



Research article

## Effectiveness of active release technique verses conventional physiotherapy in management of upper cross syndrome

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**ABSTRACT**

**Background:** In upper cross syndrome (UCS), weaker neck flexors, anterior and middle serratus and lower trapezius along with rhomboids usually develop, and tightness of the levator scapulae, pectoralis major and upper trapezius are biomechanically adapted. Active Release Technique (ART) helps to reduce discomfort and improve the range of movement. Also, Active Release Technique (ART) is a manual procedure which is also being used for other soft tissue rehabilitation as well as for the management of the scar tissues. UCS and neck pain is common with uncomfortable job postures as well as in stress and anxiety, due to which muscle dysfunction starts around the neck. **Aim and Objective:** To evaluate the effects of Active Release Technique verses conventional physiotherapy in management of upper cross syndrome physiotherapy. **Methodology:** 35 patients were grouped in two groups. Both groups were treated for six sessions. Group A was treated with active release technique and static stretching along with hydrocollator pack. The patients coming under Group B, conventional physiotherapy was given which include stretching, levator scapulae and pectoralis major as well as rhomboid strengthening, deep neck flexors, lower trapezius along with the hydrocollator pack. **Result:** Both the treatment protocol were beneficial for the UCS patients but ART yields greater reduction in pain and increase in ROM than the conventional physiotherapy. **Conclusion:** this study concludes that administering ART among the UCS patients has shown positive trends and is beneficial for the patient as compared to the conventional.

**Keywords:** Active Release technique, Upper cross syndrome, Physiotherapy

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**INTRODUCTION**

Neck is part between the head and the shoulder and it also connects the head with the body. Position of the neck and the bottom of the head and shoulders is at greater risk as people sit in the wrong way for long periods of time as there is a rapid rise of time span in the following activities like studying, writing or using a computer [1].

In upper cross syndrome (UCS), there will be weakened neck flexors, anterior and middle serratus and lower trapezius along with rhomboids, and you will observe the tightness of the levator scapulae, pectoralis major and upper trapezius. This condition is assigned cross name because it can draw "X" (a cross) across the upper body, in UCS primarily muscle imbalance occurs, which eventually happens in tonic and phasic muscles [2].

Individuals with upper cross syndrome may exhibit the following features which can be text neck posture, rounded upper back, elevated and prolonged shoulders, winged scapulae, and reduced thoracic spine mobility. The root of symptoms in mechanical neck pain is not well known, but has been hypothesized to be linked to various

anatomical structures, especially the cervical spine's zygapophyseal or uncovertebral joint. A major reason of neck pain is awkward working posture, anxiety, fatigue, heavy lifting and physically challenging jobs [3].

Manual material handling tasks can sometimes lead to the initiation of musculoskeletal disorders, for example, employees who do their work in an unacceptable role or in an unhealthy posture and perform the same behaviour during their working [4]. UCS may lead to irregular kyphosis in thoracic spine, as well as changed glenohumeral joint, altered cervical spine biomechanics, can result in loss of cervical curve and may lead to cervical spine degeneration [3]. Occurrence of such disorders can be affected by factors such as unsuitable posture at work and lack of regular exercise. Data suggests that in the shoulder-girdle and cervico-thoracic area 6-48 percent of the UCS population complain of pain [4].

Mechanical neck pain usually presents as neck and/or shoulder pain with mechanical features which may include signs

triggered due to sustained postures of the neck, neck movement, or cervical muscle palpation. Root cause of mechanical neck pain symptoms is not completely recognized. Uncomfortable job posture, anxiety, exhaustion, heavy weight lifting and physically demanding jobs are typical causes of the neck pain [5]. Mechanical dysfunction, which triggers unusual joint movement, is common cause of neck pain, because abnormal cervical joint mobility inside the joint capsule can restrict neck motion.

Head, neck structure can set limits on head's range of motion (ROM) and cause discomfort to the neck. Therefore, once muscle dysfunction starts, traditional muscle imbalance trends and altered posture follow [6]. Active Release Technique (ART): The Active Release Technique (ART) is a manual procedure for the soft tissue rehab requiring the removal of scar tissue which can cause or which is causing discomfort, stiffness, muscle fatigue and irregular symptoms such as mechanical muscle dysfunction, myofascial, soft tissue [6]. ART helps to reduce discomfort and improve the ROM. Thacker D. et.al. determined the use of Active Release Technique (ART) and use of prescribed exercises and they demonstrated progress in the anterior head carriage relative to traditional physical therapy with prescribed exercises [7].

Jun Ho Kim. et.al. determined effects of the active release technique on discomfort and cervical range of movement in cases with prolonged neck pain and result in post sessions were, the Active Release Technique (ART) showed increase in each parameter of the neck joint and no notable effects were present in the conventional physical therapy management [6].

Samy S. Abu Naser. et.al. determined knowledge-based neck pain management method and an description of neck diseases were identified and described, disease causes were sketched and disease care was given at any time possible [1].

As for now there stands a paucity of studies on the upper cross syndrome. The aim of the study is to treat patients having upper cross syndrome through the Active Release Technique (ART) and prescribed conventional physiotherapy treatment and to compare their effects that can affect cervical flexibility and to improve the symptom parameters. The goal is to enhance flexibility by using the method called Active Release Technique. In many musculoskeletal conditions, manual therapy is the preferred form of treatment [8]. According to the previous studies the effects of conventional physiotherapy in management for the upper cross syndrome is proven. Heat enhances the ROM, improving effects of stretching a set of muscle groups [9]. Stretch relaxation of the musculotendinous unit is caused by ART stretching [10] also, Numerous manual therapy strategies for reducing muscle tightness [11]. Physical therapy is an essential aspect of the patient's recovery [12]. The objective of the study was to evaluate effects of Active Release Technique verses

conventional physiotherapy in management of upper cross syndrome.

## METHODOLOGY

An Interventional study was carried out on 35 subjects at Ravi Nair Physiotherapy College (RNPC), Musculoskeletal OPD, Sawangi (Meghe), Wardha, Maharashtra, India after approval from Institutional Ethics Committee of Datta Meghe Institute of Medical Sciences (DU).

The inclusion criteria included mechanical neck pain group between 18-35 years based on assessment for neck pain. The exclusion criteria included history of trauma or surgery in cervical region, traumatic pain, cervical pathologies, cervical pain with radiculopathy, subjects taking analgesics/ muscle relaxants and non-cooperative patients.

## Outcome measures

1. NDI validity, reliability is high, the NDI exhibits excellent reliability (ICC = 0.88; [0.63 to 0.95]) [13].
2. The VAS has good validity, reliability score, ICC for all paired VAS scores was 0.97 [95% CI = 0.96 to 0.98] [14].
3. Reliability score of cervical goniometer was 0.999 to 0.931 for all cervical movements ( $r=0.999-0.931$ ) [15].
4. The length of Muscle (Pectoralis Major) was calculated for the length of the pectoralis major muscle before the start of the treatment session and after the 6<sup>th</sup> treatment session.

Group A: 18 patients were treated with the active release technique and also by static stretching.

Group B: 17 patients were treated with conventional physiotherapy which will include specific prescribed exercises.

Sampling technique is purposive sampling method so 35 is selected as sample size.

## Procedure

The institutional ethics committee (IEC) clearance was obtained before the start of study. A proper consent was taken from the patients and the patients were thoroughly explained about the study. The treatment protocol was carried out with reference to a published research protocol for UCS patients [16].

The people placed under the group A were managed through active release technique and by static stretching along with hydrocollator pack. The patients coming under the group B were managed with conventional physical therapy including: the upper trapezoid stretching, levator scapulae and pectoralis major as well as rhomboid musculature strengthening, deep neck flexors, lower trapezius along with the hydrocollator pack with six to eight layers of towel over the hydrocollator pack. Active Release Technique (ART): The ART consisted of protocols on both sides for the pectorals, the levator scapulae and the upper trapezius. Treating physiotherapist examined the subjects for the musculature involved at each scheduled session. During therapy session, active release procedure was administered once to the musculature involved for 8-10 minutes [7].

Static Stretching: For levator scapulae stretch, patients were asked to sit on a chair with one hand on armrest to maintain shoulder depression, then flex and rotate their neck to the other side with the other hand on back of their head and slowly pulling it down into the armpit. They will be asked to hold stretch for 15-30 seconds, with 2-3 repetitions on each side. Stretch will be repeated for 2,3 times per session.

Participants will be requested to stand in front of doorframe with their elbows bent at 90° degrees and lean forward without taking a step forward for a pectoralis muscle stretch. The stretch is felt throughout the chest and lasts 15-30 seconds with 2-3 repetitions per session.

### Conventional physiotherapy

**Exercises:** Exercises which were used are as follows: Cervical Nod Patients were instructed to lie on floor or stand against wall, pretending to touch the back of their neck to the wall or the floor behind them. It won't touch, but you should notice chin tuck and a lift in the crown of your head. This should make you look as if you had a double chin. To give something to press into, a rolled-up towel is placed behind the neck. 10 to 15 repetitions were recommended. Resistance Band: Make a loop of resistance band around anything that is around hip-height (a door knob works). The patient is then instructed to maintain tall posture with elbows in (not splayed open) while pulling the resistance band toward him/her with both arms, facing the doorknob or anchor point. The patient's resistance band tension is determined by the resistance band's tension. The patient were asked to squeeze the shoulder blades together, and pull the elbows back. He/she were asked to keep the chest lifted and the core engaged. 10-15 repetitions were performed

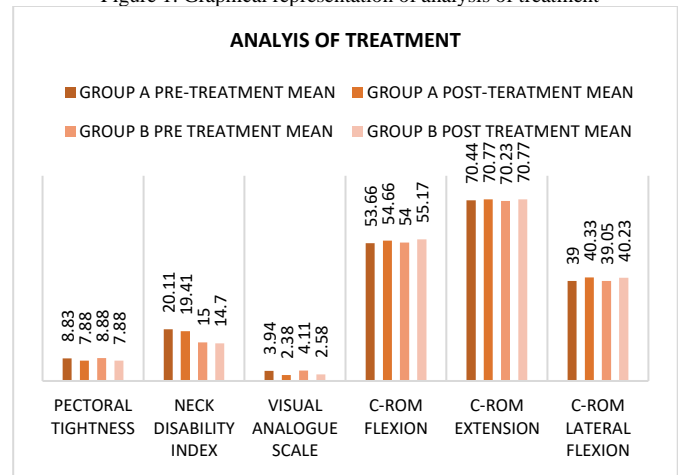
### RESULTS

Table 1. Outcome based analysis

Outcome Measure	Group A		Group B	
	Pre-Treatment Mean	Post Treatment Mean	Pre-Treatment Mean	Post-Treatment Mean
Pectoral Tightness	8.83	7.88	8.88	7.88
NDI	20.11	19.41	15	14.70
VAS	3.94	2.38	4.11	2.58
C-ROM flexion	53.66	54.66	54	55.17
C-ROM extension	70.44	70.77	70.23	70.77
C-ROM lateral flexion	39	40.33	39.05	40.33

Statistical analysis was carried out using descriptive and inferential statistics, as well as student's paired and unpaired t tests. The software utilised in study was SPSS 27.0, and the threshold of relevance was set at  $p < 0.05$ . The study was done on 35 patients which were divided into, group A and group B after the administration of treatment protocol, data collection, statistical analysis was carried out which suggests that both the treatment protocol were beneficial for the UCS patients but ART yields greater reduction in pain than conventional physiotherapy.

Figure 1. Graphical representation of analysis of treatment



### DISCUSSION

This study suggests that among the comparison between ART and conventional physiotherapy in the patients with upper cross syndrome where the patients were divided into two groups and found that both the treatment protocols were effective for the management of the UCS but the patients receiving the ART were found to have slight better improvement in neck ROM and reduced VAS scores however the pectoralis major muscle tightness was found to be reduced more among patients receiving conventional physiotherapy. For the same NDI, VAS, pectoralis major muscle tightness and neck ROM was used as outcome measures. The result of study done highlighted the effect of ART in comparison to the conventional physiotherapy. The results of a prior study demonstrated that group given ART improved their anterior head carriage compared to the group given recommended activities [7].

Also, a study found that administration ART among the patients of UCS can be effective for the neck pain and movement [6]. Pooja Dhage et.al. in their study showed that in their sample group prevalence of UCS was 30.43% and showed high prevalence of UCS in physiotherapy college students where the probable cause for the high prevalence was poor posture habits [17]. Also, Hasan Daneshmandi et.al. found in his study that high incidence of upper body abnormalities was found among the bodybuilders. According to this study Iqra Mubeen et.al. studied about prevalence of UCS among the medical students of the university of Lahore, where they found the correlation of bad posture was seen with the upper crossed syndrome as bad posture was leading to muscular imbalances and the prevalence was 37.1% [18].

Another study done Sajjad Ali et.al. in which comparison of effect of stretching exercises with the use of muscle energy technique (MET) in the management of the UCS, this study supports that stretching exercises leads to the increased neck ROM. Also, they concluded the use of MET yields better effect in comparison to stretching exercises [2].

Neck disability index was used for the study among the UCS

patients as an outcome measure in study conducted by Joy C. MacDermid et.al. on measurement properties of the neck disability index and determined that NDI currently has required support and usefulness as a self-report measure for the neck pain [19].

Static stretching is a key tool in increasing the range of motion. A study done by Park et.al shows long term effects of diagonal active stretching versus static stretching for cervical neuromuscular dysfunction, disability and pain where a eight week follow up was taken and it shows that both the stretching techniques were effective in reducing the neck disability as well as to increase the cervical ROM, similarly in this study increase in the cervical ROM post treatment session among group A and B patients was seen, managed with static stretching and ART.

### CONCLUSION

Study concluded that administering ART among the UCS patients has shown positive trends and is beneficial for patients as compared to the conventional physiotherapy along with the same timeline for the treatment protocol with respect to the pain reduction.

### LIMITATION

With addition of the covid-19 pandemic the study was conducted on a small population and therefore, this suggests that the same study needs to be conducted over a large population to check for the effectiveness of ART.

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