

EFFECT OF CERVICOTHORACIC TAPING ALONG WITH STRETCHING STRENGTHENING EXERCISE PROGRAM FOR UPPER CROSS SYNDROME

**A Dissertation Submitted to
Department of Physiotherapy
In Partial Fulfilment of the Requirements for the
Award of the Degree of
Master of Physiotherapy in Orthopaedics
(Registration no. 11300948)**

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CERTIFICATE

This is to certify that **Ms. Hardeep obero**i, **Registration No: 11300948** has Partially completed MPT PTY-608 Dissertation- I titled **“EFFECT OF CERVICOTHORACIC TAPING ALONG WITH STRETCHING STRENGTHENING EXERCISE PROGRAM FOR UPPER CROSS SYNDROME**

” under my guidance and supervision. To the best of my knowledge, the present work is the result of her original investigation and study. No part of the dissertation has been submitted for any other degree or diploma.

The dissertation is fit for the submission and the partial fulfilment of the conditions for the award of **Master of Physiotherapy (Orthopaedics)**.

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DECLARATION

I hereby declare that the dissertation entitled, “**EFFECT OF CERVICOTHORACIC TAPING ALONG WITH STRETCHING STRENGTHENING EXERCISE PROGRAM FOR UPPER CROSS SYNDROME**”

submitted for the MPT degree is entirely my original work and all ideas and references have been duly acknowledged. It does not contain any work for the award of any other degree or diploma.

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ACKNOWLEDGEMENT

First I would like to thank almighty God and Parents for giving me the courage to complete my dissertation work. I express my heartfelt thanks to **Mr. Ashok Mittal**, Honorable Chancellor, **Mrs. Rashmi Mittal**, Worthy Pro Chancellor, **Dr. Ramesh Kanwar** Worthy Vice Chancellor, **Dr. Monica Gulati**, Senior Dean, LSAMS, for providing all the facilities to carry out the project work.

I express my whole hearted thanks to **Dr. Jasobanta Sethi**, Professor and head of the Department, Department of Physiotherapy, Lovely Professional University, Phagwara, Punjab, for giving me the opportunity to work on this project.

With extreme gratitude, I wish to express my acknowledgement to my supervisor, **Dr. Harpreet kaur (PT)**, Assistant professor, Department of Physiotherapy, Lovely Professional University, Phagwara, Punjab, for his invaluable guidance and tremendous efforts in carrying out this project from its inception to completion.

I would like to give my cordial thank to all of my faculty members, **Dr. Ajay P Gautam (PT)** MPT-Cardiopulmonary, Ph.D, **Dr. S Micheal Raj (PT)** MPT-Neurology, **Dr. Sridhar (PT)** MPT-Neurology, **Dr. Harpreet Kaur (PT)** MPT-Orthopaedics, **Dr. Rati (PT)** MPT-Orthopaedics, **Dr. Manpreet Kaur (PT)** MPT-Sports, **Dr. Himani (PT)** MPT-Neurology, **Dr. Gayathri (PT)** MPT-Orthopaedics, **Dr. Ruchika Shardha (PT)**, **Dr. Biswajit kanungo (PT)** MPT-Orthopedics.

I wish to express my thanks to all subjects who volunteered to participate in the study. Last but not the least I would like to thank all my friends who helped me in my thesis.

Hardeep Oberoi

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1.1 INTRODUCTION

Upper cross syndrome is described as upper trapezius tightness, pectoralis major tightness, and tightness of levator scapulae and weakness of the rhomboids, serratus anterior, middle and lower trapezius, and the deep neck flexors, mainly the scalene muscles¹. Upper cross syndrome can cause many disorders in the body which includes headaches, degeneration of the cervical spine in early stages and the cervical curvature is also lost. In addition, Upper cross syndrome can cause kyphosis of thoracic spine and alteration in biomechanics of the shoulder complex especially the glenohumeral joint. The deviation in cervical spine morphology is associated with the loss of curvature of cervical spine and when this problem is not treated timely, degenerative changes of the cervical spine may occur. The imbalances in the musculature functions, in people with Upper cross syndrome, often cause these people to develop headaches which can be migraine headaches and chronic headaches.²

Posture is described as the proper arrangement of the parts of the body. Optimal posture is the state in which muscles and skeletal structures are balanced that protects the supporting structures of the body against injury or development of deformity. Forward shoulder posture or rounded shoulders is one of the many deviations from the normal posture of the spine. Forward shoulder posture is the abduction and elevation of the scapula and the shoulders positioned forward. In addition to abducted scapula, Forward Shoulder Posture also include winging of the scapula and humerus medial rotation. The cause of Forward shoulder posture has been due to various factors. Posture and alignment of segments of body are affected by shortening and weakness of muscles. Forward Shoulder Posture is the result of the shoulders being pulled anteriorly by tight anterior shoulder girdle muscles, such as the pectoralis major and pectoralis minor, serratus anterior and upper trapezius muscles. Forward Shoulder Posture may be caused by lengthening and weakness of the muscles that acts to pull the scapula toward the spine posteriorly, such as rhomboids, middle trapezius and lower trapezius muscles. Forward Shoulder Posture can be caused due to the presence of habitual and excessive flexion of the back, which will lead to the shortening of pectoral muscles and align the shoulders in this forward position. Muscle length changes in Forward Shoulder Posture may lead to abnormal scapulohumeral rhythm, rotator cuff tendons impingement, degenerative changes in acromioclavicular joint, bicipital tendonitis and trigger points formation³.

Optimum Posture is an outcome of many biomechanical constituents and processes which are in the body and these are joint osteokinematics and arthrokinematics, muscle balance, functioning of nervous system, and the righting reflex. As the age progresses, Upper cross syndrome can have an impact on a person's ability to compensate for aberrant systems which are functioning inside the person's body. This degradation in muscular compensation and the increasing symptoms in time can cause more severe, chronic, arthritic and degenerative changes⁴.

Forward head posture is one of the most common postural abnormalities which can be seen in patients with neck problems. Patients with neck and shoulder disorders have more severely forward head posture as compared to those without such diseases, and their acromion process is protruded. The role of the longus capitis and longus colli, deep flexor muscles of the neck, is considered important in maintaining the proper posture and maintaining stability of the neck. These muscles support the weight of the head while moving the neck in different directions and provide stability during low-intensity static muscle endurance exercise. They do not participate during high-intensity exercise, for which stronger muscle contractions are required⁵.

The musculature which are overused while attaining a posture for a long period of time in a certain position will tend to become short and tight due to overuse, this effect known as adaptive shortening. The antagonist muscles to this posture sustained in a stretched position during prolonged postures tend to become weak, long and lengthen. This effect known as stretch weakness⁴. As the age progresses, our posture tends to deviate from its normal alignment and certain changes can be seen such as rounded shoulders, head and neck protracted in a forward direction and the thoracic spine shows a kyphotic posture and becomes more curved than usual. If left untreated, poor and deviated alignment of the body and bad posture can put abnormal stresses on the tissues, which leads to early arthritic and degenerative changes in the joint and it can also cause pain. Altered posture has also been related to poor neuromuscular balance, and it can alter the gait pattern and functional abilities of the person. In previous studies it has been proposed that bad and altered posture the number of deaths per year has also increased.

The sitting posture on a chair produces more tightening and shortening of the muscles and soft tissues on the anterior part of the body and stretches and weakens the muscles of the posterior part of the body because it is a flexor dominated posture. Due to these imbalances

in the musculature that tend to develop in our musculoskeletal system, postural deviations and alterations takes place that tend to relate with the muscle imbalances inside the body. Around the world there are many professions in which people use to attain flexor dominated posture, people in their jobs attain a unhealthy and lazy lifestyle due to their job associated tasks as compared to past years. Most of the occupations require sustained posture in which there is forward arm posture use in predominant flexors synergies for e.g. physical therapist, typist and computer operators. In the coming time as our profession evolves, the use of computers and other electronic devices as well as automated devices will require employees into a seated posture i.e flexor dominated posture. In relation to pain, overuse of the muscles, dysfunction inside the joints or proprioceptive changes muscles shows changes in reaction either by becoming shortened, tight or weak and lengthened. These changes inside the body don't appear suddenly and randomly, but they occur in a predictable pattern. The muscles controlling posture tend to become short and tight and the phasic musculature shows more pronounced lengthening and weakness. In accordance with this, once musculature dysfunction begins, typical patterns of imbalances of the muscles and postural deviations and alterations ensue⁶.

In previous studies it has been shown that this postural alterations and deviations may develop due to multiple number of factors including occupation and habits of sitting, proprioceptive inputs and even psychological factors like low confidence and self esteem or depression can also lead to poor posture. The effects of the bad and altered posture assumed by the person when working at computer terminals are most pronouncedly seen in the regions of neck and shoulder which results in increased flexion of the cervical spine and forward head posture and increased static muscle tension in these regions⁷. The changes which are seen in posture of Upper cross syndrome starts from early stages of life from imbalances of muscles on the dorsal side and ventral side i.e flexors and extensors. The habitual neuromuscular strategy produces the changes and dysfunctions inside the joint as the time progresses, which in turn alters and perpetuates the neuromuscular patterns strategy⁹. Alteration of this muscular imbalance occurs through prolonged periods of attaining a posture in the classroom, work place and also attaining a prolonged and sustained posture for other activities like cooking. Children are not as proactive today and the rate of the Upper cross syndrome is on the rise. This deviated posture and sedentary lifestyle continues, where it progresses more as the age progresses in adulthood⁶.

Researchers have suggested that shortening of the pectoralis minor, a decrease in activity of the serratus anterior muscle and an increase of activity of the upper trapezius muscle may affect scapular position- ing in terms of winging, anteriorly tilting and a reduced scapular upward rotation. It has also been shown that subjects with short pectoralis minor muscle length demonstrate similar scapular kinematics as subjects with shoulder impin- gement syndrome. Likewise, muscle imbalance results in an abnormal force contribution around the shoulder, which could lead to pain and pathology .It is noted clinically that patients presenting with upper extremity dysfunction, frequently demon- strate poor scapular control²⁶

Neck pain is common source of disability.Little is known about its incidence and course.A population based study was conducted on 1100 randomly selected saskatchewan adults to determine annual incidence of neck pain and describe its course.The results revealed that the age and gender standardized annual incidence of neck pain is 14.6%. Each year 6% of population develops neck pain. The annual rate of resolution of neck pain is 36.6% and another 32.7% report improvement. Out of these subjects with prevelant neck pain at base line, 37.35% report a recurrent episode. The incidences rate of women is more as compared to male population. Incidence ratio in women is 1.19%. Women are less likely to experience resolution also. Mechanical neck pain has a life time prevelance of 45-54% in the general population up to 30% men and 50% women experiences neck pain in the course of life time. The point prevelance of neck pain has been estimated to be between 13.4 and 22.2% further 14% patient are at risk of the neck pain and become chronic which makes neck too expensive in terms of ansenteeism from work and in healthcare costs. Women report more neck pain than men. For one year prevalence scandinavian countries report more pain than rest of european and asian countries. Prevalence estimates are affected by age, quality, sample size, responses rate and different anatomical definition of neck pain⁸.

Kinesio tape is the latest therapeutic tape which has the property to treat various musculoskeletal problems .It stabilises the affected part after the exercise treatment has been done to optimise the effect of the treatment and is based on natural healing mechanism. Kenzo Kase is the inventor of Kinesio tape and he suggested that the kinesio tape can alter the muscle function by providing it stability in the proper form, it can improve blood and lymph circulation inside the body and removing waste metabolites from the body. It can decrease the pain through suppression of neurological pathway of pain gate theory. It also helps in proper functioning of muscle and fascia and can also align the bones properly which are deformed due to postural faults.

Taping is believed to affect the resting position of the scapula and assist in maintaining the proximal shoulder girdle stability necessary to perform elevation of the arm. With the tape holding the scapula in a more proper alignment, the patient can then use the shoulder without further reduction of the space between the acromion and humeral head. Additionally, the tape provides a feedback mechanism allowing the patient to feel normal alignment and positioning of the shoulder complex. The two most frequently proposed mechanisms of taping are proprioceptive and mechanical. The benefits of taping are still under contention. However, it is still widely accepted in clinical practice that taping is a useful treatment modality¹⁶. The clinical application of scapular taping has been supported in one case report¹⁷, one crossover study¹⁸ done with a wash-out period of one hour, one double blinded randomised controlled trial, and a recent pilot randomised control trial in which taping was one component of treatment provided to patient with shoulder pain. Over the past decade, taping has been proven to be an effective adjunct in reducing pain, improving proprioception and muscle recruitment pattern, and assist in motor control and function in special populations such as swimmers and violinists with forward shoulder posture. Although taping is used for the correction of postural abnormalities and many studies are available regarding beneficial effects of taping in symptomatic and specific group of population, nevertheless, there is lack of evidence for its use in clinical practice for upper quarter postural correction in healthy subjects who are at risk of musculoskeletal disorders due to altered posture. Box taping is one of the scapular taping techniques explained to correct the scapular position⁹.

1.2 NEED FOR STUDY

- i) There are many researches done on taping in adjunct with other exercise program but there is no study on box taping in upper crossed syndrome. This study can be useful to check the effects of box taping for scapula along with neck taping in upper crossed syndrome.
- ii) To find out the better options in place of traditional intervention techniques in the treatment of upper cross syndrome.

1.3 OBJECTIVE OF STUDY

The objective of this study is to provide the estimates of box taping and neck taping in combination with stretching-strengthening program for upper crossed syndrome

1.4 SIGNIFICANCE OF STUDY

The significance of this study is that if this proved significant then the prognosis time of the UCS treatment will be reduced and this protocol will be used in clinical practice in treatment of UCS.

1.5 HYPOTHESIS

Null hypothesis

There is no significant effect of box taping and neck taping in adjunct with stretching-strengthening program in UCS

Alternate hypothesis

There is significant effect of box taping and neck taping in adjunct with stretching-strengthening program in UCS

1.6 OPERATIONAL DEFINITIONS

UPPER CROSS SYNDROME (UCS)

In UCS, tightness of the upper trapezius and levator scapulae on the dorsal side crosses with tightness of cervical flexors ventrally crosses with weakness of the middle and lower trapezius. It is referred to as proximal or shoulder girdle crossed syndrome.

BOX TAPING

Box taping is one of the scapular taping techniques explained to correct the scapular position.

NORMALISED SCAPULAR ABDUCTION RATIO

Normalised scapular abduction ratio is considered as one of the reliable measures for scapular position and can be used to discriminate between normal and abnormal scapular muscles.

KINESIO TAPE

One such elastic tape is called kinesio tape, long used for rehabilitation and during athletic competition in countries such as japan

2 REVIEW OF LITERATURE

Neha Dewan et al (2014) in a study investigated the effects of box taping as an adjunct to stretching-strengthening exercise program in correction of scapular alignment in 60 subjects with forward shoulder posture: A randomised trial and she concluded that supervised stretching-strengthening program with or without box taping resulted in improvement in posture in healthy forward shoulder posture population. There was no significant additive effects of box taping⁹.

Dierking N et al conducted a study on the effect of spider tech technique on upper cross syndrome. The result of the study shows that the intervention of spider tech kinesiology tape did not show significant result between the two groups.¹⁰

Thacker D et al(2011) A research has been done on the management of upper cross syndrome through the use of the active release of technique and prescribed exercise. Result of the studies show that experimental group showed improvement in anterior head carriage versus the control group. These findings however were limited and arguably not clinically significant in comparison and they conclude that this study warrants repeating with the addition of variables prior to making any definitive decisions whether the use of ART is the advantageous in the treatment of UCS.⁶

Moore, Michele k (2004) conducted a study to discuss the upper crossed syndrome and cervicogenic headache and he concluded that principles of UCS and the use of exercise and myofascial release in the treatment of cervicogenic headache are discussed. A review of the literature indicates that analyzing muscle imbalance as well as vertebral subluxation may increase the effectiveness of chiropractic treatment for cervicogenic headaches¹¹.

Iqbal amir,Khan shorab (2010) They did a study on the combination of ischaemic technique with strain-counterstrain has been shown to produce greater improvement pain pressure threshold meter, function status of neck disability index reduction in pain intensity on visual analog scale even after one week of termination of intervention. This show the long term effectiveness of combination of two manual techniques.This study may provide a rational for the clinical use of the two manual techniques on deactivating the myofascial trigger points.¹²

Gerr, F. Marcus, M & Monteilh, C. (2004) studied the association between musculoskeletal outcomes and computer user posture and keyboard use intensity (hours of computer use per day or per week) in this study. By lowering the height of the keyboard to or below the height of the elbow and using arm rests reduces the risks of neck and shoulder musculoskeletal disorders. It was also shown the daily or weekly hours of computer use was more consistently associated with hand and arm musculoskeletal disorders than the neck and shoulder musculoskeletal disorders.¹³

Brink, Y et al(2009) performed a prospective observational study to determine whether sitting postural alignment and psychosocial factors contribute to the development of upper quadrant musculoskeletal pain in grade 10 high school students working on desktop computers. The sitting postural alignment , depression, anxiety and computer use of 104 asymptomatic students were measured at baseline. At three and six months post baseline, the prevalence of the upper quadrant musculoskeletal pain was determined. Twenty –seven students developed Upper quadrant musculoskeletal pain due to seated or computer –related activities. An extreme cervical and a combination of extreme cervical and thoracic angles were significant postural risk factors for the development of the upper quadrant musculoskeletal pain. Boys with any extreme angle were more likely to suffer pain compared with boys with all middle range angles. No similar effect was found for girls. There was no strong relationship between depression , anxiety, computer exposure and upper quadrant musculoskeletal pain among south african high school students¹⁴.

Albert et al(2006) ,studied the immediate effects of the strain counter strain technique in the local pain evoked by tender points in upper trapezius muscle. the aim of the study was to compare the immediate effect on pain pressure threshold , following a single treatment of tender points in upper trapezius muscle involving a classical strain counter strain and a modified application of strain counter strain. the results suggested that strain counter strain are effective in reducing tenderness of tender point in upper trapezius muscle.¹⁵

Chung kao chi (2002) et al studied the immediate effect of various physiotherapeutic modalities on myofascial trigger points associated with upper trapezius muscle on 119 patients. They concluded that ischaemic compression therapy , spray and release along with hot packs and active exercises can be used to treat myofascial trigger points.¹⁶

Taimela et al(2002) compared the efficacy of multimodal treatment emphasizing proprioceptive training (active) with activated home exercises (control) in patients suffering

with non specific chronic neck pain. The results showed that average self experienced total benefit was highest in the active and home exercise group rated over control group.¹⁷

Steiner et al(2000) studied the effect of moist heat on patients suffering from trapezius myalgia .Subjects were divided into two groups. First group received treatment in the form of moist heat and ibuprofen . second group received unheated wrap and ibuprofen only. There was significantly more pain relief and less muscle tension for the heat and ibuprofen group as compared to unheated and ibuprofen group.¹⁸

Linen et al evaluated the effect of intensive neck isometric strength training and lighter endurance training of neck muscles on pain and disability in women with chronic non specific neck pain. They concluded that both strength and endurance training for 12 months are effective methods for decreasing pain and disability in women with chronic non specific neck pain.¹⁹

Won-gyu-yoo, chung –hwi-yi (2007) This study examined the effect of a ball-backrest chair on the weakness and tightness of muscles associated with UCS when working at visual display terminal(VDT).The surface electromyography(EMG) was recorded from the serratus anterior,middle trapezius and upper trapezius muscles of 20 adult as they performed VDT work,which are known as the weakened and tightened muscles of UCS.The recorded signals were averaged and normalized to the mean amplitude of the EMG signals obtained during submaximal reference voluntary contractions.The significances of differences between the use of general-purpose backrest and a ball backrest was tested by paired t-test,with the significance cutoff set at $\alpha=0.05$.The activities of the serratus anterior and middle trapezius muscles increased and that of the upper trapezius muscle decreased when sitting in a ball-backrest chair with a general proposed back-rest($p<0.05$).These results indicate that the use of ball-backrest chair reduces the risk of patients with UCS developing muscles soreness or injury related to overuse when working at VDT⁷.

M.J Smith and V.Sparks (2006) performed a study on The immediate effect of scapular taping on surface electromyographic activity of the scapular rotators in swimmers with subacromial impingement symptoms . Twenty swimmers who demonstrated subacromial impingement symptoms on clinical testing were recruited. The objective was to use surface electromyography to measure any immediate change in the muscle activity of the scapular rotators (upper fibres of trapezius , lower fibres of trapezius and serratus anterior) following the application of a commonly used scapular taping technique (McConnell, 1999) during

repeated humeral elevation in the scapular plane. He concluded that there was a highly statistically significant reduction in the EMG activity of the Upper trapezius fibres as a consequence of the taping. However there was no statistically significant change in the EMG activity of the Lower trapezius fibres²⁰.

Reem S Dawood et al (2013) carried out a study to check the Effectiveness of Kinesio Taping versus Cervical Traction on Mechanical Neck Dysfunction. Participants were assigned randomly into three groups; group (A) received Kinesio taping every 4 days for 8 sessions with exercises program, group (B) received cervical traction posture pump with exercises program 3 days/week for 12 sessions, and control group (C) received exercises program only inform of stretching, postural and isometric exercises for neck and shoulder joint 3 days/week for 12 sessions. He concluded that the combined therapy of kinesio taping or cervical traction posture pump with exercise program are effective in improving the absolute rotatory angle, pain intensity and function neck disability in mechanical neck dysfunction more than exercise alone²¹.

Manuel Saavedra-Hernandez, Adelaida M. Castro-Sanchez (2012) did a study to check Short-Term Effects of Kinesio Taping Versus Cervical Thrust Manipulation in Patients With Mechanical Neck Pain. Eighty patients (36 women) were randomly assigned to two groups the manipulation group, which received 2 cervical thrust manipulations, and the tape group, which received Kinesio Taping applied to the neck. Neck pain (11-point numeric pain rating scale), disability (Neck Disability Index), and cervical-range-of- motion data were collected at baseline and 1 week after the intervention by an assessor blinded to the treatment allocation of the patients. The study concluded that Patients with mechanical neck pain who received cervical thrust manipulation or Kinesio Taping exhibited similar reductions in neck pain intensity and disability and similar changes in active cervical range of motion, except for rotation²².

Page Wornom Zanella, S Matthew Willey(2001) studied the effect of Scapular Taping on Shoulder Joint Repositioning. 36 subjects without shoulder pathology was taken and intervention was scapular taping with flexion and abduction. The study concluded that Scapular taping has no effect on joint repositioning during active shoulder flexion or abduction. Scapular winging does not affect active joint repositioning after scapular taping²³.

M.H. Alizadeh, H. Daneshmandi, B. Shademan and S. Ahmadizad(2009) studied the effects of Exercise Training on Scapula Position of Muscle Activity Measured by EMG. Twenty four male with asymptomatic protracted subjects (age 16 to 18 years) participated in the study. Subjects were assigned to control (n=12) and exercise groups (n=12) based on the distance of the inferior angle of scapula with the nearest spinous process. Lateral Scapula Slide Test (LSST) was used to measure the distance between the vertebrae and the inferior angle of scapula in the relaxed (0 degree position) standing position. The measurements were taken three times by one minute rest. The exercise group performed an exercise program for 6 weeks while the control group did not participate in any physical activity. A progressive exercise program included resistive strengthening, stretching and postural exercises that were done daily at home. It is concluded that the training program caused a significant difference on the position of the scapula in the exercise group and that the use of this exercise program in the management of scapula position may have a positive impact on individuals with protracted scapula²⁴.

Che-Hsiang Wang et al (1999) did a study to check the effects of stretching strengthening exercises on three dimensional scapular kinematics. Twenty asymptomatic subjects with forward head posture were included in this study to whom the stretching strengthening exercise protocol was given. The study concluded that the exercise program improved muscle strength, produced a more erect upper trunk posture, increased scapular stability and altered scapulohumeral rhythm²⁵.

F. Struyf, J. Nijs, J. De Graeve, S. Mottram, R. Meeusen(2010) did a case-control study to check Scapular positioning in overhead athletes with and without shoulder pain. 36 shoulder pain athletes (19 men, 17 women), were compared with 36 unimpaired athletes free of shoulder pain, matched for gender, age, hand dominance and body mass index. The blinded assessor performed visual observation, the measurement of the distance between the acromion and the table, inclinometry and the kinetic medial rotation test for dynamic scapular control in random order. Athletes with shoulder pain demonstrate scapular asymmetry in the sagittal plane, observed visually as anterior tilting on the painful side. Athletes with shoulder pain show a lack of scapular motor control on their painful side in contrast to their painfree side. No scapular positioning or motor control differences were found in athletes with or without shoulder pain²⁶.

Peter Miller et al did a study to check whether Scapula Taping Facilitate Recovery for Shoulder Impingement Symptoms. Twenty-two subjects with unilateral shoulder impingement symptoms were randomized into a taping with routine physiotherapy or a routine physiotherapy only group. The intervention group had scapula taping applied three times per week for the first two weeks of their treatment. All subjects were assessed at baseline, then at 2 and 6 weeks after the commencement of treatment. Pain and functional ability were assessed using the Shoulder Pain and Disability Index, range of shoulder elevation, and self-reported pain on elevation. At 2 weeks, the taping group demonstrated a strong effect toward reduced pain both on self-reported activity (SPADI pain subscale mean for taping 27.0 versus 41.5 for control) and pain during measured abduction (mean VAS 22.8 for taped, 46.8 for control). This study provides evidence for a short-term role for scapula taping as an adjunct to routine physiotherapy in the management of shoulder impingement symptoms²⁷.

David M. Selkowitz et al (2007) conducted a study to investigate the immediate effects of scapular taping on surface electromyographic (EMG) signal amplitude of shoulder girdle muscles during upper extremity elevation in individuals with suspected shoulder impingement syndrome. The conclusion was made that Scapular taping decreased upper trapezius and increased lower trapezius activity in people with suspected shoulder impingement during a functional overhead-reaching task, and decreased upper trapezius activity during shoulder abduction in the scapular plane²⁸.

3.1 STUDY DESIGN

The research design of present study is experimental design .

3.2 STUDY SETTING

Data for the study will be obtained from in and around Lovely Professional University.

3.3 POPULATION AND SAMPLING

The subjects who are diagnosed with upper crossed syndrome who will report in outpatient department (OPD), Department of physiotherapy, Lovely Professional University, Punjab.

Sampling method- Random sampling.

Sample size- The size of the sample is 60.

3.4 SELECTION CRITERIA

3.4.1 INCLUSION CRITERIA:

- Upper crossed syndrome:

-visually subjects whose ears are not in line with the shoulder tip

-medial borders of the scapula were not parallel to each other and anterior shoulder point was anterior to sternal notch /hollowing of the chest.

-Ear level were not in the same line with shoulder level in lateral view

-Tightness of upper trapezius,pectoralis muscle and levator scapula

-Weakness of cervical flexors,lower trapezius and rhomboids major and minor

-Foreward head posture

-Thoracic kyphosis

-Elevated and protracted shouders

-Abduction of scapula

- Age- 18-30

- Gender-Male and Female
- people with NSA is greater than or equal to 1.50

3.4.2 EXCLUSION CRITERIA

- Asymptomatic patients with UCS
- Any neurological deficit in upper extremity
- Any surgery of thorax and scapula
- Patients with vertebral basilar insufficiency
- Any fracture around shoulder girdle

3.5 PARAMETERS

1) Static scapular alignment

- Acromian distance
- T3 distance
- NSA Ratio

2) Dynamic scapular alignment

- Lateral scapular slide test

3.6 INSTRUMENTS AND TOOLS

- Measuring tape

A tape measure or measuring tape is a flexible form of ruler. It consist of ribbon of cloth, plastic, fiber glass, or metal strip.

- Adhesive crepe tape

3.7 PROCEDURE

Six subjects falling in inclusion criteria were recruited from lovely professional universities , khalsa college students , lawrence international school jalandhar.

The subjects will be comfortable and fully relaxed.The procedure will be administered in quite, distraction free rooms that have sufficient light and air circulation and free from noise, anything that may distract the subjects.

Informed consent will be obtained after screening for inclusion and exclusion criteria. All enrolments, data collection, and clinical treatment sessions will be conducted in the physical therapy clinics. We have taken two groups for treatment which will perform at clinic only.

Pre-treatment measurements, subjects will receive a standardized clinical examination thoroughly by full assessment. In the pre-treatment measurements we will review.

Pre-treatment the recording of the static and dynamic scapular alignment measures was performed bilaterally by us. All measurements were taken with measuring tape in centimeters.

For static scapular alignment, three tests were used as follows

(1) Acromial distance: with the participants in supine lying, the distance between the posterior border of acromion and table was measured.

(2) T3 distance: this test was performed with the participants instructed to stay relaxed. The measurement of horizontal distance from the third thoracic spinous process to the corresponding point on medial border of the scapula was measured.

(3) Normalised scapular abduction ratio (NSA ratio): NSA ratio was calculated by dividing the total scapular distance by length of scapula. Total scapular distance is the linear distance from the third thoracic vertebrae to inferior angle of acromion. Length of scapula is distance from inferior angle of acromion to root of spine of scapula. The participants will stand in relaxed position

For dynamic stabilisation: lateral scapular slide test (LSST) will be there. The participant will stand in relaxed position and measurements were taken from inferior angle of scapula to 7th thoracic spinous process with the participant arm in 3 different positions at 0 degree (arms relaxed on side), 45 degree (hands supported on hip and web space on iliac crest) and 90 degrees (with glenohumeral internal rotation) of abduction.

We took 2 groups in this study, randomly selected of 30 subjects in each group. One is control group in which only the strengthening and stretching is given and the other is experimental group in which stretching strengthening along with box taping of scapula and neck taping is given.

The exercise program used in both the groups are:

1. Passive stretching of the anterior shoulder muscles, Upper trapezius ,levator scapulae, sternocleidomastoid and pectoralis minor/major

1st 5 sessions- 5 stretches, each with 30 seconds of hold

2. Strengthening exercises for posterior scapular muscle and glenohumeral external rotators with dumbbells.

Posterior scapular muscles-Rhomboids major and minor, middle and lower trapezius

Glenohumeral external rotators-Infraspinatus and teres minor

1st 5 session-5 repetition each with 10 seconds of hold

Next 5 sessions-10 repetition, each with 10 second hold

3. Strengthening of upper back musculature

Subject was made to lie down on a pillow under the chest in prone lying and was instructed to straighten the upper back

1st 5 session-5 repetition, each with a 10 second hold

Next 10 sessions-10 repetitions, each with a hold of 10 seconds

4. Strengthening of cervical flexors

Neck isometrics

1st session- 5 repetitions ,each with 10 seconds hold

Next 10 sessions- 10 repetitions, each with 10 seconds hold.

Both the groups will receive the same exercise program but the experimental group i.e. Group A will have box taping and neck taping in addition with the exercise program. The tape will be kept by the patient for 6 hours daily.

This will be a four week intervention with 5 visits per week. The readings will be taken at the baseline while starting the intervention and after four weeks intervention period.

3.8 STATISTICAL TOOL

Mean

Standard deviation

T test

Arithmetic mean:

it gives the average value of the whole range of the data given .its value is obtained by adding together all the items and by dividing this total by the number of items ,The formulae used is ;

$$\bar{X} = \frac{\sum X}{n}$$

Where ,

—

\bar{X} = Arithmetic Mean

$\sum X$ = Sum of all the variables

n = Number of observations

Standard deviation (σ):

It measures the absolute dispersion (or variability of distribution).The greater the amount of dispersion or variability ,the greater the standard deviation for the greater will be the magnitude of the deviations of the values for their mean .It can be calculated from the formulae ;

$$S.D. = \sqrt{\frac{\sum X^2}{n}}$$

Where: $\sum X^2$ = The sum of the squares of the differences between the Mean and each score

n = The number of scores

Calculation of the standard error (SE): enables the management of magnitude of sampling error .it is calculated by the following formula;

$$SE = S.D / \sqrt{N}$$

Where ,

SD= Standard deviation

SE= Standard error

Paired t test:

Paired t –test is considered an appropriate test for judging the significance of sample mean within a group when population variance is not known .The relevant t test statistics is calculated from the data and then compared with its probable value based on the t distribution at the specified level of significance for concerning degrees of freedom for accepting or rejecting the null hypothesis (Kothari, 2007).

$$t = \frac{\bar{X}_D - \mu_0}{s_D / \sqrt{n}}$$

Unpaired t-test:

Student t test is considered an appropriate test for judging the significance of a sample mean or for judging the significance of difference between the means of two samples when population variance is not known, The relevant t test statistics is calculated from the data and then compared with its probable value based on the t –distribution at a specified level of significance for concerning degree of freedom for accepting or rejecting the null hypothesis (Kothari,2007).

$$t = \frac{\bar{X}_A - \bar{X}_B}{\sqrt{(SE_A)^2 + (SE_B)^2}}$$

- Statistics was performed by using SPSS Software version 19. Results were calculated by using .05 level of significance.

4. DATA ANALYSIS AND RESULT

DATA ANALYSIS

Data analysis was carried out after collecting the data for the six outcome measures of the patients in both the experimental group and control group. The comparison was to be done between the NSA Ratio, Acromial distance, T3 Distance, CVA, NPRS, LSST AT 0, 45 and 90 Degree of patients of the group A and NSA Ratio, Acromial distance, T3 Distance, CVA, NPRS, LSST AT 0, 45 and 90 Degree of patients of the group B. As the comparison was done within and between the two groups, the sample size was small (n=40) so paired and unpaired t-test was used .

The relevant t test statistics is calculated from the data and then compared with its probable value based on the t-distribution at a specified level of significance for concerning degrees of freedom for accepting or rejecting the null hypothesis. (Kothari 2007).

Statistics was performed by using SPSS 19.results were calculated by using 0.05 level of significance were taken

RESULTS

SPSS 21 was used for data analysis and it was explored that there was a significant difference between the values for values for Acromial distance, NSA Ratio, L.S.S.T, T3 Distance and CVA between group A and group B ($p < 0.05$) supporting in favour of our argument that patients in Group B have better statistical results when compared with the patients of Group A. Complete and detailed data analysis results will be shown further.

Comparison within the Group

Table No:4.1 Showing Comparison of Mean and SD of NSA Ratio values of group A and group B within the groups.

Paired T test	NSA RATION			
	Group A		Group B	
	Pre	Post	Pre	Post
Mean	1.59	1.51	1.59	1.45
S.D.	0.022	0.026	0.021	0.020
T Test	20.500		36.560	
P value	0.0000		0.0000	
Table Value at 0.05	2.09		2.09	
Result	Significant		Significant	

Comparison of mean and standard deviation of subjects NSA Ratio between the group A and Group B was done using paired t test. The mean and SD of NSA Ratio of Group A was 1.59 and 0.022 pre reading and 1.51 and 0.026 post reading that of Group B was 1.59 and 0.021 pre reading and 1.45 and 0.020 post reading respectively. After applying paired t-test significant difference in both the Group A and Group B was found ($p < 0.05$)

Graph 4.1 Showing Comparison of Mean and SD of NSA Ratio values of group A and group B within the groups

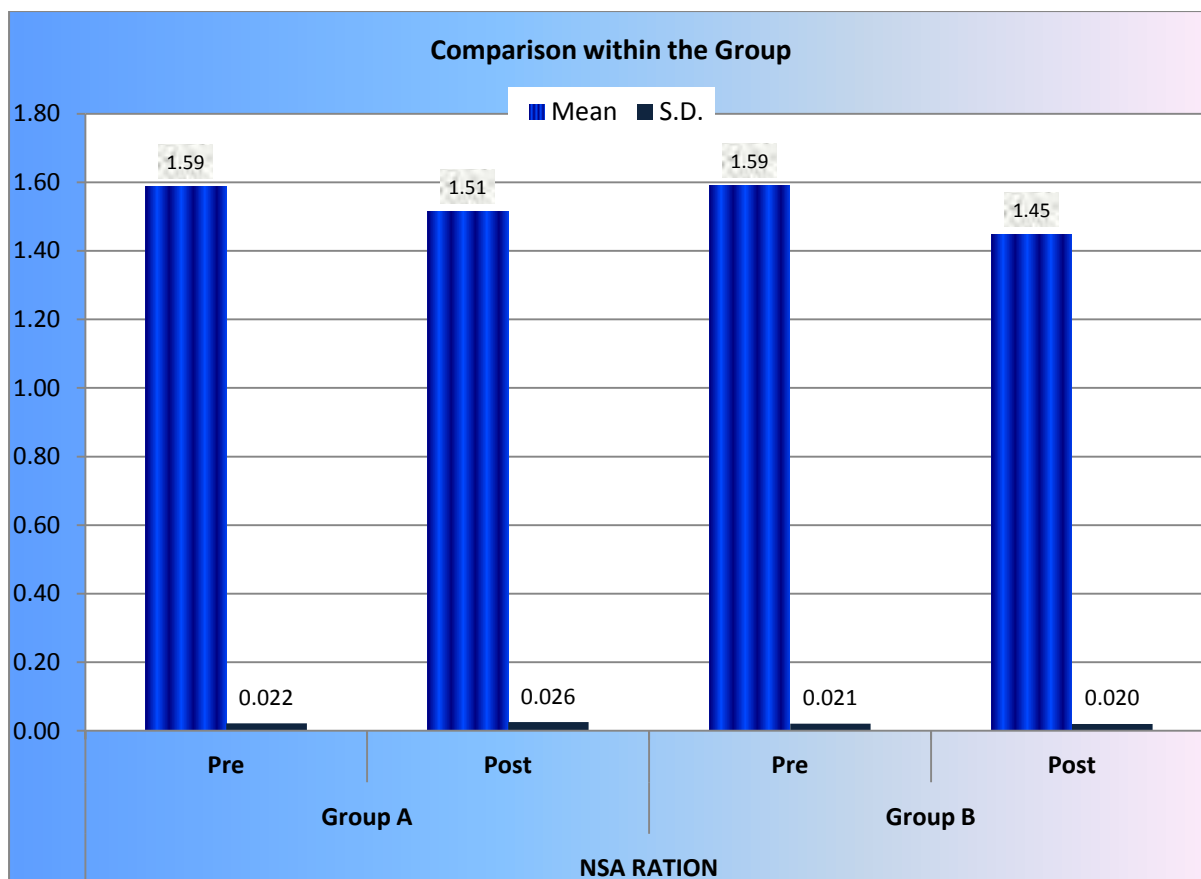


Table No: 4.2 Showing Comparison of Mean and SD of Acromial distance values of group A and group B within the groups

Paired T test	acromial dist			
	Group A		Group B	
	Pre	Post	Pre	Post
Mean	8.60	7.48	8.65	5.03
S.D.	1.210	1.272	1.470	1.219
T Test	14.050		13.620	
P value	0.0000		0.0000	
Table Value at 0.05	2.09		2.09	
Result	Significant		Significant	

Comparison of mean and standard deviation of subjects Acromial distance between the group A and Group B was done using paired t test. The mean and SD of Acromial distance of Group A was 8.60 and 1.210 pre reading and 7.48 and 1.272 post reading that of Group B was 8.65 and 1.470 pre reading and 5.03 and 1.219 post reading respectively. After applying paired t-test significant difference in both the Group A and Group B was found ($p < 0.05$)

Graph No:4.2 Showing Comparison of Mean and SD of Acromial distance values of group A and group B within the groups

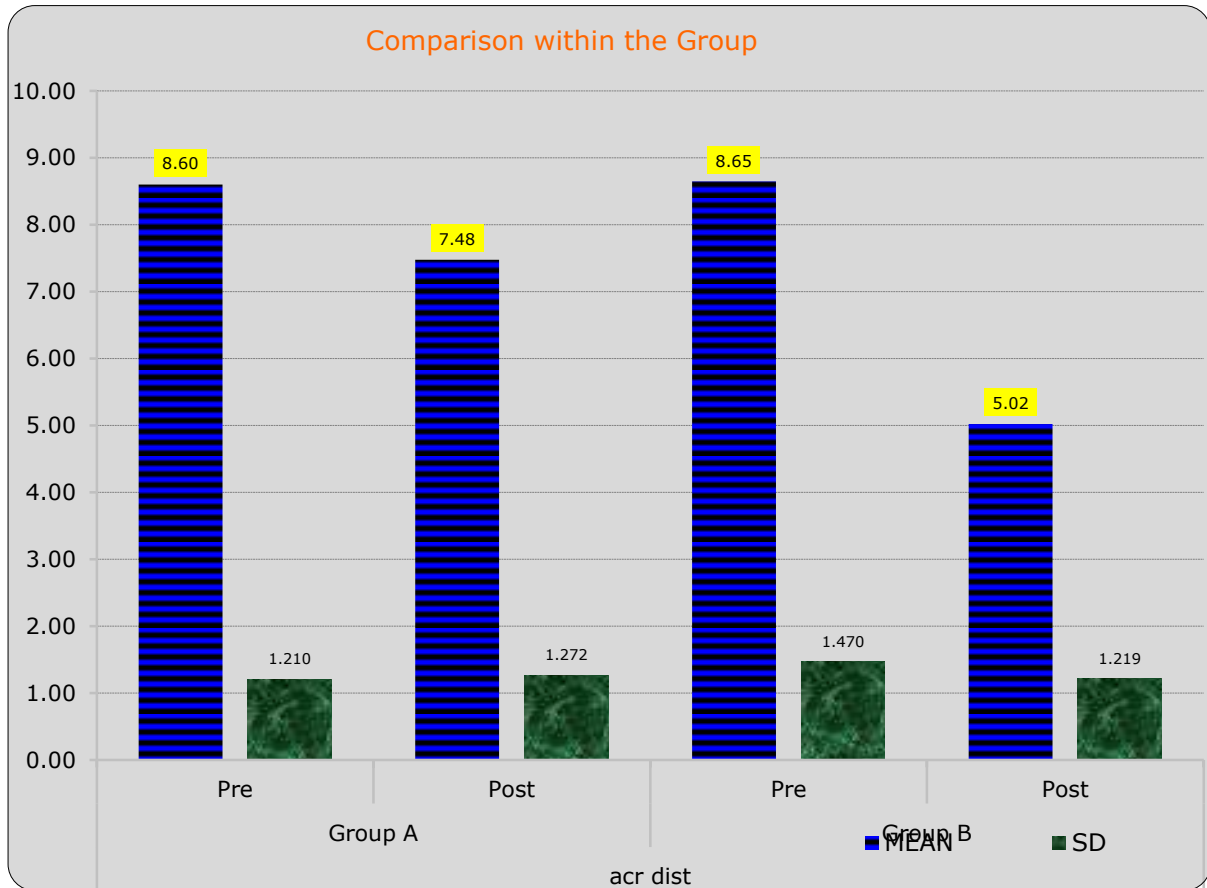


Table No: 4.3 Showing Comparison of Mean and SD of LSST 0 Degree values of group A and group B within the groups

Paired T test	lsst 0 degree			
	Group A		Group B	
	Pre	Post	Pre	Post
Mean	8.35	7.35	8.10	6.38
S.D.	1.396	1.523	1.071	0.841
T Test	13.780		13.460	
P value	0.0000		0.0000	
Table Value at 0.05	2.09		2.09	
Result	Significant		Significant	

Comparison of mean and standard deviation of subjects LSST 0 Degree between the group A and Group B was done using paired t test. The mean and SD of LSST 0 Degree of Group A was 8.35 and 1.396 pre reading and 7.35 and 1.523 post reading that of Group B was 8.10 and 1.071 pre reading and 6.38 and 0.841 post reading respectively. After applying paired t-test significant difference in both the Group A and Group B was found for LSST 0 Degree ($p < 0.05$)

Graph No: 4.3 Showing Comparison of Mean and SD of LSST 0 Degree values of group A and group B within the groups

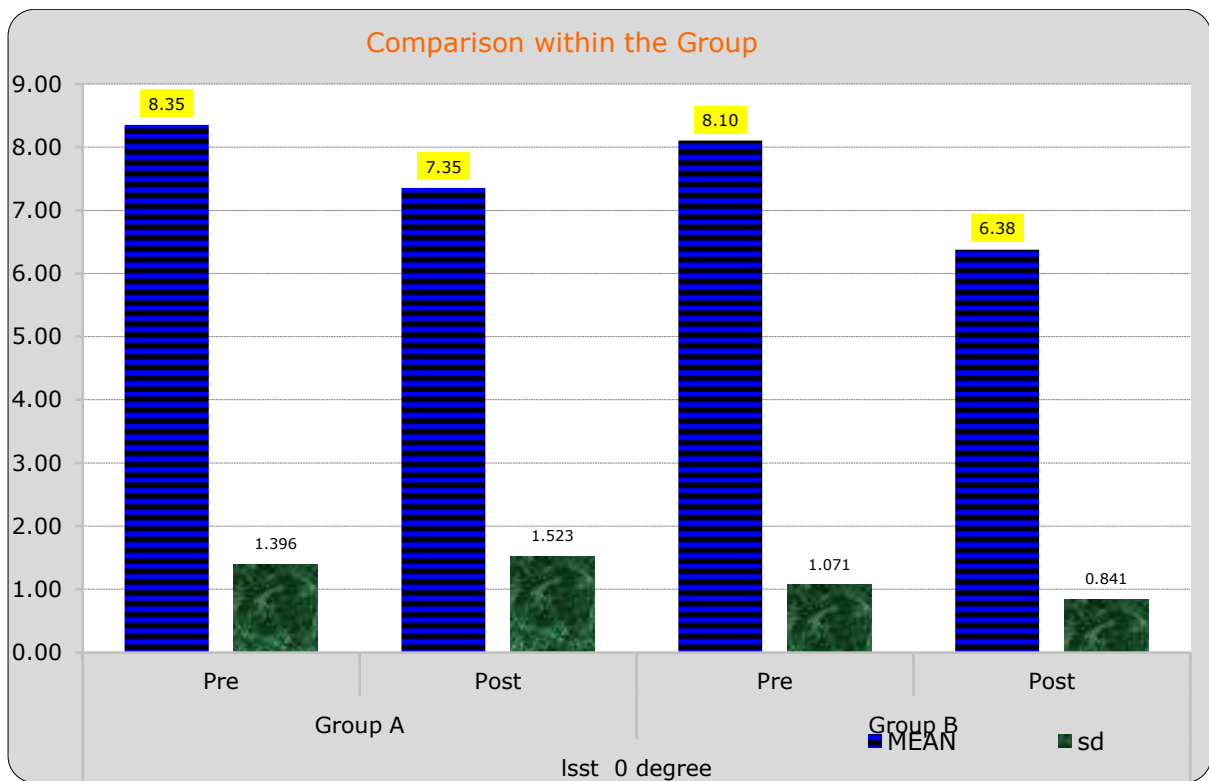


Table No : 4.4 Showing Comparison of Mean and SD of LSST 45 Degree values of group A and group B within the groups

Paired T test	Isst 45 degree			
	Group A		Group B	
	Pre	Post	Pre	Post
Mean	9.65	8.75	9.53	7.80

S.D.	1.40	1.50	1.09	1.01
T Test	13.080		13.460	
P value	0.0000		0.0000	
Table Value at 0.05	2.09		2.09	
Result	Significant		Significant	

Comparison of mean and standard deviation of subjects CVA between the group A and Group B was done using paired t test. The mean and SD of NSA Ratio of Group A was 9.65 and 1.40 pre reading and 8.75 and 1.50 post reading that of Group B was 9.53 and 1.09 pre reading and 7.80 and 1.01 post reading respectively. After applying paired t-test significant difference in both the Group A and Group B was found ($p < 0.05$)

Graph No : 4.4 Showing Comparison of Mean and SD of LSST 45 Degree values of group A and group B within the groups

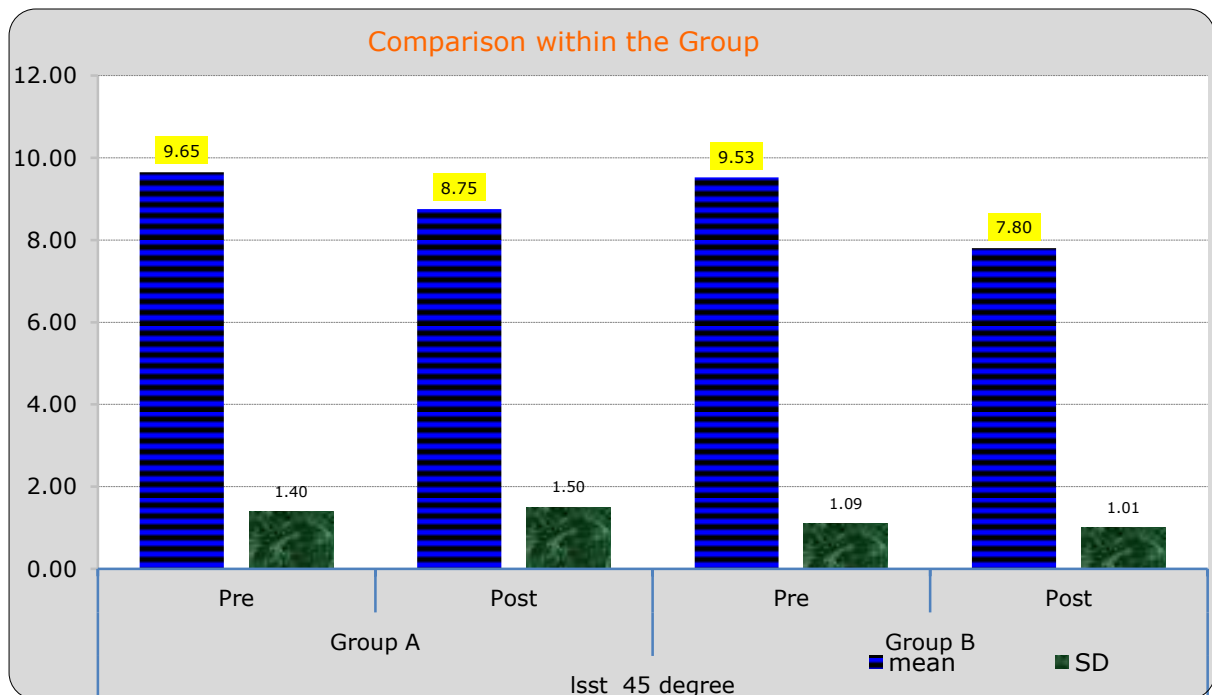


Table No : 4.5 Showing Comparison of Mean and SD of LSST 90 Degree values of group A and group B within the groups

Paired T test	lsst 90 degree			
	Group A		Group B	
	Pre	Post	Pre	Post
Mean	11.10	9.95	11.45	9.15
S.D.	1.199	1.213	0.930	0.919
T Test	9.980		16.160	
P value	0.0000		0.0000	
Table Value at 0.05	2.09		2.09	
Result	Significant		Significant	

Comparison of mean and standard deviation of subjects LSST 90 Degree between the group A and Group B was done using paired t test. The mean and SD of LSST 90 Degree of Group A was 11.10 and 1.199 pre reading and 9.95 and 1.213 post reading that of Group B was 11.45 and 0.930 pre reading and 9.15 and 0.919 post reading respectively. After applying paired t-test significant difference in both the Group A and Group B was found ($p < 0.05$)

Graph No: 4.5 Showing Comparison of Mean and SD of LSST 90 Degree values of group A and group B within the groups

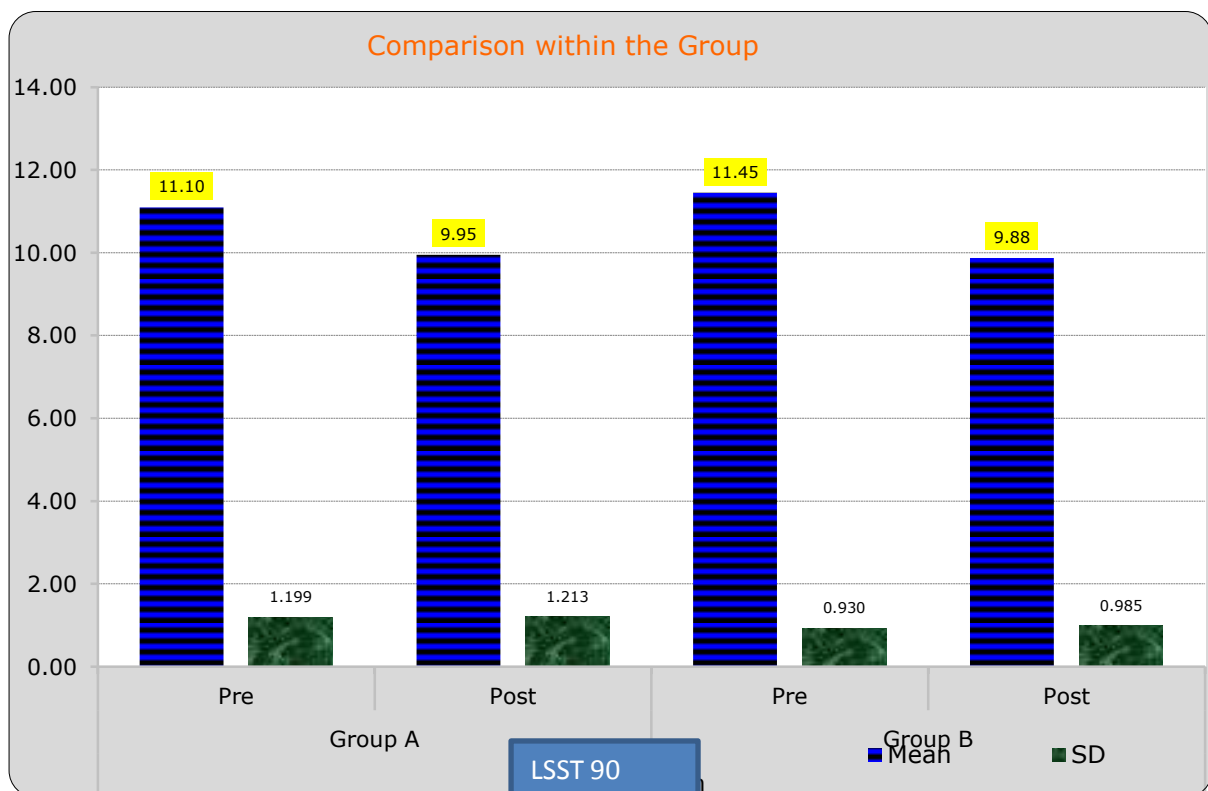


Table No: 4.6 Showing Comparison of Mean and SD of T3 Distance values of group A and group B within the groups

Paired T test	t3dist			
	Group A		Group B	
	Pre	Post	Pre	Post
Mean	8.55	7.65	8.10	5.05
S.D.	1.191	1.226	1.314	1.157
T Test	19.620		13.480	
P value	0.0000		0.0000	
Table Value at 0.05	2.09		2.09	
Result	Significant		Significant	

Comparison of mean and standard deviation of subjects T3 Distance between the group A and Group B was done using paired t test. The mean and SD of T3 Distance of Group A was 8.55 and 1.191 pre reading and 7.65 and 1.226 post reading that of Group B was 8.10 and 1.314 pre reading and 5.05 and 1.157 post reading respectively. After applying paired t-test significant difference in both the Group A and Group B was found ($p < 0.05$)

Graph No: 4.6 Showing Comparison of Mean and SD of T3 Distance values of group A and group B within the groups

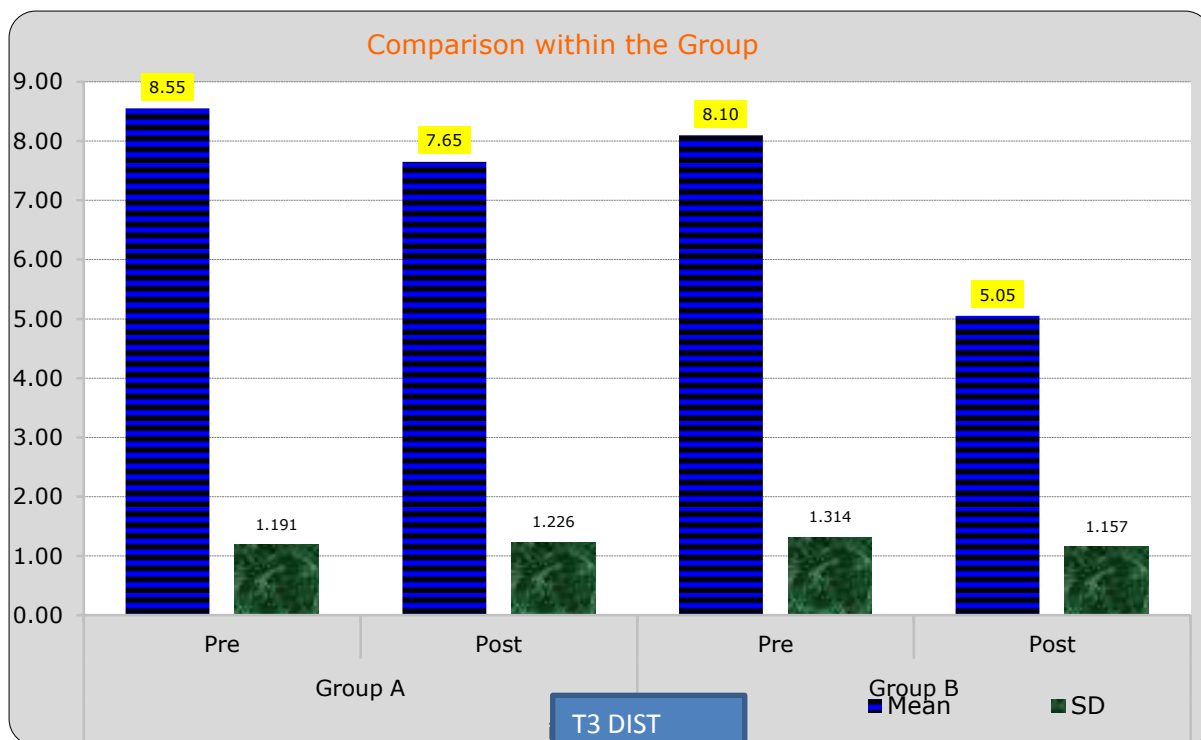


Table No : 4.7 Showing Comparison of Mean and SD of NPRS values of group A and group B within the groups

Paired T test	NPRS			
	Group A		Group B	
	Pre	Post	Pre	Post
Mean	3.95	1.50	3.95	1.50
S.D.	0.686	0.513	0.887	0.513
T Test	18.120		14.430	
P value	0.0000		0.0000	
Table Value at 0.05	2.09		2.09	
Result	Significant		Significant	

Comparison of mean and standard deviation of subjects CVA between the group A and Group B was done using paired t test. The mean and SD of NSA Ratio of Group A was 3.95 and 0.686 pre reading and 1.50 and 0.513 post reading that of Group B was 3.95 and 0.887 pre reading and 1.50 and 0.513 post reading respectively. After applying paired t-test significant difference in both the Group A and Group B was found ($p < 0.05$)

Graph No : 4.7 Showing Comparison of Mean and SD of NPRS values of group A and group B within the groups

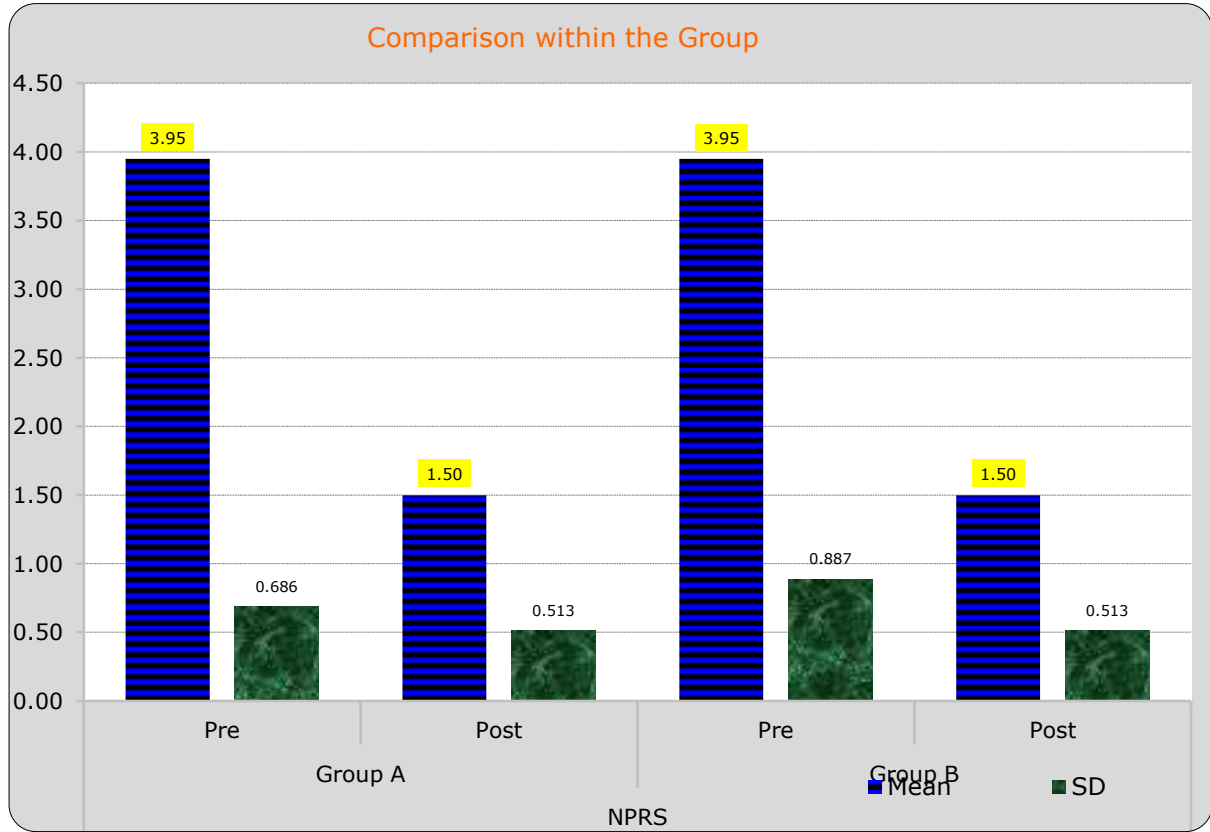
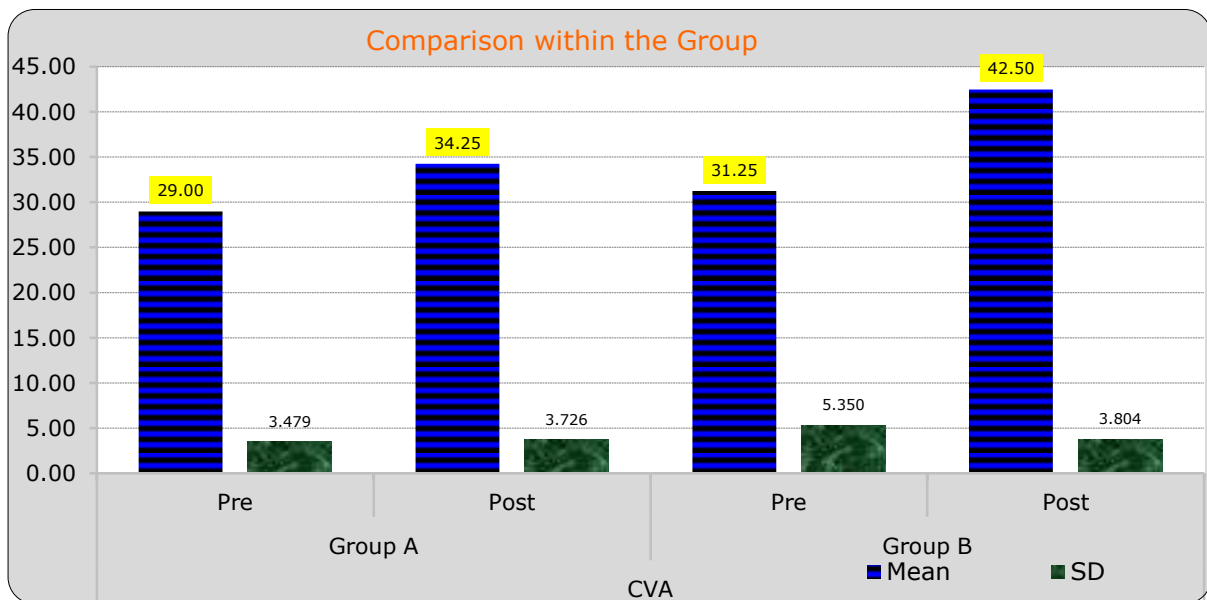


Table No: 4.8 Showing Comparison of Mean and SD of CVA values of group A and group B within the groups.

Paired T test	CVA			
	Group A		Group B	
	Pre	Post	Pre	Post
Mean	29.00	34.25	31.25	42.50
S.D.	3.479	3.726	5.350	3.804
T Test	7.760		15.760	
P value	0.0000		0.0000	
Table Value at 0.05	2.09		2.09	
Result	Significant		Significant	

Comparison of mean and standard deviation of subjects CVA between the group A and Group B was done using paired t test. The mean and SD OF CVA of Group A was 29.00 and 3.479 pre reading and 34.25 and 3.726 post reading that of Group B was 31.25 and 5.350 pre reading and 42.50 and 3.804 post reading respectively. After applying paired t-test significant difference in both the Group A and Group B was found ($p < 0.05$)

Graph No: 4.8 Showing Comparison of Mean and SD of CVA values of group A and group B within the groups



Comparison Between the Groups

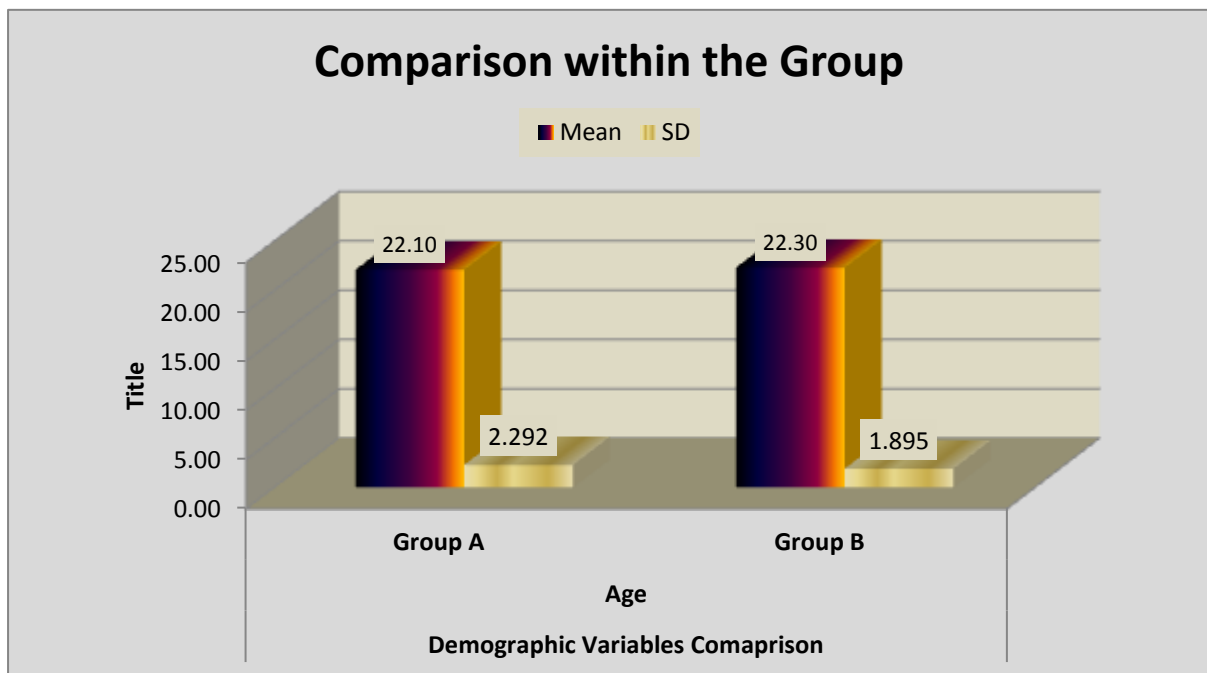
Table No: 4.9 Showing Comparison of Mean and SD of Age of group A and group B between the groups

Unpaired T Test	Demographic	
	Age	
	Group A	Group B
Mean	22.10	22.30

S.D.	2.292	1.895
Mean Difference	0.200	
T Test	0.300	
P value	0.7652	
Table Value at 0.05	2.02	
Result	Not-Significant	

Comparison of mean and standard deviation of subjects Age between the group A and Group B was done using Unpaired t test. The mean and SD of age of Group A was 22.10 and 2.292 that of Group B was 22.30 and 1.895 respectively (post reading). After applying unpaired t-test no significant difference between both the groups were found.

Graph No: 4.9 Showing Comparison of Mean and SD of Age of group A and group B between the group



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Table No: 4.10 Showing Comparison of Mean and SD of NSA Ratio values of group A and group B between the groups

Unpaired T Test	PRE	POST
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	NSA RATION		NSA RATION	
	Group A	Group B	Group A	Group B
Mean	1.59	1.59	1.51	1.45
S.D.	0.022	0.021	0.026	0.020
Mean Difference	0.003		0.068	
T Test	0.440		9.140	
P value	0.6625		0.0000	
Table Value at 0.05	2.02		2.02	
Result	Not-Significant		Significant	

Comparison of mean and standard deviation of subjects NSA Ratio between the group A and Group B was done using Unpaired t test. The mean and SD of NSA Ratio of Group A was 1.51 and 0.026 that of Group B was 1.45 and 0.020 respectively (post reading). After applying unpaired t-test significant difference between both the groups were found.

4.10 Showing Comparison of Mean and SD of NSA Ratio values of group A and group B between the groups.

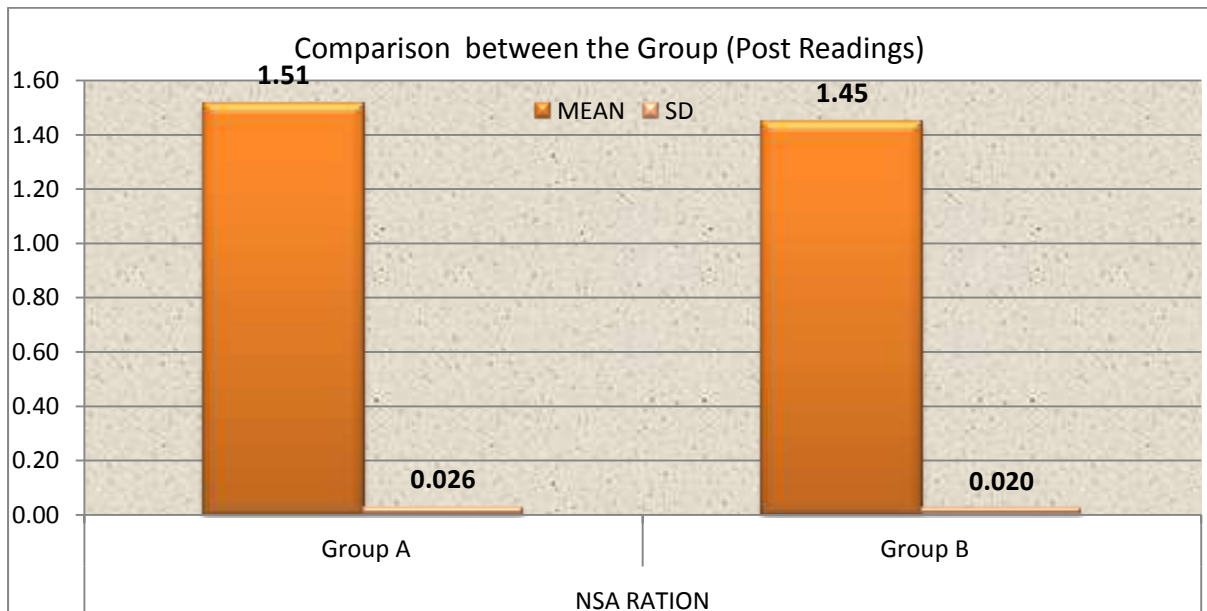


Table No: 4.11 Showing Comparison of Mean and SD of Acromial Distance values of group A and group B between the groups

Unpaired T Test	PRE		POST	
	acr dist		acr dist	
	Group A	Group B	Group A	Group B
Mean	8.60	8.65	7.48	5.03
S.D.	1.210	1.470	1.272	1.219
Mean Difference	0.050		2.450	
T Test	0.120		6.220	
P value	0.9071		0.0000	
Table Value at 0.05	2.02		2.02	
Result	Not-Significant		Significant	

Comparison of mean and standard deviation of subjects Acromial distance between the group A and Group B was done using Unpaired t test. The mean and SD of Acromial distance of Group A was 7.48 and 1.272 that of Group B was 5.03 and 1.219 respectively (post reading). After applying unpaired t-test significant difference between both the groups were found.

Graph No: 4.11 Showing Comparison of Mean and SD of Acromial Distance values of group A and group B between the groups

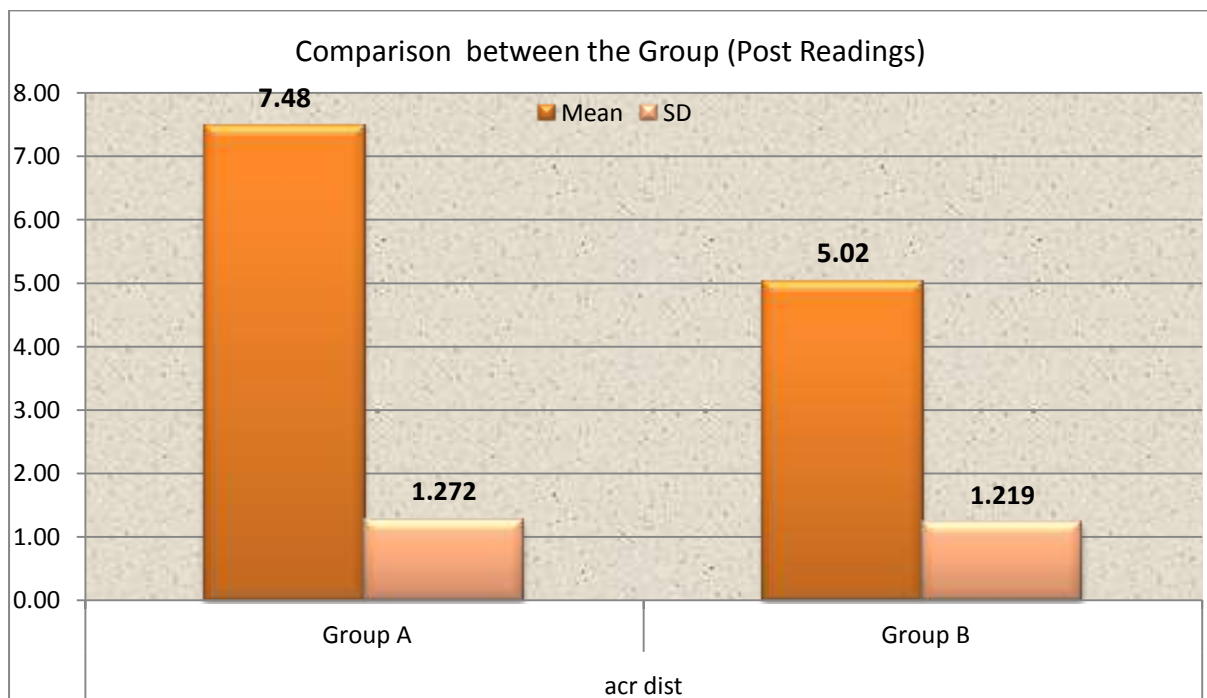


Table No: 4.12 Showing Comparison of Mean and SD of LSST 0 Degree values of group A and group B between the groups

Unpaired T Test	PRE		POST	
	lsst 0 degree		lsst 0 degree	
	Group A	Group B	Group A	Group B
Mean	8.35	8.10	7.35	6.38
S.D.	1.396	1.071	1.523	0.841
Mean Difference	0.250		0.975	
T Test	0.640		2.510	
P value	0.5291		0.0166	
Table Value at 0.05	2.02		2.02	
Result	Not-Significant		Significant	

Comparison of mean and standard deviation of subjects LSST 0 Degree between the group A and Group B was done using Unpaired t test. The mean and SD of LSST 0 Degree of Group A was 7.35 and 1.523 that of Group B was 6.38 and 0.841 respectively (post reading). After applying unpaired t-test significant difference between both the groups were found.

Graph No: 4.12 Showing Comparison of Mean and SD of LSST 0 Degree values of group A and group B between the groups

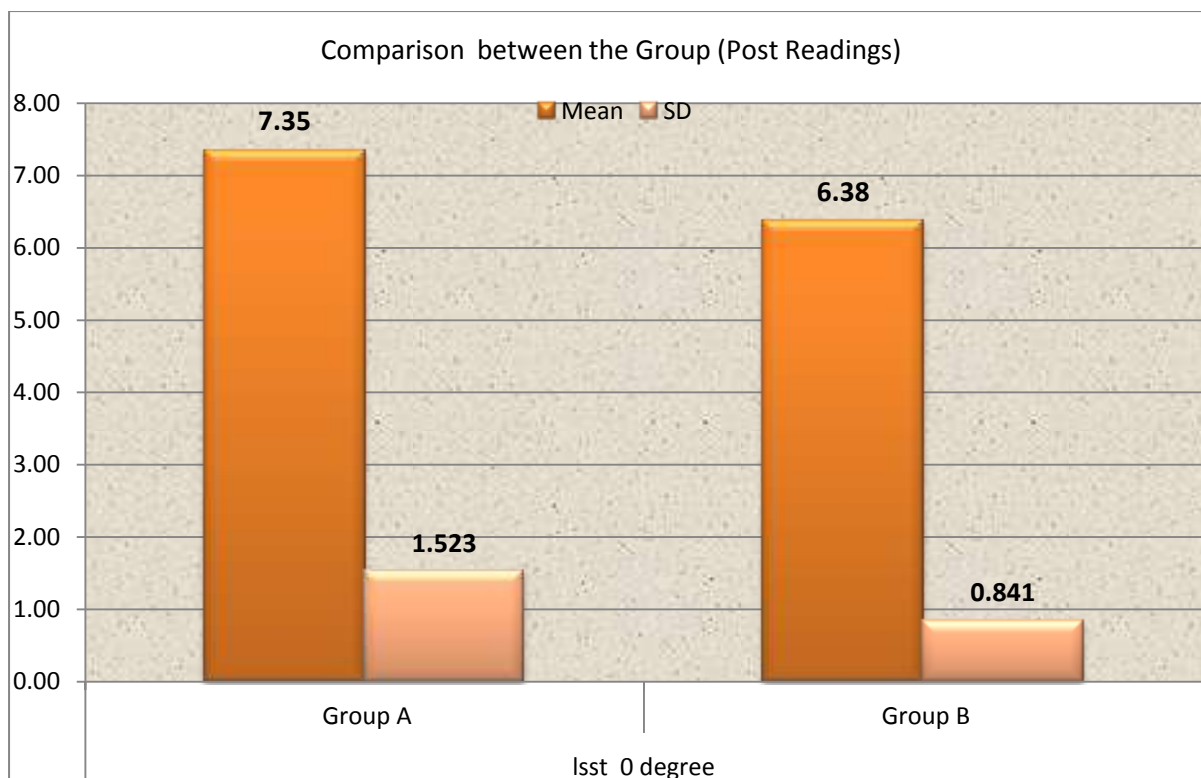


Table No: 4.13 Showing Comparison of Mean and SD of LSST 45 Degree values of group A and group B between the groups

Unpaired T Test	PRE		POST	
	Isst 45 degree		Isst 45 degree	
	Group A	Group B	Group A	Group B
Mean	9.65	9.53	8.75	7.80
S.D.	1.396	1.094	1.500	1.005
Mean Difference	0.125		0.950	
T Test	0.320		2.350	
P value	0.7544		0.0239	
Table Value at 0.05	2.02		2.02	
Result	Not-Significant		Significant	

Comparison of mean and standard deviation of subjects LSST 45 Degree between the group A and Group B was done using Unpaired t test. The mean and SD of LSST 45 Degree of Group A was 8.75 and 1.500 that of Group B was 7.80 and 1.005 respectively (post reading). After applying unpaired t-test significant difference between both the groups were found.

Graph No: 4.13 Showing Comparison of Mean and SD of LSST 45 Degree values of group A and group B between the groups

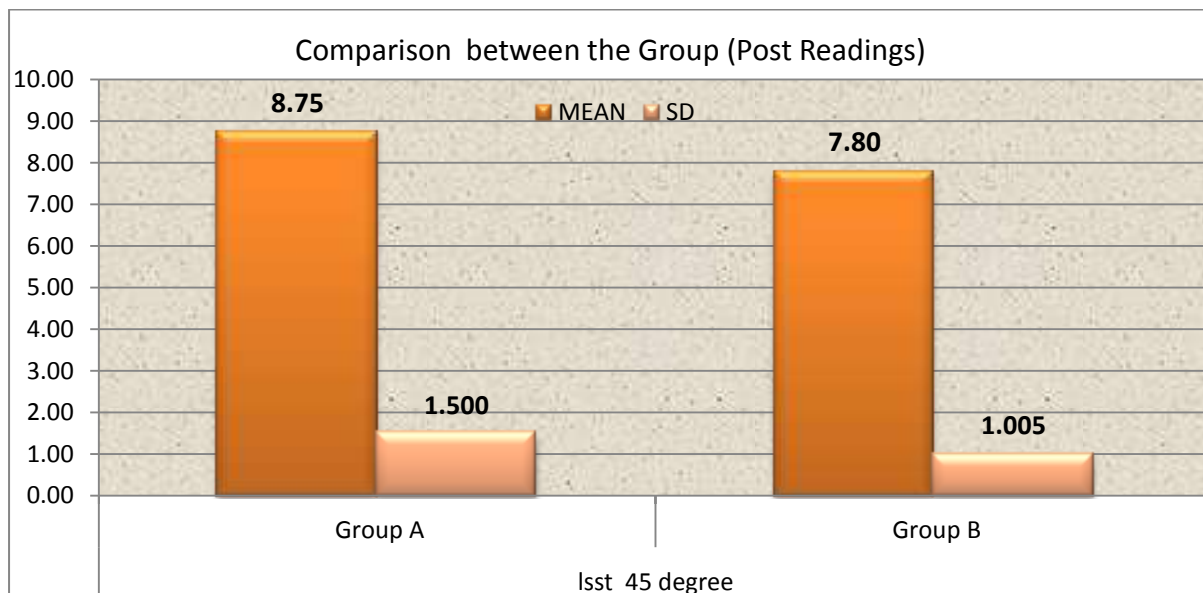


Table No: 4.14 Showing Comparison of Mean and SD of LSST 90 Degree values of group A and group B between the groups

Unpaired T Test	PRE		POST	
	lsst 90 degree		lsst 90 degree	
	Group A	Group B	Group A	Group B
Mean	11.10	11.45	9.95	9.15
S.D.	1.199	0.930	1.213	0.919
Mean Difference	0.350		0.800	
T Test	1.030		2.350	
P value	0.3088		0.0240	
Table Value at 0.05	2.02		2.02	
Result	Not-Significant		Significant	

Comparison of mean and standard deviation of subjects LSST 90 Degree between the group A and Group B was done using Unpaired t test. The mean and SD of LSST 0 Degree of Group A was 9.95 and 1.213 that of Group B was 9.15 and 0.919 respectively (post reading). After applying unpaired t-test significant difference between both the groups were found.

Graph No: 4.14 Showing Comparison of Mean and SD of LSST 90 Degree values of group A and group B between the groups

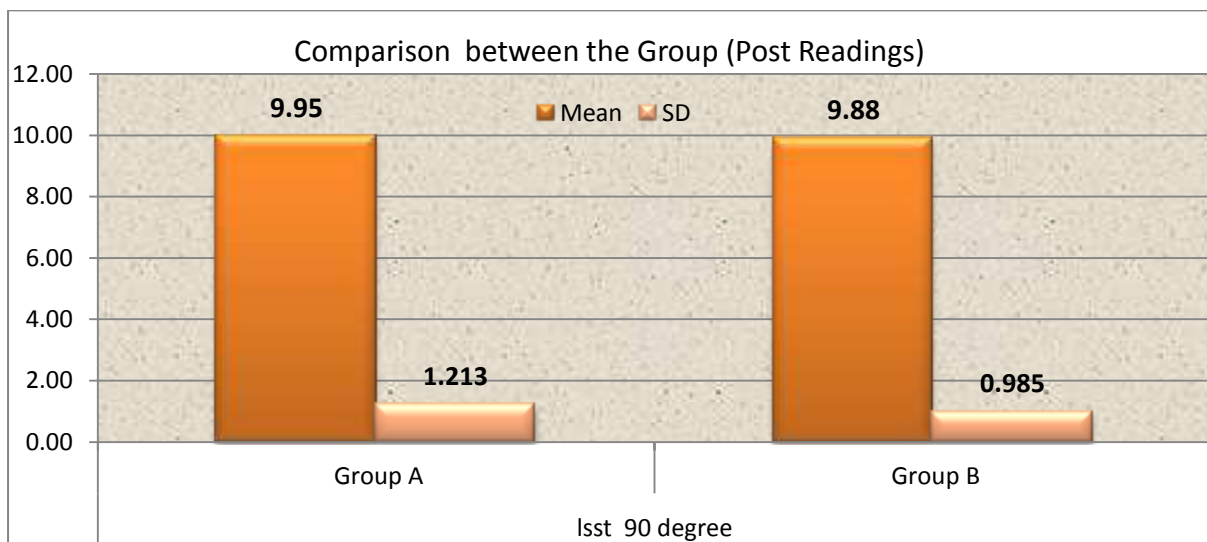


Table No: 4.15 Showing Comparison of Mean and SD of T3 Distance values of group A and group B between the groups

Unpaired T Test	PRE		POST	
	t3dist		t3dist	
	Group A	Group B	Group A	Group B
Mean	8.55	8.10	7.65	5.05
S.D.	1.191	1.314	1.226	1.157
Mean Difference	0.450		2.600	
T Test	1.130		6.900	
P value	0.2635		0.0000	
Table Value at 0.05	2.02		2.02	

Result	Not-Significant	Significant
--------	-----------------	-------------

Comparison of mean and standard deviation of subjects T3 Distance between the group A and Group B was done using Unpaired t test. The mean and SD of T3 Distance of Group A was 7.65 and 1.226 that of Group B was 5.05 and 1.157 respectively (post reading). After applying unpaired t-test significant difference between both the groups were found.

Graph No: 4.15 Showing Comparison of Mean and SD of T3 Distance values of group A and group B between the groups

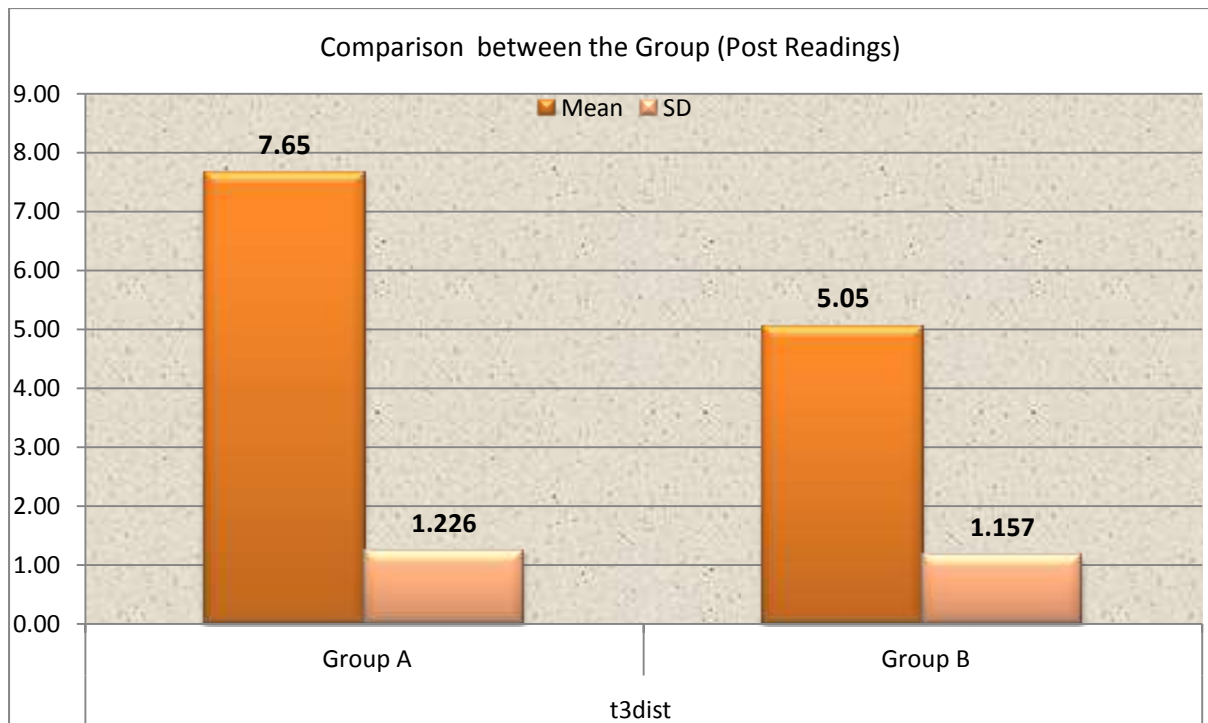


Table No: 4.16 Showing Comparison of Mean and SD of NPRS of group A and group B between the groups

Unpaired T Test	PRE		POST	
	NPRS		NPRS	
	Group A	Group B	Group A	Group B
Mean	3.95	3.95	1.50	1.50
S.D.	0.686	0.887	0.513	0.513

Mean Difference	0.000	0.000
T Test	0.000	0.000
P value	1.0000	1.0000
Table Value at 0.05	2.02	2.02
Result	Not-Significant	Not-Significant

Comparison of mean and standard deviation of subjects NPRS between the group A and Group B was done using Unpaired t test. The mean and SD of NPRS of Group A was 1.50 and 0.513 that of Group B was 1.50 and 0.513 respectively (post reading). After applying unpaired t-test no significant difference between both the groups were found.

Graph No: 4.16 Showing Comparison of Mean and SD of NPRS of group A and group B between the groups

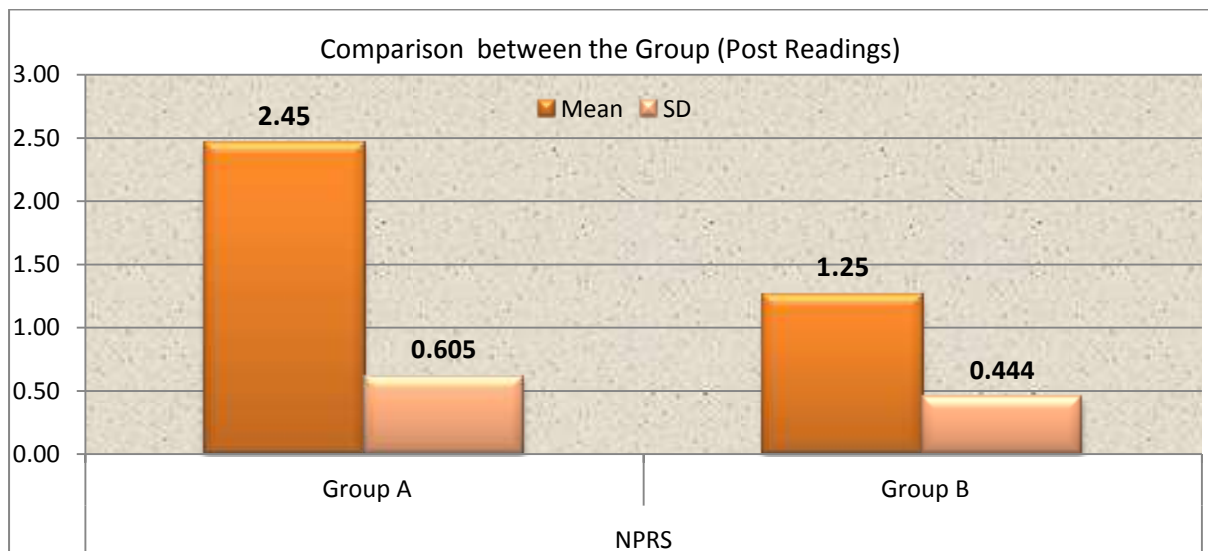


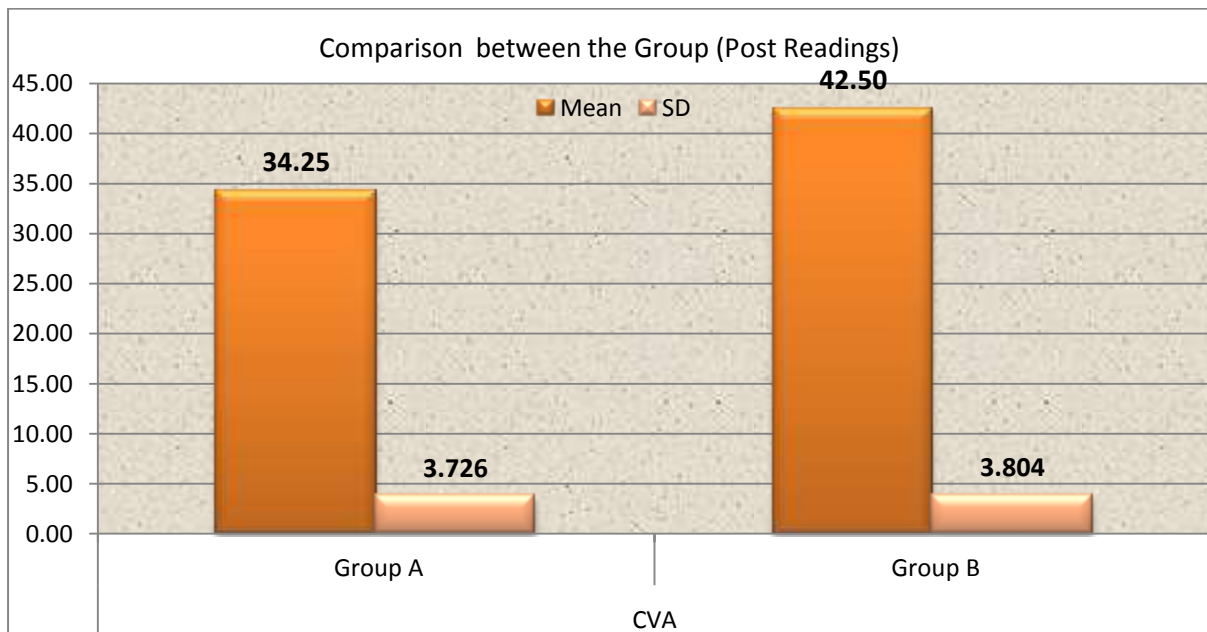
Table No: 4.17 Showing Comparison of Mean and SD of CVA of group A and group B between the groups

Unpaired T Test	PRE	POST
	CVA	CVA

	Group A	Group B	Group A	Group B
Mean	29.00	31.25	34.25	42.50
S.D.	3.479	5.350	3.726	3.804
Mean Difference	2.250		8.250	
T Test	1.580		6.930	
P value	0.1231		0.0000	
Table Value at 0.05	2.02		2.02	
Result	Not-Significant		Significant	

Comparison of mean and standard deviation of subjects CVA between the group A and Group B was done using Unpaired t test. The mean and SD of CVA of Group A was 34.25 and 3.726 that of Group B was 42.50 and 3.804 respectively (post reading). After applying unpaired t-test significant difference between both the groups were found.

Graph No: 4.17 Showing Comparison of Mean and SD of CVA of group A and group B between the groups.



5 DISCUSSION

The results of the current study suggest that the application of Kinesio Tape and rigid tape is beneficiary for the correction of the scapular and cervical alignment in the patients with upper cross syndrome as compared to the conventional treatment . Moreover, patients in both groups experienced improvements in T3 Distance, Acromial distance values, lateral scapular slide test values and NSA Ratio, but it has been seen that individuals who received the cervicothoracic taping exhibited a greater improvement than the standard physiotherapy protocol for upper cross syndrome.

The correction in postural alignment will reduce the associated risks and production of symptoms of upper quadrant musculoskeletal problems for the patient. The continuum of altered posture if there , then the patient will tend to have altered biomechanics. The alteration in biomechanical processes will lead to many of degenerative problems. Some of the complications were headaches, degenerative changes in cervical spine and thoracic spine to tears of rotator cuff, labral tears of the glenohumeral complex and musculoskeletal pain syndromes. This syndrome can start in early stages of life and continue into adulthood. Recurrent neck pain and headaches are among the most commonly occurring pain syndromes in early stages of life. This is a matter of concern because there has been an increase in prevalence of neck pain and/or headaches in childhood and because these pain syndromes more often become chronic in adolescence as well as in adult life. The symptoms can increase in severity causing sufferings for years as well as multiple days to weeks of missed work per year. The affected population of Upper cross syndrome not only keep on missing work which costs the employees and employers millions of dollars yearly these population are also losing time from family and entertainment activities due to upper cross syndrome. Forward head posture causes pain in the neck, headache(cervicogenic), tension headache and migraine headache in adults²¹.

The hypothesis was made in the previous studies that kinesiotaping may have many effects like increasing local circulation, reducing local edema, facilitating the muscles which are targeted, providing a positional stimulus to the skin, muscle, or fascial structures providing proper afferent input to the central nervous system²¹.

The results of the present study are in accordance with the findings of González-Iglesias et al .They have shown a significant improvement in the levels of neck pain and range of motion of the cervical after the short term application of the kinesiotaping; on acute whiplash

disorders in comparison to sham tape³⁰. Similarly, Kaya et al. (2010) compared the effects of kinesiotaping with the traditional physical therapy modalities in patients with shoulder impingement syndrome for two weeks. They found significant decrease in pain levels and disability scores of shoulder, arm in the kinesiotaping group in comparison with the other group³¹.

1)Static scapular alignment: In our study there were significant difference between the values of two groups at $P < 0.05$, participants showed significant difference in NSA ratio, Acromial distance and T3 distance. Acromial distance is one among the reliable parameter to measure static scapular alignment in patients with upper cross syndrome and has shown improvement in patients with cervicothoracic taping then the patients who receive conventional physiotherapy treatment.³²

Changes observed in our study was contradictory to the study done by Neha Dewan et al in which she concluded that there is no significant difference between the box taping group and the group who received conventional treatment. She stated that although there were statistically significant difference between the static scapular alignment in participants but there was no significant difference in dynamic scapular alignment.⁹ Factors which may have contributed to improvement in this study is that we have also included the taping of cervical region, the forward shoulder posture comes along with forward head posture so in our study we have taped both the components rather than concentrating on the scapula only. Moreover in our study the time duration of the study is increased to 4 weeks. This is in accordance with Hall who suggested that minimum two to three weeks of scapula taping is necessary to see improvement in the neuromuscular control³³. Results of our study were similar to the study done by M.J Smith and V. Sparkes in which the effects of stretching and strengthening exercises given for 6 weeks time in competitive swimmers with forward shoulder posture to correct the static scapular alignment²⁰.

2)Dynamic Scapular Alignment: In our study there were significant difference between both the groups in which Lateral Scapular Slide Test was used as a reliable assessment parameter. There was greater improvement noticed in the experimental group as compared to the control group²⁹.

The previous studies suggest that the taping provides feedback and the type of support which is mechanical in nature for optimal shoulder positioning. The type of biofeedback and the time duration of the biofeedback are different in taping as compared to advice and exercise

for optimal posture. Increasing time duration of the biofeedback from the taping application should have many benefits such as allowing of the adaptation of the neural pathways by consistent correct proprioceptive feedback. However, it is possible that with the continuous and repeated application of taping the habituation of the feedback from the application of tape may reduce the feedback effectiveness. Since the increase in the isotonic activity of muscle action directed at optimal posture may be the goal of the treatment, then it is important to know the long term effects of taping that whether it facilitates or inhibits muscle activity⁹.

We conducted measurements of right shoulder in our study. The data shows improvement on right side which could be related to hand dominance as all 40 subjects included in the study were right handed. This is a same approach from previous research involving shoulder measurements to evaluate posture, which evaluated only one shoulder on each subject, usually the right shoulder⁹.

The Implications of this study are:

- (i) stretching-strengthening exercise program which is supervised alone or in combination with box-taping were well tolerated in healthy upper cross syndrome subjects for correction of scapular and cervical alignment; but adherence may be challenging in asymptomatic young individuals.
- (ii) stretching-strengthening exercise program was effective (

$P < 0.05$) in correcting scapular and cervical alignment in asymptomatic students presenting with upper cross syndrome. Therefore, stretching-strengthening exercise program may be a useful measure to prevent and to reduce upper cross syndrome which is considered an etiological factor in development of upper quarter musculoskeletal disorder

5.1 LIMITATIONS

The Limitations of our study is that the length of time is short (i.e 4 weeks) over which it was conducted and the sample size is also small. The Patients knew about the study and was also educated with postural awareness which can also causes some errors in this study. Due to these factors the maintenance of compliance rate of 100% is not possible and when comparing this study to the studies which has to be done in future. Another limitation of this study was that the NSA ratio has both the denominator and numerator which is evaluated by the physical therapist and it might be possible that both the values might have been having some area of doubt.

6.CONCLUSION

The present study among the patients with upper cross syndrome showed an improvement in both Group A(standard physiotherapy treatment) and Group B(cervicothoracic taping).On comparing both the groups the results from data analysis shows that stretching strengthening along with box taping of scapula and neck taping is more effective than only strengthening and stretching of patients with upper cross syndrome.

FUTURESCOPE

Further future studies would need to include a large sample size and an overall lengthening to the period over which the follow up should be made. The blindedness of the patients and evaluator was not possible so that can be implied in further studies that the blindedness of the evaluator should be there.Further research should include long-term effects on the posture as well as evaluation of changes in participants capabilities to carry out the activities of daily living.

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8.1 APPENDIX-1

Inform consent

EFFECT OF CERVICOTHORACIC TAPING ALONG WITH STRETCHING-STRENGTHENING IN UPPER CROSS SYNDROME

I confirm that I have read and understand the information sheet for the above study. I have had opportunity to consider the information, ask question and have had these answer satisfactorily. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without any medical care or legal rights affected. I understand that relevant sections of any of my medical notes and data collected during the study may be looked at by responsible regulatory authorities for research purpose. I agree and give my voluntary consent to take part in the research study.

Investigator: Hardeep oberoi (orthopaedics)

Name of subject:

Date:

Date:

Signature:

Signature:

8.2 appendix - 2

ASSESSMENT FORM

Date/...../.....

Name.....

Age

Gender

Occupation

Address

Chief complaint-

History of present illness-

Past history -

Surgical history-

Pain evaluation

Site : localised to neck/generalised/other

Side: Right/ Left/Central/other.....

Onset: Sudden/ Gradual/Insidious

Duration :

Type of pain : Superficial/Deep/dull/diffuse/cramping/sharp/shooting/throbbing

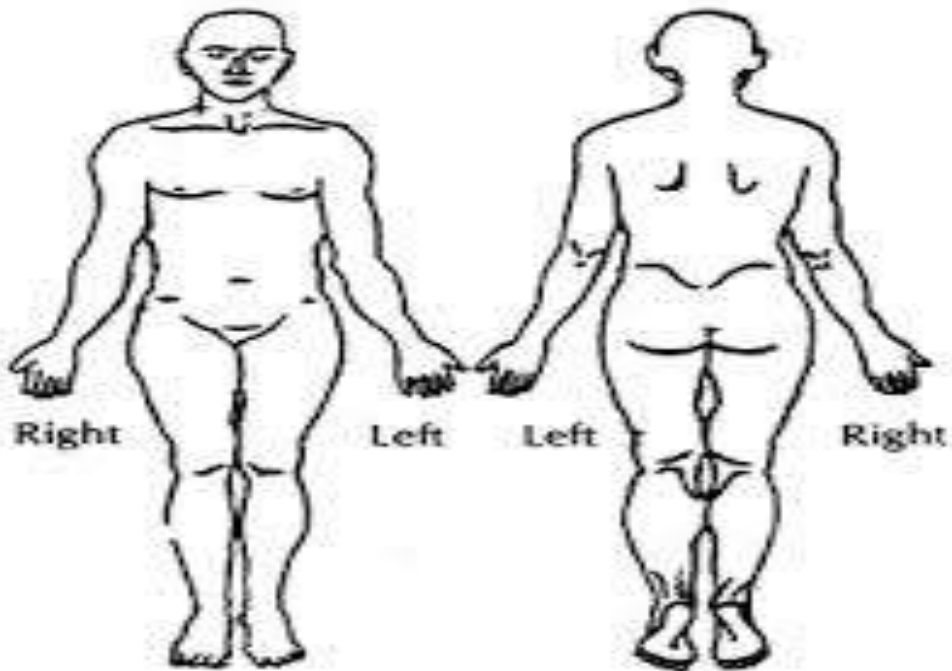
Aggravating factors:

Relieving factors:

Intensity of pain : NPRS

0

10



On Observation

Any deformity: present/absent

If present, type of deformity:

-Posture

(Anterior view)

Ear height/head tilt/rotation

Clavicles level

Shoulders levels

Rib cage level /rotated

Arm gap-compare sides

Iliac crest – height

Knuckles-direction

Finger tip levels

Knee –bowed,knocked

Feet –direction,arch,weight bearing(shoes)

(Lateral view)

Head position-foreward?

Cervical curve –increased or decreased

Shoulder alignment (rounded/not)

Thoracic curve-increased/decreased

Lumbar curve-increased/decreased

Pelvis –ASIS v PSIS- Tilt foreward /backward

Knee –alignment

Ankle –alignment

(Posterior view)

Ear height/head tilt/rotation

Level of shoulder

Scapula level/prominenece

Spine –alignment(scoliosis)

Arm gap-compare sides

Iliac crest –hieghts

Knees –bowed/knocked

Ankles-fall in /out

Feet-arch

On palpation

Cervical range of motion (active) evaluation chart

Cervical AROM	Pre test readings	Post test readings
Flexion		
Extension		
Rt/Lt side flexion		
Rt/Lt rotation		

Shoulder AROM

Shoulder AROM	Pre test readings	Post test readings
Flexion		
Extension		
Medial rotation		
Lateral rotation		
Abduction		
Adduction		

Elbow AROM

Elbow AROM	Pre test readings	Post test readings
Flexion		

Extension		
-----------	--	--

Wrist AROM

Wrist AROM	Pre test readings	Post test readings

Assessment of forward head posture

	Pre test readings	Post test readings
Craniovertebral angle		

Muscle flexibility test

Muscle tightness: present/absent

If present specify the muscle :

Special tests

-cervical distraction test

-Cervical compression test

-Adson test

-Lhermitte's sign

-VBI test

Provisional diagnosis

8.3 MASTER CHART

Group A																		
			NSA RATION		acr dist		lsst 0 degree		lsst 45 degree		lsst 90 degree		t3dist		NPRS		CVA	
Group	Gender	Age	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
A1	F	20	1.59	1.48	7.5	6.5	7.5	6	8	7	9	8	8.5	7.5	3	1	25	30
A2	F	22	1.58	1.5	7	5.5	7	6	8	7	10	9.5	7.5	6.5	4	2	25	30
A3	F	23	1.56	1.5	9	7	8	6.5	9	8	11	10	7	6	4	1	30	35
A4	F	20	1.57	1.48	8	6.5	7	6	10	9	11	9.5	7.5	6.5	4	2	35	40
A5	F	19	1.6	1.5	7	5.5	6.5	5	8	7	10	8.5	8	7	5	1	25	30
A6	F	22	1.62	1.55	9	7.5	7.5	6.5	9	8	10	8.5	7	6	5	2	30	35
A7	F	22	1.56	1.5	7.5	6.5	7	6	8	7	10	8	8.5	7.5	4	2	30	40
A8	F	26	1.62	1.57	7	6	8	7	9	8	11.5	10	7	6.5	5	2	25	35
A9	F	24	1.57	1.52	8.5	7.5	7.5	7	9	8	10	9	8.5	7.5	3	1	30	35
A10	F	23	1.58	1.5	8	7	8.5	7.5	10	9	11	10.5	7.5	6.5	4	2	30	35
A11	F	22	1.62	1.55	7.5	7	7	6.5	9	8	10	9.5	8	7	3	1	35	30
A12	F	18	1.6	1.53	8	7	7.5	6	9	8	10.5	9.5	8	7.5	3	1	25	30
A13	F	19	1.56	1.49	8.5	8	8	7	9	9	11	10	8.5	7.5	4	1	30	35
A14	M	24	1.56	1.48	10.5	9.5	10	9	12	11	12.5	12	10.5	9.5	4	2	30	35
A15	M	23	1.58	1.5	9	8	9	8	10	9	11.5	11	9	8	4	1	35	40
A16	M	27	1.58	1.51	9.5	8	9.5	8.5	11	10	12	11	9.5	9	4	1	25	30
A17	M	24	1.63	1.54	10	9	10	9	12	11	12.5	11.5	10.5	9.5	3	1	25	30
A18	M	22	1.59	1.53	9.5	8.5	9.5	9	11	10	12	10	9.5	8.5	4	2	30	35
A19	M	21	1.58	1.52	11	10	11.5	10.5	13	12	13.5	12	10.5	10	4	2	30	35
A20	M	21	1.6	1.54	10	9	10.5	10	12	11	13	11	10	9	5	2	30	40
			1.59	1.51	8.60	7.48	8.35	7.35	10	9	11.10	9.95	8.55	7.65	3.95	1.50	29.00	34.25

GROUP-B

Group B																		
Group	Gender	Age	NSA Ratio		acr dist		lsst 0deg		lsst 45 deg		lsst 90 deg		t3 dist		NPRS		CVA	
			Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
B1	F	24	1.58	1.45	8	4	7	6.5	9	8	11	9	7	3.5	6	2	25	40
B2	F	22	1.61	1.46	10	5	8	7	10	9	12	10	8	4.5	4	2	30	45
B3	F	24	1.59	1.42	9	4.5	7	5.5	9	7	11	8.5	7	5	4	1	30	45
B4	F	19	1.6	1.43	7	3.5	9	7	10	8	12	9.5	7.5	3.5	5	2	35	45
B5	M	21	1.62	1.45	12	5	10	8	12	10	13	11	11	5	4	2	25	40
B6	F	21	1.57	1.42	9	4	7	5.5	8	7	11	8.5	7.5	3.5	3	2	25	40
B7	F	22	1.55	1.41	7	3.5	8.5	7	9	8	12	9.5	6.5	5	4	2	30	40
B8	M	21	1.58	1.43	11	6	7.5	6.5	9	8	12.5	9.5	10	5.5	5	2	25	40
B9	F	23	1.6	1.48	7	4	7	5.5	9	7	10	8	7	4	3	1	35	45
B10	F	22	1.62	1.47	7.5	4.5	7.5	6	9	7	10	8	7.5	4.5	4	1	40	45
B11	F	18	1.59	1.43	7.5	4	7.5	6	9	8	11	9	6.5	4	5	2	30	40
B12	F	25	1.56	1.45	8	5.5	8	6.5	10	8	11.5	9	7	4	4	1	30	40
B13	F	24	1.58	1.46	8	5.5	7	5	9	7	10	8	8	5.5	3	1	35	45
B14	F	24	1.58	1.45	7.5	4	7.5	5.5	9	7	11	8	7.5	5.5	5	2	40	45
B15	F	24	1.63	1.48	7	4	7	5	9	7	10.5	8.5	7.5	5	3	2	35	45
B16	M	22	1.61	1.47	9	6.5	9	7.5	11	9	11.5	10	9	6.5	4	1	40	50
B17	M	21	1.59	1.44	8.5	6.5	9.5	7	11	9	12	10.5	8.5	6	3	1	25	35
B18	M	21	1.57	1.45	9.5	6	8.5	6.5	10	9	11.5	10	9	6	4	1	25	35
B19	M	23	1.58	1.43	10	7.5	9.5	7	11	8	12.5	9	10	7	3	1	30	45
B20	M	25	1.6	1.46	10.5	7	10	7	12	9	13	10	10	7.5	3	1	35	45
			1.59	1.45	8.65	5.03	8.10	6.38	10	8	11.45	9.18	8.10	5.05	3.95	1.50	31.25	42.50

8.4 Appendix -4

TREATMENT PROTOCOL

Group A = In this group 3 patients were taken. They were given stretching- strengthening exercise program along with postural awareness over upper trapezius, levator scapulae, pectoralis major. The treatment session lasted for 4 weeks in a total of 5 days per week.

Group B = In this group 3 patients were taken. They were given cervicothoracic taping along with stretching-strengthening exercise program and postural awareness. Here the taping technique used was box taping for the scapula along with neck taping. In Box taping patients were instructed to fully retract and depress the scapula. Two horizontal strips of tape were used to draw the medial border of scapula together and two vertical strips were used to facilitate thoracic extension. One horizontal strip extended from superior angles of one scapula to superior angle of other scapula and other horizontal strip extended from inferior angle of one scapula to inferior angle of other scapula. the vertical strips overlap the horizontal strips. Neck taping was such that two strips (I and Y) of the tape were used , Y strip started from thoracic vertebrae 3-5 to the occiput of the skull, and I strip was put at middle of the neck horizontally.

8.5 APPENDIX-5

ASSESSMENT TOOLS

1 Plumb line

2 Numerical pain rating scale

3 Measuring tape , protractor

4 Goniometer (Universal)

CERVICOTHORACIC TAPING ALONG WITH STRETCHING STRENGTHENING EXERCISE PROGRAM FOR UPPER CROSS SYNDROME

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Description

Upper Cross Syndrome (UCS) is defined as “tightness of the upper trapezius, pectoralis major, and levator scapulae and weakness of the rhomboids, serratus anterior, middle and lower trapezius, and the deep neck flexors, especially the scalene muscles. It has been seen that taping along with the exercise program can be an effective choice of treatment

Purpose

There are very few researches done on taping along with exercise program in patients with upper crossed syndrome. The purpose of this study is to provide better treatment options in upper crossed syndrome by providing estimates of box taping and neck taping in combination with stretching – strengthening program for upper crossed syndrome.

Relevance

The findings of the study will be relevant in the treatment of UCS treatment. The main relevance of this study is that if this proved significant then the prognosis time of the UCS treatment will be reduced and this protocol will be used in clinical practice in treatment of UCS. The findings of the study will also provide baseline information to physiotherapy community by creating a time saving and more effective treatment protocol for upper crossed syndrome

Participants

For the current study data was collected from 40 respondents (18-30 years) participated in the study. These respondents were randomly divided into two groups A and B. Group A (20 subjects) was the control group in which only the strengthening and stretching was given and the another is Group B (20 subjects) experimental group in which stretching strengthening along with box taping of scapula and neck taping was given.

Method

All participants who fall into the inclusion criteria were evaluated and given exercise program and experimental group has been given cervicothoracic taping along with exercise program and control group has been given only exercise program.

Data Analysis

Descriptive statistics was calculated for the respondents. In addition, the values for Acromial distance, NSA Ratio, L.S.S.T, T3 Distance, CVA, & NPRS were calculated for each individual patient irrespective of the group. Independent sample t-test was used for checking the statistical difference between these values for the two groups.

Results

SPSS 19 was used for data analysis and it was explored that there was a significant difference between the values for values for Acromial distance, NSA Ratio, L.S.S.T, T3 Distance and CVA between group A and group B ($p < 0.05$) supporting in favour of our argument that patients in Group B have better statistical results when compared with the patients of Group A. Complete and detailed data analysis results will be shown further.

Conclusion

The results from data analysis shows that stretching strengthening along with box taping of scapula and neck taping is more effective than only strengthening and stretching of patients.

Implications

Findings of the study have direct implications for physiotherapist dealing with Upper Crossed Syndrome as it was found that Cervicothoracic taping is useful along with exercise program in patients with upper crossed syndrome.

Keywords: Upper Crossed Syndrome, Box Taping, Normalised Scapular Abduction Ratio.
