

ORIGINAL RESEARCH

Comparative study of ART and joint mobilization in middle aged females having chronic neck pain

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ABSTRACT

Background: Middle-aged women have a 60-70% likelihood of experiencing neck pain at some point in their lives. A common culprit behind neck discomfort is mechanical dysfunction, which can lead to abnormal joint movement. This can restrict neck mobility due to irregular cervical joint mobility within the joint capsule. Moreover, imbalances in the soft tissues surrounding the head and neck can limit the range of motion (ROM) of the head, potentially resulting in neck pain. Methods such as joint mobilization (JM) and joint manipulation are frequently employed to enhance joint capsule mobility. Active release technique (ART) is also utilized for rehabilitation and treatment purposes. It's important to note that there is limited research available on this topic, making it an area that warrants further investigation. **Materials and Methods:** 60 females within the age group of 40 to 60 years with a 2 month or longer history of neck were included in this study and were randomised into 2 groups : Group A- ART (Active Release Technique), Group B- Joint mobilization. The duration of the physiotherapy sessions was 3 weeks with 4 sessions per week. Results were analysed on the basis of pre and post therapy visual analog scale (VAS), NPAD Scale and neck ROM. **Results:** Both Group A and Group B showed significant improvements in their VAS (Visual Analog Scale) and NPAD (Neck Pain and Disability) scores, with p-values of less than 0.001. Additionally, both groups demonstrated a significant increase (p-value < 0.001) in every parameter related to neck joint range of motion (ROM). However, it's worth noting that the difference in the mean decrease in VAS and NPAD was 0.77 and 13.85 in favour of Group A. Also, the difference in the mean increase in flexion and extension angle was 1.06 and 11.44 in favour of Group A (Active Release Technique). Based on these findings, it can be concluded that Group A is more effective in terms of improving VAS and NPAD scores and increasing the range of motion (ROM) of the neck when compared to Group B. **Conclusion:** Based on the results obtained in the present study, it can be concluded that both Group A and Group B have a positive impact on reducing pain as measured by the VAS and NPAD scales and on increasing neck range of motion (ROM). Both treatment groups showed some significant improvements in their effects, indicating that both techniques are effective in addressing these issues. However, it's important to note that the Active Release Technique (ART) group demonstrated a promising trend towards greater effectiveness, especially for patients with chronic neck pain. Therefore, it is recommended that ART may be considered as part of the treatment approach for middle aged females with chronic neck pain conditions, as it could lead to better results.

Key Words: ART (Active Release Technique), JM (Joint Mobilization), VAS Scale, NPAD and Neck ROM

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INTRODUCTION

Neck pain has become a significant health concern in the modern era, as highlighted by studies such as those conducted by Bouter et al.[1]. This discomfort can originate from various structures within the neck, including intervertebral discs, ligaments, muscles, facet joints, dura, and nerve roots, as pointed out by Chung et al[2]. While potential causes of neck pain can range from tumors, infections, inflammatory

diseases, to congenital disorders, it's essential to note that in many cases, no underlying systemic illness can be identified. Instead, the issue is often attributed to musculoskeletal neck pain.

The neck, or cervical spine, is a highly complex network of nerves, bones, joints, and muscles that are intricately connected to the brain and the spinal cord. This structure is specifically designed for strength, stability, and efficient nerve communication. Various

problems can lead to neck pain, and irritation in the nerve pathways can result in pain radiating into the shoulder, head, arm, and hand.

Acute neck: It occurs suddenly and generally heals in days to weeks. The source of pain is usually in the muscles and ligaments, joints, or discs.

Chronic neck: If pain persists for more than 3 months; it may be felt all the time or with certain activities which aggravates pain. It results in pain, stiffness and soreness in the neck, perhaps with decreased mobility, often presents as widespread hyperalgesia on palpation and in both passive and active movements in neck and shoulder area. [3]

The neck muscles play a crucial role in supporting the head and keeping it in a neutral position, primarily because the head carries a significant weight, typically around 10-12 pounds (approximately 5.4 kilograms). When the head tilts forward, such as when using mobile phones or laptops, it places additional strain on the neck as the muscles work harder to stabilize it. This forward bending of the head is a common occurrence when reading in bed or spending extended hours working on a computer, and it can lead to the development of neck pain. Another potential trigger for neck pain is sleeping in an uncomfortable or awkward position that places undue stress on the neck muscles and structures.

The prevalence of neck pain in the general population is a significant concern, with studies indicating that the one-year incidence of neck pain can be as high as 40%. This places neck pain in a prominent position in global health concerns, as recognized by the World Health Organization (WHO), which ranks it as the fourth most common condition. One approach to addressing soft tissue pain, including neck pain, is the Active Release Technique (ART). This patented treatment method was developed by Dr. P. Michael Leahy and is used to manage a range of conditions, such as headaches, plantar fasciitis, sciatica, carpal tunnel syndrome, and other myofascial issues. ART is renowned for its ability to enhance flexibility and athletic performance and expedite the healing process for specific types of injuries [4]. It offers a valuable option for individuals seeking relief from various forms of soft tissue pain and improved physical performance.

The Active Release Technique (ART) is a manual therapy employed to address soft tissue issues within muscles, joints, and connective tissue. Practitioners utilize palpation to pinpoint areas of tension or adhesions in specific tissues. Subsequently, the tissue is manipulated from a shortened position to a lengthened position, while maintaining tension along the fibers of the tissue through manual contact. This technique involves a variety of skilled movements, comprising over 500 specific maneuvers tailored to individual cases. The duration of treatment varies on a case-by-case basis, with an average of 4 to 11 visits, each lasting approximately 15-30 minutes, often proving sufficient for correcting soft tissue issues [5].

ART shares similarities with deep tissue massage techniques and myofascial release in that it focuses on manipulating soft tissue to alleviate stress on joints and nerves. [6]. The conditions that ART effectively treats, often without the need for medications, primarily impact fascia (connective tissue), major muscle groups, tendons, and ligaments. These issues frequently result from overused muscles, leading to the formation of scar tissue, tears, pulls, strains, and inflammation. The primary objective of the active release technique is to restore normal mobility and facilitate smooth movement between muscular tissue and nerves (Oh, 2001). Moreover, it can aid in the distribution of joint fluid throughout the body and stimulate the lymphatic system, which helps reduce inflammation. ART is a valuable therapeutic approach for individuals seeking relief from various soft tissue problems and enhanced overall well-being.

Kaltenborn Joint Mobilization (JM), developed by Freedy Kaltenborn over 40 years ago, stands as one of the most widely employed methods for alleviating joint pain and enhancing joint mobility. This technique effectively addresses joint capsule mobility, dismantles adhesions that restrict joint movement, and promotes the circulation of synovial fluid within the joint. The Kaltenborn Joint Mobilization involves the application of Kaltenborn's traction and gliding techniques. To alleviate pain using physiological movements such as flexion, extension, side bending, and rotation, Grade I or II traction is administered for a duration of 10 seconds. It's worth noting that when applied at the end range of motion directly on the cervical vertebrae joint, this technique may induce tension in the neck muscles. Grade III traction is recommended in conjunction with mobilization glides for addressing hypo-mobile joints, and oscillations within the pain threshold can be employed to reduce hypo-mobility, as suggested by Zisman in 2004. [7]

- Grade I (loosen): Neutralizes pressure in joint without actual surface separation. Produce pain relief by reducing compressive forces.
- Grade II (tighten or take up slack): Separates articulating surfaces, taking up slack or eliminating play within joint capsule. Used initially to determine joint sensitivity.
- Grade III (stretch): Involves stretching of soft tissue surrounding joint. Increase mobility in hypomobile joint.

MATERIALS AND METHODS

Aim: The aim of the study is to compare the effectiveness of Active Release Technique and Joint Mobilization Technique in middle aged females having chronic neck pain.

Objectives:

- To find the effects of Active Release Technique in middle aged females having Chronic Neck Pain.

- To find the effects of Joint Mobilization only in middle aged females having chronic neck pain.
- To compare the effects of Active Release Technique and Joint Mobilization both in middle aged females having Chronic Neck Pain.

HYPOTHESIS

Null hypothesis H0:

There will be no significant effect of Active Release Technique (ART) in middle aged females having Chronic Neck Pain.

There will be no significant effect of Joint Mobilization in middle aged females having Chronic Neck Pain.

There will be no significant difference between Active Release Technique (ART) and Joint Mobilization, both in middle aged females having Chronic Neck Pain.

Alternative hypothesis H1:

There will be a significant effect of Active Release Technique (ART) in middle aged females having Chronic Neck Pain.

There will be a significant effect of Joint Mobilization in middle aged females having Chronic Neck Pain.

There will be a significant difference between Active Release Technique (ART) and Joint Mobilization, both in middle aged females having Chronic Neck Pain.

MATERIALS AND METHODS

The research was conducted with a sample of 60 middle-aged females at Bundelkhand Medical College who visited the Orthopaedic Outpatient department from September 2022 to September 2023. The study spanned a period of 6 months. Specifically, it targeted middle-aged females between the ages of 40 to 60 suffering from chronic neck pain, as diagnosed by the presence of symptomatic chronic neck pain with either unilateral or bilateral involvement. These patients were selected based on predefined inclusion-exclusion criteria during a specified schedule, and the selection was done randomly using a simple random sampling technique.

The selected patients were evenly divided into two groups, each consisting of 30 individuals. These groups were designated as "group A" and "group B." Middle-aged females in "group A" received the Active Release Technique, while those in "group B" received the Joint Mobilization Technique. The primary objective of the study was to compare the effectiveness of these two techniques in managing chronic neck pain among middle-aged females. The study included two stages of data collection. In the first stage, before the intervention, baseline assessments were conducted, which involved gathering data on the Visual Analog Scale (VAS), Neck Pain and Disability Scale (NPAD), and neck range of motion. In the second stage, data was collected again during the third week after the interventions in both groups, and these observations

were utilized for further statistical analysis. Before participating in the study, the middle-aged females in both groups were provided with necessary instructions and information about the research. They were explained the complete study procedure in their own language, and their willingness to participate was recorded through a consent form that they duly signed. The data collected before and after the intervention in both groups (A and B) was analyzed to assess the effectiveness of the Active Release Technique and the Joint Mobilization Technique in managing chronic neck pain.

INCLUSION CRITERIA

- Patients: age group 40-60 years females.
- Symptomatic chronic neck pain as established by unilateral or bilateral involvement.
- Patients with neck range of motion are as follows: Flexion 0- 45° degrees, Extension 50°-60°, both sides rotation 0- 50° & both sides bending 0-35 degrees.
- Pain: 7 to 9 @ VAS scale, 7 to 15 @ NPAD scale.
- The patients who have given consent.

EXCLUSION CRITERIA

- Any history of trauma, surgery, acute infections, malignancy or any systemic disorders, or having any cervical spine or any other upper limb dysfunction, neurological diseases, cardiovascular diseases, osteoporosis, recent steroid infiltration.
- If they had whiplash damage occurred in the last 6 weeks
- The history of spinal tumors, cervical spine fracture or open neck surgery, detection of cervical spinal stenosis, bilateral upper extremities symptoms, or positive neurological findings
- Receiving Myofascial pain treatment in the months before the study.
- Long term use of corticosteroids.
- Contraindications to mobilization (cervical instability, signs or symptoms of vertebral artery insufficiency, severe osteoporosis, tumor, tuberculosis of the spine, disease of the spinal cord etc.)
- Discogenic disorders.
- Middle-aged females with chronic neck pain who recently underwent physiotherapy interventions (at least 3 months before)
- Males and females except middle aged group.

GROUP A: ACTIVE RELEASE TECHNIQUE (ART)

During the Active Release Technique (ART), patients assumed a relaxing supine position, and the therapist assessed the neck muscles. The therapist carefully palpated the area to identify any scar tissue or tender points. Subsequently, the ART technique was applied

to isolate and target the problematic area, with the goal of breaking up scar tissue and promoting proper blood flow for healing. This was achieved by gently applying tension to the muscle and combining it with

specific movements, including flexion, extension, lateral rotation, and side bending of the neck. Typically, ART treatments last for about 20 minutes.



Active Release Technique



Active Release Technique

GROUP B: JOINT MOBILIZATION (JM)

Joint Mobilization (JM) is characterized by the application of low-velocity, rhythmic movements with short or large amplitudes. In this technique, patients were positioned in a supine posture, and the therapist secured the patient's head at the edge of the treatment surface. JM, based on Kaltenborn's methods of traction and gliding, was employed in various

directions, including anterior-posterior (AP), posterior-anterior (PA), lateral, and rotational glides. To alleviate pain using physiological movements such as flexion, extension, side bending, and rotation, Grade I or II traction was administered for 10 seconds. These low-velocity, rhythmic movements in the form of directional glides were performed as part of the treatment process.



Joint Mobilization Technique (Neutral Position)



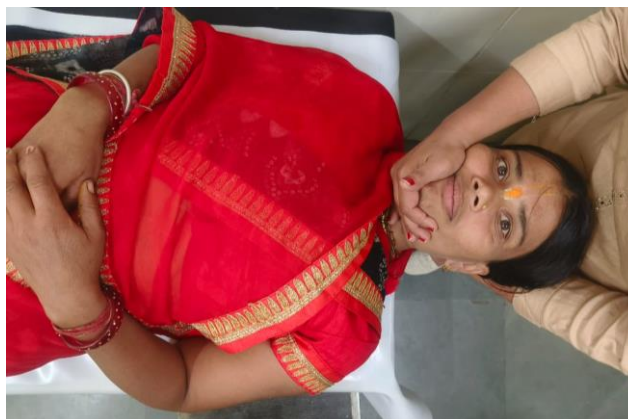
Joint Mobilization Technique (PA Glide)



Joint Mobilization Technique (AP Glide)



Joint Mobilization Technique (Neutral position)



Joint Mobilization Technique (Lateral Glide)

RESULT

At the baseline pre-intervention sampling stage, the mean VAS score was 8.2 ± 1.22 and the mean NPAD score was 211.5 ± 33.25 in Group A. After intervention of active release technique, the mean VAS score was 0.88 ± 0.76 points and NPAD scale was 31.83 ± 8.29 which was found to be significantly reduced. This reduction in the mean VAS score of 7.32 points and mean NPAD score of 179.67 between baseline and post intervention among middle aged females having chronic neck pain in group A was statistically significant ($p < 0.001$).

At the baseline pre-intervention sampling stage, the mean VAS score was 8.5 ± 1.84 and the mean NPAD score was 242.8 ± 47.85 in Group B. After the intervention of joint mobilisation technique, the mean VAS score was 1.95 ± 1.12 points and NPAD scale was 49.28 ± 9.13 points which was found to be significantly reduced. This reduction in the mean VAS score of 6.55 points and mean NPAD score of 193.52 points between baseline and post intervention among middle aged females having chronic neck pain in group A was statistically significant ($p < 0.001$).

Moreover, the statistical agreement projected that the middle-aged females having chronic neck pain intervened with active release technique had more improved VAS score, and NPAD score than middle aged females having chronic neck pain intervened with joint mobilization technique. Henceforth, active release technique among middle aged females having chronic neck pain may be preferred as an effective conservative program for reducing the intensity of pain. Furthermore, active release technique may be considered as a tool to combat the severity of neck pain among middle aged females having chronic neck pain.

At the baseline pre-intervention sampling stage, the mean angle of flexion was $40.5 \pm 2.85^\circ$ and the mean angle of extension was $39.6 \pm 4.6^\circ$ in Group A. After intervention of active release technique, the mean angle of flexion was $58.5 \pm 3.05^\circ$ and the mean angle of extension was $64.3 \pm 7.19^\circ$, which was found to be significantly increased. This increase in the mean flexion angle of 18° and the mean extension angle of 24.7° between baseline and post intervention among middle aged females having chronic neck pain in group A was statistically significant ($p < 0.001$).

At the baseline pre-intervention sampling stage, the mean angle of flexion was $37.93 \pm 3.04^\circ$ and the mean angle of extension was $47.57 \pm 4.22^\circ$ in Group B. After the intervention of joint mobilization technique, the mean angle of flexion was $54.87 \pm 4.49^\circ$ and the mean angle of extension was $60.83 \pm 5.45^\circ$, which was found to be significantly increased. This increase in the mean flexion angle of 16.94° and the mean extension angle of 13.26° between baseline and post intervention among middle

aged females having chronic neck pain in group A was statistically significant ($p < 0.001$).

Moreover, the statistical agreement projected that the middle-aged females having chronic neck pain intervened with active release technique had more improved angles of flexion and extension than middle aged females having chronic neck pain intervened with joint mobilization technique. Henceforth, active release technique among middle aged females having chronic neck pain may be preferred as an effective conservative program for improving the weak angles of flexion and extension. Furthermore, active release technique may be considered as a tool to combat the severity of angles of flexion and extension among middle aged females having chronic neck pain.

It's worth noting that the difference in the mean decrease in VAS and NPAD was 0.77 and 13.85 in favor of Group A. Also, the difference in the mean increase in flexion and extension angle was 1.06 and 11.44 in favor of Group A (Active Release Technique).

DISCUSSION

The objective of this study is to compare and assess the impacts of two different therapeutic techniques, namely Active Release Technique (ART) and joint mobilization, on middle-aged females suffering from chronic neck pain. The study comprises two experimental groups: one receiving ART treatment and the other receiving joint mobilization. A total of 60 subjects were randomly assigned to these groups, with 30 individuals in each (Group A for ART and Group B for joint mobilization). Evaluation was conducted using the Visual Analog Scale (VAS), Neck Pain and Disability Scale (NPAD), and neck range of motion (ROM).

Both groups demonstrated improvements in all three assessed variables, with ART showing the most significant improvement and joint mobilization exhibiting the least improvement. Statistical analysis revealed a significant difference in VAS, NPAD, and neck ROM between the two groups. ART primarily targets soft tissues like tendons, nerves, and myofascia and is applied to conditions such as repetitive strain injuries, acute injuries, and damage caused by abnormal posture, effectively resolving scar tissue adhesion and soft tissue-related symptoms like pain, muscle weakness, tingling, and spasm.

On the other hand, joint mobilization is employed to address joint hypo-mobility by identifying cervical joint segments with abnormal mobility and stimulating sensory receptors responsible for pain sensation, thereby influencing muscle activity in the desired direction. After three weeks of treatment, significant improvements were observed in VAS, NPAD, and neck ROM compared to the pre-test values. These improvements were noticeable after the final session on the 12th day. However, long-term follow-up, which is recommended for future studies, was not

conducted. The positive outcomes in this study may be attributed to the continuous 12-day treatment regimen (excluding Sundays).

In conclusion, the results of this study suggest that Active Release Technique (ART) is more effective than joint mobilization for middle-aged females experiencing chronic neck pain. Additionally, conventional exercises were incorporated into both treatment groups, yielding positive results, and further research in this area is warranted.

CONCLUSION

Following the intervention of ART (Active Release Technique) and joint mobilization at the post-intervention stage, the chronic neck pain in both Group A and Group B exhibited significant improvement compared to the pre-intervention stage. However, the subjects in Group A, who received ART, experienced a notably greater reduction in chronic neck pain than the subjects in Group B, who were treated with joint mobilization. The comparative analysis of outcomes between these two physiotherapy approaches suggests that ART is more effective than joint mobilization for alleviating chronic neck pain in middle aged females. Nevertheless, joint mobilization remains a viable and effective option for middle aged females with chronic neck pain.

In summary, the results obtained from the data indicate the rejection of all null hypotheses. Therefore, all alternative hypotheses have been

accepted, thus achieving the stated objectives and fulfilling the aim of the research project titled "A study to compare the effectiveness of Active Release Technique and Joint Mobilization techniques in middle aged females with chronic neck pain."

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