RESEARCH PAPER

A Comparative Study On Finding Effectiveness Of Conventional Treatment And Active Release Technique On Upper Trapezius Muscle Causing Neck Pain In Adhesive Capsulitis: An Experimental Study

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ABSTRACT
Adhesive capsulitis presents as a painful and progressively restrictive condition affecting both active and passive shoulder mobility, resulting from fibrosis and contracture of the joint capsule. Diabetes generally affects 2-5% of the overall population and can impact up to 20% of those diagnosed with the condition, with a significantly higher prevalence noted among females aged 40-60. This experimental study involved a comparison utilising groups of 20 individuals each. One group underwent conventional treatment, whereas the other group was provided with the active release technique alongside conventional treatment. The statistical analysis revealed significant differences between the conventional treatment and experimental groups. Both groups demonstrated enhancements in pain (VAS) and functional measures (UEFS, range of motion); however, the experimental group showed markedly greater progress across all metrics. The experimental group showed significant decreases in VAS scores, accompanied by marked enhancements in upper extremity function and range of motion, including flexion, extension, abduction, and internal rotation. All results for the experimental group showed statistical significance ($p < 0.001$), indicating that the experimental intervention is more effective than the conventional treatment in improving patient outcomes..

Keywords: Adhesive capsulitis, Active release technique, Neck pain, Shoulder Rom, Upper Extremity Functional Index Scale, Visual analogue scale.
How to cite this article: Kumar AKVK, Suganthirababu P, Aishwarya R... A Comparative Study On Finding Effectiveness Of Conventional Treatment And Active Release Technique On Upper Trapezius Muscle Causing Neck Pain In Adhesive Capsulitis: An Experimental Study. Int J Drug Deliv Technol. 2026;16(5s): 254-258; DOI: 10.25258/ijddt.16.5s.31
Source of support: Nil.
Conflict of interest: None

INTRODUCTION

Adhesive capsulitis of the shoulder is a condition marked by the stiffening and thickening of the joint capsule, resulting in a progressive and painful restriction of shoulder mobility. Adhesive capsulitis can significantly affect daily activities, even though it generally resolves on its own. The prevalence ranges from 2 to 5% in the general population and may increase to 20% among individuals with diabetes. The probability increases in women between the ages of 40 and 60, with approximately one in four individuals possibly exhibiting symptoms in both shoulders. [1]
Neck pain is prevalent, especially among middle-aged individuals, with a higher incidence observed in women. The upper trapezius muscle is often activated. Approximately two-thirds of individuals experience neck pain at some point in their lives. Research shows a mean point prevalence of 13%, with a range between 5.9% and 38.7%, and a mean lifetime prevalence of 50%, varying from 14.2% to 71.0%. The variations underscore the complexities of the condition and the importance of thorough strategies for effective management. [2]
Inflammation of the trapezius muscle leads to ongoing discomfort, which is evident even during periods of rest, and is intensified by physical exertion. This inflammation also leads to muscle spasms and tightness in the trapezius area. As a result, distinct nodules form within the skeletal muscle band. Austin Sports Therapy utilises the Active Release Technique, which was developed by chiropractor Dr. P. Michael Leahy, to effectively address various issues related to muscles, tendons, ligaments, fascia, and nerves. [3]
Active Release Technique (ART) is a hands-on approach employed for the treatment of soft tissue issues. This method entails the application of deep digital pressure to the sensitive area (trigger point) while the muscle is in a contracted state. The patient is then guided to actively transition into a lengthened position on the opposite side. This reduces the adhesions. ART plays a significant role in reducing discomfort and improving the range of motion. [4]
This study aims to assess the efficacy of traditional treatment methods compared to active release technique (ART) in the management of patients with adhesive capsulitis experiencing neck pain associated with upper trapezius muscle involvement. The study was designed to assess and contrast the two approaches in terms of their efficacy in alleviating pain levels, improving shoulder range of motion, and reinstating functional ability. This research seeks to assess the extent to which ART offers significant advantages over traditional methods in the rehabilitation of patients with this combined musculoskeletal condition.

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MATERIALS & METHODS

An experimental study was conducted at the Department of Physiotherapy, Dr. B.R. Ambedkar Medical College and Hospital, Bangalore. The study included both male and female patients diagnosed with Grade 2 Adhesive Capsulitis who are aged between 40 and 60 years and have diabetes. Patients with adhesive capsulitis experiencing painful, stiff shoulders and upper trapezius muscle pain for a minimum of 3 months were included. Additionally, those with at least 25% restricted shoulder range of motion and unilateral adhesive capsulitis, who could comprehend commands and were willing to participate in the study, were also considered. Individuals with a recent surgical history involving a specific shoulder, those experiencing posttraumatic shoulder pain and stiffness; individuals presenting with paraesthesia, cervical radiculopathy, a prior fracture in the shoulder complex, and those with rotator cuff pathology were excluded from the study.

A total of 40 participants diagnosed with adhesive capsulitis and exhibiting neck pain associated with upper trapezius muscle involvement were recruited using a convenience sampling technique. The intervention lasted for three weeks, during which participants attended 12 treatment sessions each week. Apley's scratch test was utilised as a clinical tool to evaluate shoulder mobility and functional impairment, both prior to and following the intervention. To assess the effectiveness of the interventions, the following outcome measures were utilised: the visual analogue scale (VAS) for pain intensity, the upper extremity functional scale (UEFS) for evaluating functional ability, and goniometric measurement of shoulder range of motion (ROM) to assess joint mobility. The assessments will be carried out before the intervention to establish baseline values and following the completion of the treatment period to evaluate the effectiveness of the respective therapeutic approaches. An analysis was conducted comparing pre- and post-intervention scores to assess the impact of conventional treatment versus active release technique on pain reduction, functional improvement, and restoration of range of motion in patients with adhesive capsulitis and related neck pain stemming from upper trapezius muscle involvement.

PROCEDURE

A total of 40 samples were divided into 2 groups, with 20 participants in each group A and B. Group A received conventional treatment, and Group B received conventional treatment and active release techniques. Both groups received 12 sessions of treatment for 3 weeks. Each subject was screened, and those who did not meet the inclusion criteria were excluded.

CONVENTIONAL TREATMENT

The patient was positioned in a chair and underwent interferential therapy (IFT) for a duration of 10 minutes, subsequently receiving ultrasound therapy for 8 minutes. The procedure commenced with the administration of pain relief, and upon achieving pain reduction, various exercises including the shoulder wheel, finger ladder, pendulum exercises, and wand exercises were introduced. The exercises were conducted with 10 repetitions, accompanied by one-minute sets.

EXPERIMENTAL TREATMENT

The patient was positioned in a chair and underwent interferential therapy (IFT) for a duration of 10 minutes, subsequently receiving ultrasound therapy for 8 minutes. Active release techniques were subsequently employed to alleviate discomfort, utilizing gentle pressure on the affected area while the patient actively flexed their neck toward the contralateral side. The procedure prioritized pain relief at the outset, and following the reduction of pain, exercises including the shoulder wheel, finger ladder, pendulum exercises, and wand exercises were introduced. The exercises were conducted with 10 repetitions, accompanied by a one-minute interval for each set.

RESULTS

The study's findings revealed a notable disparity in treatment outcomes between the two groups. Both the conventional treatment group (Group A) and the experimental group that received Active Release Technique (ART) alongside conventional treatment (Group B) demonstrated significant enhancements in pain intensity, functional ability, and shoulder range of motion [Table 2]. Nonetheless, the extent of enhancement was markedly more pronounced in Group B. The assessment of pain levels, utilising the Visual Analogue Scale (VAS) [Graph – 1], indicated a mean reduction of 1.35 points in Group A. In contrast, Group B demonstrated a more pronounced decrease of 3.95 points, with this difference achieving statistical significance ($p < 0.001$).

The evaluation of functional outcomes, as measured by the Upper Extremity Functional Scale (UEFS) [Graph – 2], demonstrated improvement in both groups. Group A exhibited a moderate enhancement of 4.30 points, whereas Group B revealed a considerably greater increase of 16.65 points ($p < 0.001$). Regarding shoulder range of motion (ROM) [Table 3], Group B consistently demonstrated enhanced improvements across all assessed parameters. In Group B, shoulder flexion increased by 73.85°, while Group A experienced an increase of 20.25°. Extension improved by 18.50° in Group B, in contrast to 6.50° in Group A. Abduction demonstrated a significant increase of 112.25° in Group B compared to 10.00° in Group A. Additionally, internal rotation improved by 28.00° in Group B, whereas Group A recorded a gain of only 7.50°. All differences observed between groups were statistically significant ($p < 0.001$).

The results demonstrated that conventional physiotherapy produced measurable improvements; however, the incorporation of Active Release Technique notably improved pain reduction, functional performance, and shoulder mobility in patients experiencing adhesive capsulitis and upper trapezius-related neck pain.

DISCUSSION

Adhesive capsulitis, commonly referred to as frozen shoulder, is a musculoskeletal condition marked by pain and

increasing stiffness, resulting in a limited range of motion (ROM) in the shoulder joint. Myofascial trigger points (MTrPs) in muscles such as the upper trapezius frequently contribute to neck pain and limited shoulder mobility. Standard approaches for AC generally encompass physical therapy techniques like stretching exercises, joint mobilisations, soft tissue mobilisation, strengthening exercises, electrotherapy, and proprioceptive training. The goal of these treatments is to reduce pain, improve range of motion, and get the body back to normal.A study comparing proprioceptive training combined with conventional physical therapy to conventional therapy alone showed that both groups had less pain, less disability, more functional activity, and a wider range of motion. However, the group receiving proprioceptive training exhibited significantly greater enhancements in functional activity and pain reduction, while the differences in range of motion between the groups were not significant. [5]

A randomised clinical trial examining Active Release Technique (ART) versus Muscle Energy Technique (MET) in subacute AC patients with trigger points demonstrated that both methods were effective in alleviating pain and enhancing range of motion and functional ability; however, ART showed a significantly greater effectiveness compared to MET. ART involves the manual manipulation of soft tissues to treat adhesions and scar tissue in muscles and fascia. This helps release trigger points and restore normal muscle function. A subsequent examination of Active Release Technique (ART) administered to the upper trapezius muscle in individuals suffering from chronic neck pain revealed its effectiveness in reducing pain and improving range of motion. [6]
Compared to traditional physiotherapy alone, the combination of ART with standard treatments leads to faster and more significant enhancements in pain, range of motion, and functional status in patients with upper trapezius involvement and neck pain. Proprioceptive exercises and other conservative therapies yield improved outcomes; however, incorporating manual release techniques may further enhance these effects. [7]
Numerous studies on trigger point treatments, including dry needling, ischemic compression, and myofascial release, indicate that targeting trigger points in muscles like the upper trapezius results in decreased pain and enhanced shoulder function in AC. The findings endorse the integration of ART as a significant complement to traditional therapies. [8]
This study was carried out to assess the effectiveness of conventional treatment and experimental methods in enhancing pain relief and range of motion.

Conventional Treatment in Adhesive Capsulitis with Neck Pain:
Conventional management for adhesive capsulitis (frozen shoulder) primarily includes oral NSAIDs and standardized physical therapy involving gentle active exercises, joint mobilization, and stretching exercises designed to improve shoulder and neck range of motion (ROM) and reduce pain. Modalities such as ultrasound and TENS may offer some benefits, although their efficacy in adhesive capsulitis is less established. Soft tissue mobilization and deep friction massage targeting the upper trapezius and shoulder muscles help reduce myofascial trigger points and muscle tightness, which can contribute to neck pain. These approaches can improve ROM, reduce pain, and restore function by addressing capsular fibrosis and muscle dysfunction around the shoulder girdle and upper trapezius. [9]

Active Release Technique (ART) for Upper Trapezius and Adhesive Capsulitis:
Active Release Technique is a specialized manual therapy designed to address scar tissue and adhesions in soft tissues, such as muscles, tendons, and fascia. ART entails identifying and alleviating adhesions as the patient engages in targeted movements to improve tissue flexibility and functionality. In patients with adhesive capsulitis experiencing upper trapezius muscle involvement leading to neck pain, ART has demonstrated considerable enhancements in pain reduction, range of motion (including flexion and extension), and functional disability scores, frequently yielding faster and more evident results than certain conventional methods or muscle energy techniques (MET). Research indicates that ART significantly alleviates pain intensity and enhances shoulder and neck functionality by targeting myofascial trigger points and improving soft tissue mobility in the upper trapezius region. [10]
All participants underwent evaluation using the UEFS questionnaire, and measurements were taken for VAS scores as well as shoulder flexion, shoulder extension, abduction, and internal rotation. The evaluation is conducted for the pre and post-interpretation scores of an individual. The researcher elucidates the technique to the respondent participants. They were advised to complete a minimum of 12 weekly treatment sessions over a period of 3 weeks. The UEFS is utilized to assess upper extremity function in individuals experiencing hand and upper extremity disorders. Patients assessed their functionality using a 0 - 4 Likert scale, with 0 representing extreme difficulty and 4 denoting no difficulty in completing the task. Research has established that re-test reliability is exceptional (ICC 0.94, 95% CI 0.92 to 0.95) in a cohort with shoulder, elbow, wrist, and hand musculoskeletal conditions; ICCs of 0.95 in a group with upper extremity musculoskeletal conditions, and ICCs of 0.85 (95% CI: 0.73, 0.92) in a sample with shoulder, elbow, wrist, and forearm musculoskeletal conditions.[11,12]
A comparison was conducted by organising groups of 20 individuals each. One group underwent conventional treatment, while the other group received the active release technique in conjunction with conventional treatment. The statistical analysis demonstrated notable differences between the conventional treatment and experimental groups. [13-15] Both groups exhibited improvements in pain (VAS) and functional measures (UEFS, range of motion); however, the experimental group displayed significantly greater advancements across all metrics. The experimental group demonstrated significant reductions in VAS scores along with notable improvements in upper extremity function and range of motion, including FLEXION, EXTENSION, ABDUCTION, and INTERNAL ROTATION. The results for the experimental group

demonstrated statistical significance ($p < 0.001$), indicating that the experimental intervention outperforms the conventional treatment in enhancing patient outcomes.

CONCLUSION

This experimental investigation demonstrated the enhanced therapeutic effectiveness of incorporating Active Release Technique (ART) into standard physiotherapeutic protocols for patients diagnosed with adhesive capsulitis and upper trapezius-related neck pain. Both the control group, which received conventional therapy alone, and the intervention group, which received conventional therapy in conjunction with ART, exhibited statistically significant enhancements in pain intensity, functional capacity, and range of motion (ROM). The intervention group demonstrated significantly improved clinical outcomes across all assessed parameters. The intervention group demonstrated a notable reduction in pain scores as measured by the Visual Analogue Scale (VAS), underscoring the analgesic effectiveness of ART. Additionally, notable improvements in upper extremity functional performance, assessed using the Upper Extremity Functional Scale (UEFS), were observed in the ART group, likely due to the effective release of myofascial adhesions and targeted soft tissue mobilization. Moreover, enhancements in range of motion for flexion, extension, abduction, and internal rotation were consistently and significantly superior in the ART group, often exceeding those of the control group by a factor of three to five. The findings indicate that ART, when combined with standard physiotherapeutic interventions, provides substantial clinical advantages regarding pain reduction, functional recovery, and improvement in joint mobility for patients experiencing adhesive capsulitis and related cervical myofascial issues.

LIMITATIONS

Studies with larger sample sizes can be undertaken in the future to achieve better results as these studies were conducted with small sample sizes. This study demonstrated the immediate effectiveness of a treatment; as a result, it is impossible to ascertain the treatment's long-term effects of the treatment, which can be determined only by a longer-term study.

IMPLICATIONS

The experimental treatment may be applied to adhesive capsulitis alongside. The trapezius muscle causes neck pain treatment protocol, as the findings of this study indicate that participants who received this intervention demonstrated significant improvements in pain levels and range of motion. Furthermore, it has the potential to enhance patient-therapist compliance and treatment adherence.

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