being. MFR is a goal-oriented approach to working with tissue-based restrictions and their two-way interactions with movement and posture. The umbrella of MFR methods focuses on how postural habits, specific activities or lack of activity, and compensations for prior injuries result in chronic stress and avoidance of full range of movements. These result in both shortening of muscles and adhesions between layers of fascia. Fascia forms the passive structural definition of our bodies. Adhesions are places in which separate fascial layers or fibers have bonded together dysfunctional. The application of controlled and focused force which is applied in a purposeful direction, acts to stretch or elongate the muscular and fascial (myofascial) structures toward the goals of restoring the fluid/lubricative quality of the fascial tissue, the mobility of tissue, and normal joint function [9].

2. Material and Methods

Study Design: prospective comparative study.

Source of Data

The source of data will be collected from OPD of DR.A.P.J. Abdul Kalam College of Physiotherapy.

Study Setting

Department of orthopedic physiotherapy, DR A.P.J. Abdul Kalam College of Physiotherapy.

Study population

Patients with cervical spondylosis coming to OPD of DR. A.P.J. Abdul Kalam College of Physiotherapy.

Sample size: 30.

Sampling Method: simple random sampling.

Selection Criteria

- **Inclusion criteria**
- Age between 30 to 50 years
- Both genders
- All subjects with clinical and radiological diagnosis with cervical spondylosis affecting any of vertebrae between $C_1 – C_7$

Procedure

The study received ethical approval (Ref.No.PIMS/CPT/IEC/2017/484) from Institutional Ethical Committee of Dr. A. P. J. Abdul Kalam College of Physiotherapy, Loni. The participants will be screened and after finding suitability according to the inclusion and exclusion criteria, they will be requested to participate in the study. They will be explained about the study and the intervention. The participants will be briefed about the nature of the study, duration of intervention and the intervention being used will be explained in the language best understood by the participants. They will be encouraged to clarify the queries regarding the study if any. An informed written consent form, approved by ethical committee will be given to the participants.

Assessment

All the patient were examined, their pain history was taken. Physical examination was done including cervical range of motion, pain assessment on Visual Analogue Scale and functional ability assement on Neck Disability Index.

Pre intervention pain on VAS and functional ability on neck disability scale and range of motion were assessed. All participants were randomly allocated to group A and B by the investigator on alternate basis.

Group A participants had received myofascial release technique, Group B participants had received Maitlands's mobilization. After 3 weeks sessions of the intervention, once again pain on VAS and functional ability on neck disability index and cervical range of motion was measured of all the participants.

Group A

Position of the patient: Supine on the table.

Position of the therapist: sitting on the stool near the head end of the patient.

Hand placement: hands on first levator scapulae and then trapezius.

Application

Myofascial Release Treatment session is performed by therapist directly on skin without oils, creams or machinery. This helps the therapist to accurately detect fascial restrictions and apply the appropriate amount of sustained pressure to facilitate release of the fascia. With relaxed hands, slowly stretched out the elastic component of the fascia until barrier

is reached. At that point, maintain sufficient pressure to hold the stretch at the barrier and wait a minimum of 90 to 120 seconds, usually longer on affected side of levator scapulae and trapezius each session is given for 15 minutes.one hand would be on affected side of levator scapulae and other near the shoulder direction of force applied on tissue is in opposite direction of each other.

Group B

Maitland mobilization viz, posto-anterior central pressure (PACP) and lateral flexion technique. Prior to application of above mentioned technique, assessment of accessory movement individual cervical vertebrae and assessment of physiological movements was carried out. The position of the participant prone for PACP and supine for lateral flexion technique. After proper positioning of the participant and the therapist, Maitland mobilization technique is administered with proper instruction. Therapist position –standing on head end of patient Mobilization (grade I and grade II) specific to segment involve will be administered appropriate direction for 2 minutes followed by 2 minutes rest per vertebrae i.e. 10 oscillation/minute.

At the end of the 3 weeks procedure of respective groups, they will be re-assessed using the VAS, NDI and cervical range of motion by goniometer.

The data obtained from the pre intervention will be compared to that of the data obtained from the post-intervention. This information will be recorded and compared respectively for each group.

Fig 1: Myofascial Release Technique

Fig 2: Cervical Maitland Moblization

3. Data analysis, interpretation and result

Table 1: Data presentation of Neck Disability Scale

Ndi	Group a [mean± sd]	Group b [mean± sd]	Paired test group a Pvalue	Paired test group a t value	Paired group b test Pvalue	Paired test group b T value	Upaired test P value	Upaired test t value
Pre Post	82%±3.23 21.9%±2.84	82%±3.71 63%±3.14	P<0.0019 Consired Extremely Significant	T=57.44	P<0.0001 Consired Extremly Significant	T=14.61	P<0.0001 Extremly Significant	T=37.58

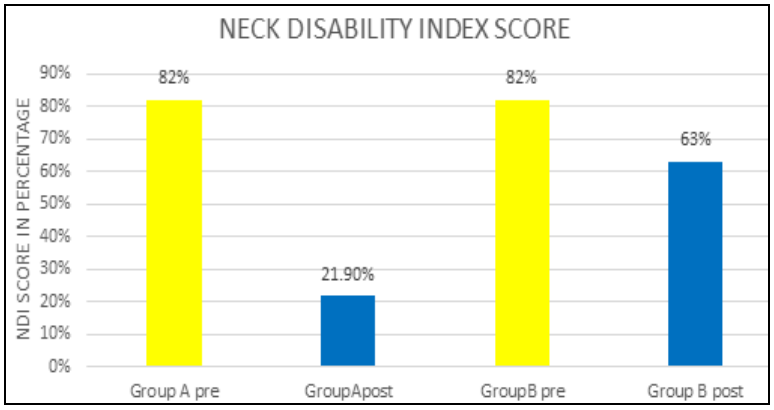

Fig 3: Pre and Post Reading of Neck Disability Index

Result No 1: Graph 1 shows Comparison of mean in pre and post of group A and B in terms of NDI where the t and p value was group A (t=57.44, P<0.0019), group B (t=14.61, p<0.0001) by using paired t test and t=37.58 and p <0.0001 by using unpaired t test which shows extremely significant difference.

Table 2: Data presentation of visual analogue scale

Visual analogue scale	Group A [Pre]	Group A [Post]	Group B [Pre]	Group B [Post]
Mild	0	11	0	5
Moderate	5	4	4	10

Severe	10	0	11	0

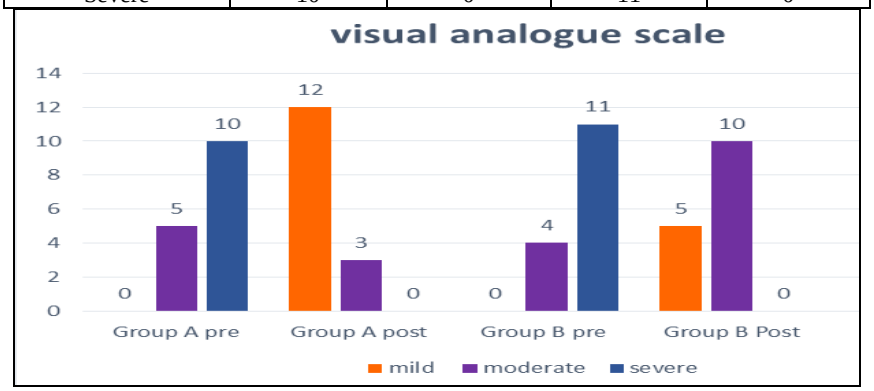

Fig 4: Pre and Post Reading of Visual Analogue Scale

Result No 2

Graph 2 shows comparison of result of pre and post of group A and B in terms of Visual Analogue Scale, where group a post showed better result than b group.

Table 3(a): Data presentation of cervical range of motion

	Group A Mean ± SD[PRE]	Group A Mean ±SD[POST]	Group B Mean ± SD [PRE]	Group B Mean ±SD[POST]
Flexion	63.4 ±2.32	71±2.44	62.3±2.02	67.3±3.03
Extension	52.2±2.11	59.3±0.97	50.4±2.66	54.53±2.47
Lateral flexion (rt)	38.13±2.57	43.13±1.50	33.6±2.47	38.3±3.24
Lateral flexion (lt)	37.2±2.59	43.6±3.39	33.4±2.47	36.8±1.92
Rotation (rt)	72.2±2.59	80.13±1.40	71.4±1.76	75.8±1.42
Rotation (lt)	71.4±1.59	79.86±1.40	72.5±2.61	76.6±2.12

Table 3(b): Data presentation of cervical range of motion

	Paired test groupa P value	Pairedtest Groupa t value	Paired test group b P value	Paired test group b t value	Unpaired test P value	Unpaired test t value
Flexion	P<0.0001 Extremely Significant	T=9.827	P<0.0001 Extremely Significant	T=11.21	P<0.0019 Very Significant	T=3.43
Extension	P<0.0001 Extremely Significant	T=13.84	P<0.0001 Extremely Significant	T=16.38	P<0.0001 Extremely Significant	T=5.74
Lateral flexion (rt)	P<0.0001 Extremely Significant	T=8.77	P<0.0005 Extremely Significant	T=4.53	P<0.0001 Extremely Significant	T=5.23
Lateral flexion (lt)	P<0.0001 Extremely Significant	T=8.42	P<0.0001 Extremely Significant	T=7.77	P<0.0001 Extremely Significant	T=6.67
Rotation (rt)	P<0.0001 Extremely Significant	T=18.42	P<0.0001 Extremely Significant	T=16.14	P<0.0001 Extremely Significant	T=7.84
Rotation (lt)	P<0.0001 Extremely Significant	T=16.73	P<0.0001 Extremely Significant	T=16.16	P<0.0001 Extremely Significant	T=5.37

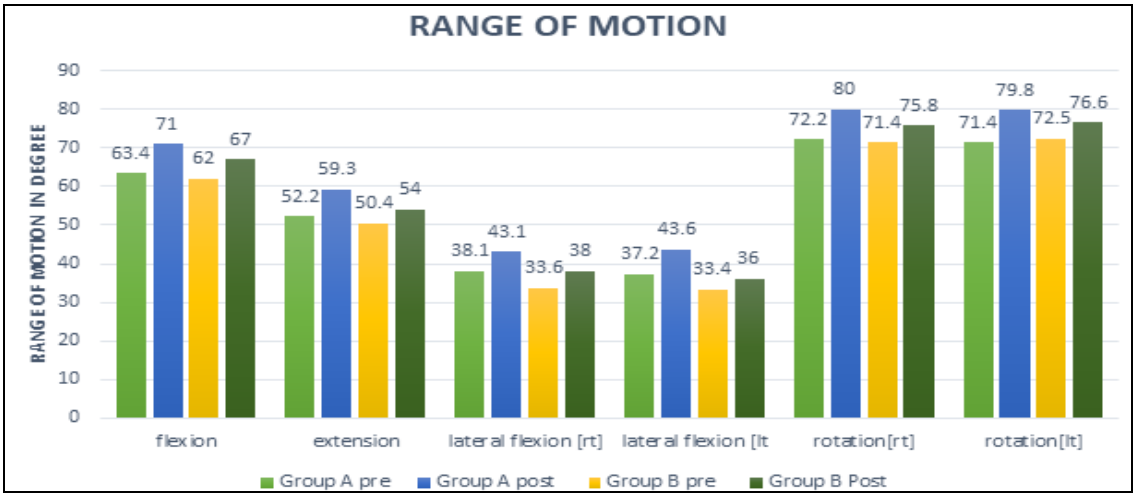

Fig 3: Pre and post reading of cervical range of motion

Result No 3

Graph 3shows comparison of result of pre and post of group A and B in terms of cervical range of motion where the t and p value for group A flexion (t=9.82,p<0.0001),extension (t=13.84,p<0.0001)lateral flexion Rt (t=8.77,p<0.0001)lateral flexion lt(t=8.42,p<0.0001)rotation Rt (t=18.42,p<0.0001) rotation lt (t=16.73,p<0.0001)

group B flexion(t=11.21,p<0.0019), extension (t=16.38, p<0.0001)lateral flexion rt(t=4.53,p<0.0001)lateral flexion lt(t=7.77,p<0.0001)rotation rt (t=16.14,p<0.0001) rotation lt ((t=16.16,p<0.0001) by using paired t test and flexion (t=3.43,p<0.0001) extension (t=5.74,p<0.0001), lateral flexion rt(t=5.23,p<0.0001)lateral flexion lt(t=6.67,p<0.0001),rotation rt(t=7.84,p<0.0001)rotation lt(t=5.37,p<0.0001) by using unpaired t test which showed significant change in ROM.

Discussion

The study evaluated the effectiveness of myofascial release technique and Maitland's mobilization in cervical spondylosis patients. The sample size of the study was 30 participants. The participants were divided into 2 groups. The participants were assessed on the first day for the severity of pain, functional ability and range of motion using VAS, NDI, and range of motion by goniometer respectively. Group A received myofascial release technique and group B received Maitland's mobilization manipulation. The intervention was for 3 weeks and the outcome measures i.e. severity of pain, functional ability and cervical range of motion using VAS, NDI and goniometer respectively were again noted after 3 weeks.

The result of this study showed that there were significant changes in, pain, functional activity and cervical range of motion of both the groups. However, when both the groups were compared, Group A (myofascial release) showed highly significant changes than Group B (Maitland mobilization), because myofascial release technique helps in Reducing inflammation, Reduces muscle and nerve pain, Decreased fascial tension beneath scar tissue, helps in Soft tissue mobilization, loosening constricted connective tissues and freeing impinged structures of the muscular and nervous systems, fascial adhesion decreases blood circulation by compressing the arteries myofascial release increases the blood flow which allows nutrients to get to the tissues and metabolic waste to be taken away, it helps in in improving nerve function, numbness, tingling, or pain are often created by fascial adhesion pressing on the nerves, myofascial release technique relieves the pressure that is placed on these nerves, bringing new awareness to the area that are affected Myofascial release works on the painful area, also addresses all area of dysfunction throughout the body, it allows the body to heal by allowing the blood, lymph, and nerve receptors to work more effectively by releasing endorphins which helps in reducing pain [15].

Tanvir Ahmed in his study Efficacy on Myofascial Release Technique among the Neck Pain Patient the study design was randomize controltrial. 10 patients with neck pain conveniently allocated to Myofascial release with conventional physiotherapy group and 10 patients to the only conventional Physiotherapy group for this study. Visual analogue scale was used to measure painintensity in different functional position and Goniometer are used to measure range of motion in different physiological range [7].

Conclusion

Compared to Maitland's mobilization, myofascial release technique has showed significant effect in cervical spondylosis patient in terms of pain threshold, functional ability and improvement in cervical range of motion.

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